CRITICAL THINKING IN A CASE - *BASED* AND A TRADITIONAL NURSING EDUCATION PROGRAM

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DEDICATION

To my wife Mona and two sons Mohammad and Ahmad,

My father in law, Mr. Mohammad Khachchan,

My brother in law, Mr. Imad Khachchan, and

All the critical thinkers; educators and students

This one is dedicated for you.

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DECLARATION

Except for referenced citations in text, this is the

researcher's original work

Mahmoud Ali Kaddoura

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ABSTRACT

Up to 1998, the Institutes of Nursing in the United Arab Emirates have been using the traditional lecture-based teaching/learning process in their graduate-nursing program. In 1998, however, these Institutes adopted a new approach; namely, the case-based learning (CBL) for the education of their nursing students. This approach emphasizes the use of self-directed and cooperative learning that is supposed to help students increase their critical thinking (CT) level. As the students were experiencing changes in the teaching practices, it was important to determine the effect of the teaching and learning approaches on students' CT abilities, and to describe suggestions needed for improvement. Empirically, very little is known regarding the influence of CBL on a student's CT. The question then remains, as to whether students who have undergone case-based learning, differ significantly in their CT abilities from those who studied in the traditional method. This study investigates the critical thinking skills in relation to two types of nursing educational programs: (a) the traditional teaching and (b) the case-based learning. The professed purpose of the study in hand is to measure and compare the level of critical thinking in participants from each of the two programs. The instrument of measurement guiding this study is the model developed by Facione and Facione (1998). The design has been a comparative descriptive survey. The critical thinking abilities were measured by

the CCTST, which was administered to 38 participants from the traditional curriculum and 65 from the case-based learning curriculum who agreed to participate in the study. When the scores were analyzed by using the independent sample t - test, this study found that, in general, participants from both programs performed badly on the CCTST. Nevertheless, the CBL program participants performed significantly better when compared to the traditional program participants in all aspects of the CCTST.

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CHAPTER ONE

INTRODUCTION

Statement of the Problem

The world of nursing in today's fast paced and technologically advanced world is changing daily, and the challenge for the nursing faculty is to teach their students critical thinking skills and the ability to function competently in varied situations (Huff, 1997). Because of the rapidly changing nature of the health care system, nurses are presented with increasingly complex practice issues with no clear solutions. Memorizing groups of facts and disease entities does not adequately prepare nursing students for the unpredictable clinical situations they may face in practice. Rather educators have to empower them with skills that will promote confidence and creativity in finding solutions to complex problems (Mastrian & McGonigle, 1999). Promoting these critical thinking (CT) skills in nurses represents an additional challenge for the nursing faculty since the development of such skills requires that students become active participants in their learning (Mastrian & McGonigle, 1999).

Active learning is thus described as one wherein students are thinking about the material, processing it intellectually, and developing an understanding of it, rather than simply listening passively, taking notes, and planning to memorize them later. Active learning strategies develop the information-processing and meta-cognitive skills that are essential components in CT (Bain & Travis, cited in Elliott, 1996). Active learning is further defined in the context of the classroom as anything that involves students in doing things and thinking about what they are doing. It might thus include a spectrum of activities; a shift from a modified lecture format to role-playing, simulation, and games in case-based learning (Bonwell & Eison, 1991).

A major strategy that promotes students' active learning and provides practical preparation for clinical practice is teaching with case studies. Case discussion solicits students' ideas and participation, as these cases put them in the position of doing analysis and deciding on a course of action (O'Connell & Bates, 1976). In agreement with O'Connel and Bates, Cox (1998) maintains that when used effectively, CBL can facilitate a systematic, theoretical approach to client problems, empower students to become their own teachers, and engage students and their teacher in analytical dialogue about clinical nursing situations. Furthermore, the small-group class structure in case-based learning elicits active participation from the learners and supports professional practice goals by encouraging relatively egalitarian learner-teacher interactions. Students' self-direction has to increase as the teacher's imposed structure decreases (Ulrich & Glendon, 1995).

Thus, case-based learning enhances self-directed learning (SDL) because the students work on their own. They need to read and seek as much information as possible on the task, check with and discuss it with members of their group (Gwele, 1999). However, when using case-based curriculum, students need to be prepared for this methodology. They need to be oriented to the principles of critical thinking and its skills (Uys, 1998).

Critical thinking has become an end target in most schools of nursing today. No matter what type of program students have previously attended, this skill is fundamental to their performance (Nicoteri, 1998). Hence, in nursing schools, faculty strive to prepare nurses who think critically, who assess patients from both physical and psychosocial perspectives, identify relevant problems, and develop individualized plans of care (Jones & Sheridan, 1999).

Case-based learning is rivalled only by problem-based learning (PBL) in terms of popularity as an approach for helping students to develop independent and critical thought as

well as preparing them for the reality of clinical nursing practice. Yet, very little has been done in terms of empirical research comparing the influence of various teaching/learning approaches, specifically traditional lecture-based teaching and case-based learning, in terms of facilitating the development of critical thinking skills.

Background and Significance of the Problem

Nurse educators have traditionally used a didactic model to deliver instruction in the classroom. Loving and Wilson (2000) maintain that faculty use the didactic model to design instruction because of their adherence to the traditional educational philosophy underpinning all didactic educational programs. Such programs embrace the behavioral model of education, and have resulted in content-driven, teacher-centred curricula, in which the teacher is perceived as the only information dispenser and is primarily responsible for evaluation (Gould & Bevis, cited in Marcinek, 1993). It follows that the traditional classroom is teacher centred, with students being spoon-fed the information given by the lecturer, who is in the position of authority, and subsequently the teacher decides all about the teaching learning process (Mulholland, 1994; Cravener, 1997). A prominent feature of such an educational philosophy is a hierarchical view of teacher and students; where faculty teach and are in a superior position, and students learn and are in an inferior position (Loving & Wilson, 2000).

Such a traditional teaching/learning environment tends to produce shallow, surface thinkers who rely on rote memory rather than understanding (Mulholland, 1994). Hence, the uniform environment of the large group lecture is apparently no longer considered effective in the promotion of learning; as the outcomes of didactic learning fail to exhibit a patient-oriented, critically-thinking nurse capable of adequate decision making in practice (Heliker, 1994).

The Ministry of Health (MOH) in the United Arab Emirates (UAE) established the Institutes of Nursing in 1973 in order to prepare a qualified nursing workforce that can meet the demands of the country. Since then, these institutes have been the major providers of nursing staff in the UAE. The core curriculum at the beginning was basic education for 18 months post preparatory school level for both males and females. However, since 1993 these Institutes have been preparing only female nursing graduates through a three-year diploma-nursing program (MOH Institutes of Nursing, UAE, cited in Gwele, 1999).

The increasing health demands of the nation of the UAE and the need to keep abreast with the standards of practice, in addition to providing higher educational levels and opportunities for continuing education made it incumbent that a BSN university level program be set up. This need was met by the University of Sharja, which set up a BSN program a year ago. Additional providers of nursing graduates in the UAE are the Higher Colleges of Technology that provide their graduates with a higher Diploma in Nursing.

The nursing profession in the UAE has been facing many problems, one of which is that most of its personnel are not from the UAE nationality, but expatriates from multinational backgrounds. Currently, the authorities have recognized the need to equip the country with its own people who can better understand the culture of the nation and the health care needs of the patients and save the future of the health care. Although the expatriates' contributions to health care are not to be underestimated, concerns are being raised as to cost versus quality of health care.

The Institutes of Nursing have a great deal of involvement in the decision making and the shaping of the health policy within the UAE. The staff of the MOH Institutes of Nursing in the UAE have recognized the significance of critical thinking in nursing education. So, they sought ways in which students graduating from their nursing program could be equipped

to meet the challenges presented by the demand for independent thought in clinical decision making. Subsequently, a strategic review of the three-year diploma-nursing program took place in 1997. This led to a complete review of the curriculum for the three-year Diploma in Nursing, including the Institutes' philosophy of nursing and education. Hence, the following statement of philosophy which embodies the new trend:

> Nursing care follows a process of assessment, planning, implementation, and evaluation and involves key processes such as problem solving, critical thinking, communicating, caring, and collaborating with others (MOH Institutes of Nursing, UAE, in Gwele, 1999, p. 29).

In the same document, the teaching/learning process is aptly described as:

> .... an interactive process that involves a learner and a teacher who is responsible to facilitate students' learning using student-centered approaches in the process such as self-directed learning and case-based learning emphasizing critical thinking and problem solving both in the classroom and in the clinical settings (MOH Institutes of Nursing, UAE, in Gwele, 1999, p. 30).

In 1998 the diploma program was duly changed to adopt a case-based curriculum. Prior to these changes, the primary mode of instruction was the traditional teacher-centred lecturing. Nonetheless, some courses, specifically anatomy and physiology given during the first year, and microbiology given during the second year, are still being taught via the

didactic lecturing manner. Otherwise, all the nursing courses are being offered in the case-based method.

In keeping with its mission statement and policy for teaching, the majority of the tutors at the MOH Nursing Institutes have been attending workshops developed by experts in the field of case-based education in order to help faculty understand the dynamics of case-based pedagogy. Likewise, workshops on study skills, cooperative learning, and self-directed learning were conducted for student nurses. This program has now been in operation for three years. Whether or not a case-based teaching/learning process makes a difference in terms of nursing students' CT abilities is an important question. This applies not just for the UAE's MOH Institutes of Nursing, but for nursing education globally, as the world of nursing education in an effort to prepare critical thinking nurses is constantly being faced with difficult curricula choices.

Essentially, this study attempts to answer the following question raised: " Will there be a significant difference between the CT ability of nursing students in CBL program and those who have recently graduated from a traditional lecture-based educational program?"; i.e., to gauge the effect of CBL on promoting CT in nursing students. It does so by examining the critical thinking skills of two groups: nursing students and recent graduates from two different curricula approaches, i.e., a case-based learning program and a traditional nursing program to see whether there are any significant differences that warrant further research or encourage further implementation of the case-based curriculum. In other words, the purpose of the study in hand is to compare differences in the critical thinking ability of the participants from the two aforementioned types of nursing educational programs.

Review of various Theories and/or Models of Critical Thinking

There is no standard model for CT (Brooks & Shepherd, 1990). One model, though, has been proposed by Ennis (1987), according to whom, CT is not equivalent to higher order thinking skills, partly because that idea in itself is so vague. Critical thinking is rather seen as a practical activity that includes most of the directly practical, higher order thinking skills, in addition to dispositions, which would not be included in a listing of skills. Critical thinking is thus described as reasonable reflective thinking that is focused on decision making regarding what to believe or to do. It is further postulated that this process of reflectively and reasonably deciding what to believe or do could still be broken down into a set of CT dispositions and abilities. These dispositions and abilities are designated as goals for a critical thinking curriculum (Ennis, 1987).

While the dispositions include: seeking a clear statement of the question, seeking reasons, trying to be well informed, using credible sources, taking into account the total situation, using one's CT abilities, and being sensitive to the feelings and level of knowledge of others; the abilities include: focusing on a question; analyzing arguments; asking, answering, clarifying, and/or challenging questions; and observing and judging the credibility of a source. As to making inferences, these include three interdependent kinds: deducing and judging deductions, making value judgements , and inducing and judging inductions (generalizing and inferring explanatory conclusions and hypotheses that are supposed to explain the fact). Next, the CT abilities involve identifying assumptions, deciding on action, and interacting with others in discussions, presentations, or debates. To sum up, the basic areas of CT ability, according to Ennis, are clarity, basis, inference, and interaction (1987).

Another critical thinking theoretical framework was conceptualized by Paul (cited in Elliott, 1996). This framework describes CT as one that well defines its purposes and goals,

precisely frames a question or problem, and carefully checks information for its completeness and relevance. Paul added that CT is sensitive to ideas and concepts; can trace implications and consequences, and can appreciate multiple perspectives and ways of looking at things (cited in Elliott, 1996).

This definition incorporates specific skills that can be practiced and refined in a classroom setting if educators are willing to plan for active student involvement. Educators can plan active learning strategies that engage students in thinking about the content, framing questions, identifying assumptions, and predicting consequences. If students are to use information this way, they can become active participants in the learning process, rather than passive recorders, merely recording lecture content (Elliott, 1996). The three basic dimensions of CT, according to Paul (cited in Sedlak & Dohney, 1998), are the following:

1. Elements of reasoning: Examples of these elements are identifying assumptions, raising problems, and recognizing implications and consequences.
2. Abilities of reasoning: Examples of these abilities are developing perspectives, questioning, clarification of issues, generating solutions, and comparing corresponding solutions.
3. Traits of reasoning: These are effective attitudes and traits, such as humility, courage, confidence, fair-mindedness, integrity, and thoughts underlying feelings.

Paul (cited in Chubinski, 1996), proposed that in order to think critically, students have to own the ability to recognize clues and make connections between clues in order to understand the rationale of things. Summarizing classmate's comments and describing divergent views is, according to Paul, one way to recognize the assumptions and views of others. Deciding what is a fact, unreality, or opinion is another part of the critical thinking skill of examining data, Paul asserted.

A CT framework in nursing curricula evaluation has been developed by Miller and Malcolm (1990), based on the components suggested by Watson and Glaser. This model aptly illustrates the interaction of attitude, knowledge, and skills in the resulting levels of critical thinking attained in nursing curricula.

Attitudes denote a frame of mind, and an attitude of inquiry that recognizes the existence of problems. This attitude of inquiry, and using a questioning process permeates the CT process. To think critically, assumptions should be questioned. Attitudes of both faculty and students are derived from personal life experiences. Attitudes and assumptions regarding education are the result of prior educational practices. The assumption is usually that students consider education in its traditional sense wherein the teacher gives them the information. The teacher is in charge of what is to be taught with very little input on the behalf of the students. This has been taking place because the major assumption is that the faculty is always right and knows the best. Whereas the learning process, Miller and Malcolm assess, should be a "dynamic interactive process" (1990, p. 70), these authors contend that both students and teachers make efforts to integrate and apply the nursing knowledge to provide the best client's care.

Knowledge of real situations in nursing is necessary to think critically about nursing problems. This knowledge base, upon which one builds his/her arguments, involves weighing the accuracy and logic of the evidence, and understanding the nature of valid inferences, abstractions, and generalizations. Miller and Malcolm (1990) proposes that CT is not only required in the application of existing knowledge in the formation of safe, appropriate nursing judgements, but also it's essential in developing knowledge base of the discipline.

Skills in applying these attitudes and knowledge are also required. Thinking critically can be learned by maintaining an open attitude of inquiry, asking questions, analyzing,

making theoretically-based hypotheses, testing inferences, reflection on and examining the situations prior to drawing conclusions, and evaluating assumptions and interventions. Nurse educators usually think of skills as being merely psychomotor; however, it can also be cognitive in nature such as the CT skills. Cognitive skills that manipulate knowledge in the process of CT include organizing, assembling evidence, discriminating comparisons, evaluating, and developing criteria for evaluation (Miller & Malcolm, 1990).

Another CT model for nursing judgement that emphasizes the reflective nature of CT has been developed by Yahiro and Saylor (1994) based upon the works of Ennis (1987), Kurfiss (cited in Mastrian & McGonigle, 1999), and Norris (1985). This model includes components of nursing experience, competencies, and standards and defines the CT process as "a reflective and reasonable thinking about nursing problems without a single solution and is focused on deciding what to believe and do" (Yahiro & Saylor, 1994, p. 352). This critical thinking model defines the outcome of CT as the clinical judgement of nurses relevant to nursing problems in a variety of settings. The five components of critical thinking for nursing judgement, according to these authors are: specific knowledge, experience, competencies, attitudes, and standards in nursing.

The nursing environment thus provides the context that constrains or facilitates CT. Nursing students are often urged to memorize in order to retain factual information. In such environments, nursing students are discouraged from developing their CT abilities. Characteristics of a learning environment conducive to critical thinking are flexibility, creativity, support for change, and risk taking. In addition to environment, Yahiro and Saylor (1994) maintain that individual characteristics influence one's CT ability. Age, culture, gender, ethnicity, socio-economic status, intelligence, and level of development may affect the components of critical thinking, which in turn influence one's level of CT.

Although the CT concepts as appear in the models advanced by Ennis (1987), Paul (cited in Elliott, 1996), Miller and Malcolm (1990), and Yahiro and Saylor (1994) are prominent and influential, the model chosen for this research is the model developed by Facione and Facione (1998) since it is found relevant to diploma nursing education and hence, more appropriate to guide this study. Facione and Facione purport that the concept of critical thinking has different meanings among different researchers. The present study has adopted the Faciones' theoretical framework as it is based upon a clear consensus definition of CT by expert researchers and theoreticians, whose description of CT is relevant to this research study question.

The Framework Guiding the Study

The theoretical framework for this study is based on the conceptualization of critical thinking as consisting of the two dimensions of cognitive skills and affective dispositions developed by the Delphi research project on CT. This two-year research project consisted of a panel of 46 experts in the fields of education, philosophy, psychology, and other physical and social science disciplines drawn from the United States and Canada. The goal of the research project was to achieve a consensus regarding what to expect of college students in terms of CT. This was the first consensus of the domain of CT among experts in the field (Facione & Facione, 1998). The panel's work produced a list of core CT skills and dispositions crucial to becoming a good critical thinker. A complete description of an ideal critical thinker appears in the "definition of terms / critical thinking" section.

As already mentioned, the concerned panel conceptualized critical thinking in terms of two dimensions: (a) cognitive skills and (b) affective dispositions. There was a strong consensus that cognitive skills at the core of CT include analysis, evaluation, inference, interpretation, and explanation. These skills are employed interactively in a reflective

reasoning process of making a judgement about what to believe or to do. These skills are needed to address problems, consider alternatives, and make decisions about what to believe or do. In thinking critically, a person not only attempts to determine reasonably what to do or what to believe, but in doing so, the person is also able to apply the core of CT skills to one another (Facione & Facione, 1998).

The affective dispositions, on the other hand, are viewed by Facione and Facione (1998) as one's inclination to use CT skills as the habits of mind. These are elements in our character that drive one towards using CT. Developed through a consensus of the panel, the list of affective dispositions characterizes the traits of good critical thinkers as follows:

1. Inquisitiveness: A measure of intellectual curiosity and enthusiasm to acquire knowledge and to learn explanations even when the applications of the knowledge are not immediately apparent.

2. Systematicity: Valuing organization, use of an orderly and focused process in the inquiry stage in the approach of complex problems.

3. Analyticity: Demanding the use of reason and evidence to resolve problems and anticipating consequences.

4. Truth seeking: Honesty and objectivity within findings, a courageous desire for the best knowledge even if it fails to support one's own preconceptions, beliefs, or self interests.

5. Open-mindedness: Tolerance of divergent views and self-monitoring for possible bias.

6. Critical-thinking self-confidence: Trusting of one's own reasoning powers and seeing oneself as a good thinker.

7. Cognitive maturity: Recognition that some problems have more than one option. It involves awareness that multiple solutions may be acceptable and that reaching closure may be necessary even in the absence of complete knowledge.

In addition, a further consensus on subskills that were related to each core skill has been arrived at by the panel. These appear in Table 1, which includes a clearer descriptive explanation of the theoretical framework guiding the study (see Table 1).

The first five cognitive skills (abilities), in Faciones' model, can be used to monitor, correct, and improve the process of coming to a reasonable judgement. Yet, the expert consensus included self-regulation; also called meta-cognition, as a sixth core CT skill. However, this extra skill is not targeted in the California Critical Thinking Skills Test (CCTST). The conceptualization of CT as both cognitive skills and affective dispositions has far-reaching implications on educational assessment and instruction in nursing. This use of the cognitive skills and dispositions to think critically could enhance the clinical judgement process

subscales are not recommended as exact indicators of a particular individual's ability. Instead subscale scores should be used as gross indicators of an overall group's strengths and weaknesses. Each item of the 34 items on the CCTST is assigned to one of these subscales. Together, the above-mentioned three subskills form a full representation of the core CT skills, taking into account that meta-cognitive self-regulation, while being exercised as one takes the CCTST, cannot be readily assessed apart from the operation of the other skills. Moreover, the two other subscales on the CCTST follow a more traditional conceptualization of inductive and deductive reasoning. Thirty out of the 34 CCTST items can be classified as either inductive or deductive. It is worth noting that the labels "inductive" and "deductive" have grown ambiguous as a result of important differences in what they denote in different disciplines. Concern about this ambiguity explains why the words "deduction" and "induction" appear nowhere in the CCTST total scores calculation. The first three subscales; analysis, inference, and evaluation draw together the major core skills to compute the total CCTST score.

Thus, six scores are proposed to be obtained from an individual's CCTST: (a) an overall score on one's CT skills, and (b) five subscales which are analysis, evaluation, inference, deductive reasoning, and inductive reasoning (Facione & Facione, 1998). The first three CCTST subscales (analysis, inference, and evaluation) draw together the major core skills identified in the theory of CT advanced in the Delphi report. The more traditional characterization, "inductive vs. deductive" is recaptured in the pairing of the fourth and fifth CCTST subscale.

Table 1

Consensus List of CT Cognitive Skills and Subskills

1. Analysis

a. Examining ideas

b. Identifying arguments

c. Analyzing arguments

2. Evaluation

a. Assessing claims

b. Assessing arguments

3. Inferences

a. Querying evidence

b. Hypothesizing alternatives

c. Drawing conclusions

4. Interpretation

a. Categorization

b. Decoding significance

c. Clarifying meaning

5. Explanation

a. Stating results

b. Justifying procedures

c. Presenting arguments

6. Self-regulation

a. Self-examination

b. Self-correction

The five Faciones' subscales are as follows:

1. Analysis is comprehending and expressing the meanings or significance of a variety of experiences, situations, data, events, beliefs, judgements, procedures, or criteria. This includes the subskills of categorization, decoding significance, and clarifying meaning. Analysis on the CCTST also means identification of the intended and actual inferential relationships among statements, questions, and concepts. This includes the subskills of examining ideas, detecting arguments and breaking them down into their concept elements.

2. Evaluation signifies the assessment of the probability of statements or other representations, which describe a person's perception, experience, situation, judgement, belief, or opinion; and assessing the logical strength of the inferential relationships among statements, descriptions, questions, or other forms of representation. This includes the subskills of assessing claims and assessing arguments. In addition, Evaluation on the CCTST also means statement of the results of one's reasoning, justification of that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one's results were based. This includes the subskills of stating results, justifying procedures, and presenting arguments.

3. Inference means the ability to identify and secure the elements needed to draw reasonable conclusions, to form hypotheses, consider relevant information and elicit the most reasonable consequences which follow, either most probably or necessarily, from those elements. This includes the subskills of querying evidence, presuming alternatives, and drawing conclusions. All these subskills are drawn upon when one

is reasoning. Whether one is reasoning inductively or deductively, one is inevitably bound to be using all these subskills, i.e., analysis, evaluation, and inference. Using all these subskills when reasoning either simultaneously or one at a time depends on the individual's mental bias and the nature of the precept.

4. Inductive reasoning in the CCTST subscale means an argument's conclusion, which is meaningfully justified but not necessitated by the assumed truth of its premises.

5. Deductive reasoning as used in the CCTST subscale means the assumed truth of the premises, which purportedly necessitates the truth of conclusion.

The CCTST is specifically designed to measure the skills dimension of CT. Yet, to measure the dispositional side of CT, the CCTDI is usually used, however it will be excluded in this study. A complete description of CCTST appears in the "methodology" section.

Research Objectives

The objectives of this study are to:

- Measure critical thinking abilities of recent graduates of a diploma traditional nursing program.
- Measure critical thinking abilities of the level of third-year students in a CBL diploma-nursing program.
- Compare the level of CT of recent graduates of a traditional nursing program to the level of CT of final year nursing students in a CBL nursing program.

Definition of Terms

In this study, a definition of **critical thinking** derived from the APA (The American Philosophical Association) Delphi report has been adopted. The ensuing definition is:

> Critical thinking is a purposeful process involving reflective judgement and reasoning of both inductive and deductive nature. The ideal critical thinker is one who is: habitually inquisitive, well-informed, trustful of reason, open minded, flexible, honest in facing personal biases, prudent in making judgements, and willing to reconsider. Moreover, the ideal critical thinker is clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (Facione & Facione, 1998, p. 2).

Critical thinking ability refers to scores obtained by the participants on taking the CCTST.

Traditional program is defined as a program in which the teaching method is didactic; where the teacher imparts information by lecturing and the students listen to the lecture and take notes.

CBL Program is defined as a program that uses real-life situations as a method of instruction, where the tutor is a facilitator of the learning process for the students who learn through group discussion of case studies.

Hypothesis

Nursing students in the case-based learning program will obtain significantly higher scores on the measurement of critical thinking skills than those students in the traditional program.

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

The purpose of the review of literature for this study is to examine the accumulated body of literature on various definitions, measures, and research findings related to (a) critical thinking, (b) didactic teaching, and (c) case studies and case-based learning.

The Concept of Critical Thinking (CT)

There is no universally accepted, all-inclusive framework or set of criteria by which to describe or evaluate critical thinking (Videbeck, 1997). Although there is no standard definition of critical thinking, varied definitions and perspectives have been proposed. Indeed, various authors have put forward varied definitions of critical thinking as relative to their own disciplines. Some of these authors included both cognitive skills and attitudes in their description, as discussed in the CT model of Miller and Malcolm (1990). Their view of critical thinking is similar to that advanced by Tiessan (cited in Johannsson & Wertenberger, 1996). Other authors, however, have expanded the definition of CT to include cognitive skills, attitudes, reflection, and/or meta-cognition (Ennis, 1987; Mcpeck, cited in Colucciello, 1997; Norris, 1985; Paul, 1992; Yinger, cited in Colucciello, 1997).

A case in point is Paul (1992) who describes CT as thinking about thinking; while one is thinking in order to make one's thinking better. Paul elaborates on his definition by indicating that thinking involves self-improvement through standards that assess one's thinking. He proposes that not only has one to employ CT skills, but also one has to think critically about one's thinking and have the dispositions to act in accord with the dictates of critical thought. Paul's definition implies a meta-cognitive activity of self-regulation, which is

at the core of CT skills. This is in accord with the Faciones' sixth skill (mentioned in Table 1) which is meta-cognition and includes self-reflection.

Similarly, CT is defined (Ennis, 1987; Norris, 1985) as a reflective and reasonable thinking about problems having more than one solution that is focused on deciding what to believe or do in such a situation. This process is a pre-requisite to determining the course of action one is to take; to determine the best course of action, one has to draw on all the sources of his/her knowledge and skills. It is thus a multidimensional meta-cognitive activity that involves both internal and external practices when analyzing, evaluating, and critiquing issues, interactions, and information (Ennis, 1987; Norris, 1985). Cognitive skills are those abilities directly applied in carrying out some tasks while meta-cognitive skills relate to planning, monitoring, and revising the progress of cognitive skills (Norris, 1985). Critical thinking, in short, is described as a complex of many considerations requiring a critical spirit for its implementation. To Norris, this complex is highly sensitive to context, i.e., the nature of the problem itself, the environment in which it's posited, and the nature of the agents involved.

A similar view is shared by Dewey (cited in Daly, 1998) to the purport that CT is a subset of the reflective process involving thorough assessment, scrutiny, and the drawing of conclusions in relation to the issue at hand. Critical thinking is developed through reflection both on experience and knowledge. The importance of CT in this process according to Dewey is that problems are subject to healthy scepticism and timely suspension of judgement.

The critical thinking definition, however, frequently used in **nursing** is a rational, linear problem-solving activity that reflects the nursing process (Nicoteri, 1998; Sullivan, 1987). According to Sullivan, CT skill is the ability to analyze and solve problems logically.

The process of critical analysis is such that, once learned, it is transferable to subsequent problems, thus enabling the nurse to deal with a series of potential problem situations.

Similarly, Nicoteri (1998) sees critical thinking primarily as both an attitude and a reasoning process, albeit the fact that it includes problem solving. According to him/her, critical thinkers are active communicators, open minded, patient, confident, flexible, creative, and able to investigate problems before they occur and ask questions to keep their goals in sight. Nicoteri further asserts that critical thinkers become problem solvers by learning to conceptualize, think abstractedly, formulate generalizations, and consider new possibilities. Hence, according to him/her, CT involves identifying the problem, assessing resources, and generating possible solutions. Nicoteri, however, maintains that thinking critically doesn't usually come naturally; experience is important to its development and cultivation.

Several researchers propose an expanded definition of CT for nursing, which includes problem solving, reasoning in opposing viewpoints, and an attitude of inquiry rooted in reflection (Feingold & Perlich, 1999; Jones & Brown, 1991; Kurfiss, in Mastrian & McGonigle, 1999). Critical thinking, according to the above-mentioned authors, comes to include the ability to challenge previous assumptions and analyze their validity and utility rather than accept facts at face value. For instance, Kurfiss draws a line between problem solving and CT to show that the latter is a far more sophisticated process than problem solving because problem solving usually involves complex problems in which usually only one right answer exists. He/she reasons that problems requiring critical thinking generally do not have a right answer or a single solution. To Kurfiss, critical thinking thus comes to mean an investigation, the purpose of which is to explore a situation, a phenomenon, a question, or a problem to arrive at a hypothesis, or conclusion about it that integrates all available information and can therefore be convincingly justified.

Parallel to this trend is that of Brookfield (cited in Maynard, 1996) in which CT is described as a process, highly sensitive to context, with emotional and rational dimensions. He conceptualized CT as an active process rather than an outcome. This process has specific components: (a) identifying and challenging assumptions, (b) challenging the importance of context, and (c) imagining and exploring alternatives. Embedded in this process is the concept of perspective taking, which makes it invaluable to the nursing field. In the context of this study, CT is viewed as cognitive skills and dispositions as well as the cognitive engine that drives the process of knowledge development and clinical judgement in nursing (Facione & Facione, 1998). The skills and dispositions attributes of CT are centred to nursing in that they have to embody a search for the best knowledge in a given context. Critical thinking demands not only the gathering of facts and covering all available information, but it diverges from that into reflecting on all possible perspectives/interpretations and being open to all kinds of new evidence and reconsidering judgement to arrive ultimately at the best course of belief and action.

Critical thinking is thus far from being a linear approach. It is rather a non-linear recursive process, in the words of Facione (1997), in which a person forms a judgement about what to believe or what to do in a given context. It is common, Facione and Facione (1998) adds on, to both the nursing reasoning and ethical reasoning categories of clinical judgement. It thus completes the essential components of clinical judgements, which are content, knowledge, and practical experience.

Perusal of the preceding review of nursing related literature on CT will reveal that, for most nurse authors, CT, albeit more than a process of problem solving, is nevertheless inextricably intertwined with it. Critical thinking, Duchscher (1999) asserts, is more than a reasoned process of solving clinical problems in nursing. Its more relevant side is the

challenging of established rules and norms of doing things, which is required in the nursing practice. Critical thinking is therefore a method of assessing, planning, implementing, evaluating, and reconstructing nursing care. But, of more value, Duchscher stipulates, it is an approach to nursing, which encourages nurses to challenge established theory and practice.

Educational Approaches for Developing CT

One of the most important challenges for a nurse educator is to develop efficient and effective methods of teaching CT to undergraduate nursing students. The mere provision of students with a variety of clinical experiences, Weis and Simmons (1998) postulates, would not produce critical thinkers as many nursing students and new graduates lack CT skills. Two challenges that often face nurse educators, Dobrzykowski (1994) proposes, are (a) enhancing CT skills of all nurses and (b) selecting appropriate creative strategies to teach them, to enhance their interest, and create anticipation for subsequent learning (Chubinski, 1996).

A valuable teaching/learning strategy for developing CT is the **debate** strategy. Debate is defined as the for and against argument of a specific assertion, proposition, or solution to a problem (Fluharty & Ross, cited in Garrett, Schoener, & Hood, 1996). The debate techniques involve dividing students into two groups: (a) the first group students debate the proposed issues and (b) the other group students identify the use of uncertain terms and ideas, and value judgements that are not compatible with profound CT practices, though they may not speak during the debate. The debate requires reversing students' roles to give all students the opportunity to participate in both listening and debating (Beeken, Dale, Enos, & Yarbrough, 1997) and thus improves communication skills (Garrett, Schoener, & Hood, 1996).

Preparation for debate demands that students entirely explore the problem in question and use reason, logic, and analysis when formulating opinions about the issue (Cooper, cited

in Garrett, Schoener, & Hood, 1996). Students are held responsible to read extensively and come to the debate fully prepared about the issue being proposed to judge and discuss the issue logically and persuasively. During the debate, students are compelled to think primarily of the issue, calling on reason, logic, and judgement; these establish a cornerstone of CT.

Because learning occurs through experience, Mallik (1998) recommended CT skills to be practiced by student nurses in the clinical area and to be fostered by faculty, who themselves are supposedly comfortable with teaching these skills. Consequently, creative teaching strategies that ensure contextually relevant practice in the use of CT skills are needed.

The use of a clinical **simulation** experience is singled out by Wissmann (1996) as one strategy to facilitate critical thinking within the context of class preparation and to provide a safe opportunity for critical decision-making practice. Hypothetical case studies are developed to simulate real life emergencies. Students are then asked to make critical decisions based on the provided information, and they can ask specific questions to obtain additional information. Cases are developed and circulated among small groups. This allows each group several attempts at critical decision making.

Furthermore, clinical simulations provide opportunities for students to practice critical thinking without the added complexity of the clinical setting (Holzemer, Resnik, & Slichter, cited in Weis & Simmons, 1998). Such simulations present realistic problems, which require active involvement in problem solving, providing feedback on the process, and require the learner to act on the effects of undesirable actions. As in the real world, mistakes cannot be retracted or erased (McGuire, Solomon, & Bashook, cited in Weis & Simmons, 1998). Simulations thus require the use of decision-making skills to select relevant information and take appropriate actions specific to a patient situation (Weis & Simmons, 1998).

An additional and equally as good strategy to promote CT is **dialoguing** with others. Dialogue enhances the ability to develop perspectives, which is a major component of CT, as well as promotes tolerance of more than one perspective; a view hotly advocated by Faciones (Chaffee, cited in Sedlak & Dohney, 1998). To develop their critical thinking skills, students can further use peer review activities. Peer review can enhance professional reflection on one's own practice as well as the practice of others through critique and praise (McAllister, cited in Sedlak & Dohney, 1998). One strategy to do this is clinical rounds, which can be used to help students reflect and critically think about their own nursing care as well as the care performed by their peers. Clinical rounds can identify patient care problems and issues for further study, and can provide a forum to develop and share knowledge. Student-led rounds is an informal means of developing collaborative dialogue as students present patients to their peers and summarize the nursing care given with rationales. This clinical teaching strategy uses peer review during student-led rounds to cultivate beginning students' critical thinking (Paul, cited in Sedlak & Dohney, 1998).

A number of other strategies have been suggested by Alfaro-leFevre (1999) to develop effective clinical judgement and consequently CT in the clinical area. These strategies include acquiring a factual nursing knowledge base, using the nursing process as a reasoning framework, and exercising responsibility to identify practice conditions and the significance of prioritizing one's reasoning and actions.

Alexander (1993) highly recommends that nursing students be taught the systematic, scientific process of CT, which is similar to the nursing process. The nursing process is, after all, one way to think critically (Dobrzykowski, 1994). However, the teaching of CT skills requires a holistic approach since breaking CT into single units confuses the learner (Dadler & Whimby, cited in Brooks & Shepherd, 1990). This holistic approach combines teaching of

analytical thinking with communication in order to improve the student's total intellectual functioning.

It is acknowledged that not all these techniques can be used within the framework of a single class. However, distributed throughout the semester, they highlight to students the fact that thinking is an important component in classroom instruction. The focus of classroom learning has shifted from an emphasis on memorizing the results of the faculty members' expert thought process to a concern for the students' own thinking process. Critical thinking then becomes a daily experience, not an experience saved for the clinical practice setting (Elliott, 1996).

Review of CT Research in Nursing Education

Several studies presenting longitudinal data have provided mixed results regarding the impact of nursing education on CT. Many researchers used the WGCTA instrument to measure CT abilities in nursing (Bauwens & Gerhard, 1987; Brooks & Shepherd, 1990; Gross, Takazawa, & Rose, 1987; Miller, 1992; Pardue, 1987; Sullivan, 1987). Studies that compared baccalaureate students at various levels of the baccalaureate nursing degree found no significant differences in CT abilities between entry level and the different levels of education (Bauwens, Gerhardt, 1987; Maynard, 1996; Sullivan, 1987; Wrobel, O'Sullivan & Smith, 1997). Similar findings were reported by Dungan (cited in Kintgen-Andrews, 1999) based on a study using the Cornell Critical Thinking Test **(CCTT).** Dungan found no significant difference between the CCTT scores of baccalaureate entering freshmen nursing students, second-level associate degree students, and baccalaureate senior nursing students. Hence, according to this author there is no significant relationship between CT ability and level of nursing education. However, these results were inconsistent with the findings reported by Berger (1984); Brooks and Shepherd (1990); Fredrickson (cited in Adams,

Whitlow, Stover, & Johnson, 1996); Gross, Takazawa, and Rose (1987); Miller (1992); Pardue (1987); and Shin (1998). These latter researchers found CT to improve with subsequent years of nursing education.

Another predictor variable commonly used in the study of CT is the type of nursing education program, that is, the type of qualifications the programs lead to. Brooks and Shield (1990), Pardue (1987), and Shin (1998) examined the difference between CT and level of education preparation in associate degree, diploma, baccalaureate, and/or Master's program. The results consistently revealed that nurses with Master's and baccalaureate degrees had the highest WGCTA scores (Pardue, 1987) and that baccalaureate degree students did better than associate degree students (Brookes & Shepherd, 1990; Shin, 1998).

A number of studies using Faciones' instruments **(CCTST and CCTDI)** reported different findings from those using the WGCTA instrument (Colucciello, 1997; Thompson & Rebeschi, 1999). Thompson and Rebeschi used the CCTST (Form A) and CCTDI on baccalaureate nursing students at the program entry and then once more two weeks prior to graduation to measure CT outcomes. The results of this study indicated that the total scores of CCTST significantly increased from entry to exit. In addition, the scores of the five subscales all increased from entry to exit. Similarly, Colucciello (1997) used these two instruments in a cross-sectional study to examine CT skills and dispositions of baccalaureate nursing students representing five academic levels in a baccalaureate nursing program (Sophomore II, Junior I, Junior II, Senior I, and senior II). He/she found a statistically significant difference in CT skills among the academic levels in the study. ANOVA statistical analysis indicated that the overall CT skills of junior I and senior I and II students were significantly different from those at the sophomore II level, and that skills of students at the junior II level were significantly different from those at the junior I level. Students at the Junior I level had the

highest CT mean scores and students at the sophomore II level attained the lowest scores compared to all groups including the senior groups, reflecting a significant difference. Yet, those students at the senior II level, who would ordinarily be expected to have the highest mean score, ranked second highest out of the five levels. Results also revealed a significant positive relationship between the CT skills and dispositions. Analysis of variance (ANOVA) indicated a significant difference in the total CT dispositions mean scores between students at the junior I and senior I and II levels and those at the sophomore II level.

Furthermore, an aggregate data analysis of CT assessment in 50 nursing programs throughout the United States during a five-year period has been published. Data obtained from 145 undergraduate samples using the CCTST and CCTDI. Cross sectional comparisons of class levels of diploma nursing program (freshmen, sophomore, junior, and senior) revealed that CT skills increase as students progress through nursing program (Facione, 1997).

In addition, McMillan (cited in Pless & Clayton, 1993) "reviewed 27 studies that investigated the effect of instructional methods, courses, programs, and general college experiences on changes in college students' CT" (p. 425). He/she noted that 16 of the 27 studies used scores obtained from the WGCTA as the dependent measure. The results failed to support the use of specific instructional or course conditions to enhance CT. It is worth mentioning that similar to those reviewed by McMillan, very limited studies, reported in this review of research, used different learning approaches as predictor variables. The emphasis was rather on types of programs such as diploma or associate degree versus baccalaureate degree, than on lecture-based versus non-traditional educational programs such as PBL and/or CBL in nursing.

Traditional Educational Programs

Conceptualizations of Traditional Educational Programs

The traditional educational curricula are described as didactic, teacher-centred teaching methods that are organized around subject areas or disciplines (Mulholland, 1994, Young, 1998). In such traditional subject-based curricula, instructional topics and courses are organized around discrete blocks of knowledge that relate to subject areas or disciplines such as medical and surgical nursing, critical care nursing, community health nursing, and mental health nursing.

Similarly, the traditional lecture format is depicted as a didactic method of teaching where the teacher delivers structured packages of theoretical or practical knowledge complete with analysis, insight, and conclusions that students are expected to memorize and master (Grecich & Paraschos, 1994; Bridges & Hallinger, 1995). It is the transmission of knowledge and learning, in which the central purpose of student evaluation is to ascertain whether students recall the knowledge to which they have been exposed.

Theoretical and/ or Philosophical Underpinnings of Traditional Teaching

The traditional didactic teaching method is underpinned by the perennialism theoretical position (Tanner &Tanner, 1995). Perennialism is an educational theory that represents a conservative traditional view of education. Perennialists consider the school as an institution designed to cultivate human intelligence and the ideal education as one that is calculated to develop the mind. The central aim of education is seen as the dissemination of truth and development of the power of thought. According to this theory, the teacher assumes a traditional role of being the expert, telling the students what it is that they need to know. The teacher generally behaves in a traditionally didactic manner, dispensing information to

students, who are viewed as blank sheets onto which the teacher carves information. Students primarily work alone and the teacher seeks the correct answers to validate their learning.

In addition, traditional didactic teaching is underpinned by another theory, wherein the traditional teaching is related to the behaviorism theory of learning developed by Skinner (Tootell & McGeorge, 1998). The tradition of behaviorism has influenced many of the instructional practices seen in classrooms known as traditional teaching practices. The teacher learns how to manipulate the classroom experience to get the students to exhibit the desired behavior. This is done over and over until the desired response is achieved at which time the learner is praised for his/her work. This form of teaching is called knowledge transmission, where the teacher is the manager or supervisor who knows and designs all tasks for the student learners and corrects their wrong answers. The students are then the followers of the teacher's directions and passive receivers of information. The behaviorism theory views teaching as transference or presentation of information, and learning as an acquisition of knowledge and skills that takes place through drill guided practice. Skinner's behaviorism favors drilling exercises since it views learners as amenable to conditioning and discounts their cognitive ability or the fact that they can think and help in their own learning (Tootell & McGeorge, 1998).

Rationale of Traditional Teaching

The traditional lecturing teaching method, according to de Tornyay and Thompson (1987), helps to emphasize and clarify important content and thus controls the thinking of a group of students in a given direction. According to these authors, the lecturer can inform students about facts and ideas that might seem boring on the pages of books. The traditional method gives the teacher control over the learning process. The teacher's skill, enthusiasm, and special way of organizing subject materials presented didactically can serve as a

motivation and inspiring experience for students. It takes less time than other methods that help the students to discover educational principles for themselves such as CBL.

The Process of Learning in Traditional Teaching

Traditional learning, according to Kradjan, O'Sullivan, and Odegard (1998), occurs in reaction to a general topic. The material to be learned is provided by the lecturer. If readings are required, they are designed to supplement the lecture material. Didactic teaching stresses retention of facts, since fact-based material is most commonly supplied during the lecture. Problem solving is not the primary goal of traditional learning, which is viewed as passive. Information is spread in large quantities in a unidirectional process in which the teacher directly presents information and skills dictated by a textbook, resulting in little interaction between teacher and students. Mulholland (1994) and Young (1998) observes that in such a learning environment class time is often devoted to the students, who generally sit as the instructor lectures, demonstrates or, discusses the topic in class.

The lesson in the traditional didactic instructional form usually starts with a review of the previous lesson. The teacher would then go over the students' homework, listen to memorized material, and assign home study, which usually consists of materials to be read or memorized from the book. Although the teacher poses many questions, almost all of the questions asked are at knowledge and comprehension levels that most often begin with "what" and "when". However, high order questions that would promote CT in students such as 'what if', 'do you approve', etc. are rarely asked in such a traditional teaching method, as the students usually remain passive throughout the session. Hence, acquisition and memorization of a large quantity of factual knowledge are overemphasized (de Tornyay & Thompson, 1987).

The Teacher's Role in Traditional Teaching

Traditional education programs, according to Mulholland (1994) and Young (1998), place the central responsibility on the teacher. The teacher's role is to dispense information in lectures, assign readings, and provide demonstrations. The teacher is in a central place of responsibility to decide what information and skills the students should learn, when, how, in what sequence, and at what pace it is to be learned. This predominant view of education depends on the concept of teaching. Teacher-centred pedagogic techniques rely on the idea that learners are empty receptacles who passively absorb imparted information in small pieces, which may then be recontextualized by repeated practice, comments Freire (1972).

Traditional teaching strategies such as the use of explanations may be adequate when the purpose of instruction is to transmit all of the information and achieve correct performance. The overuse of explanations, however, creates a passive listener follower's role for students, contributing to dependence and reducing the need to think for oneself. As a result, the nurse who has long been used to being dependent on a higher authority for guidance, explanations and solutions, when faced with a new situation; often the clinical setting, is most unlikely to develop alternative problem-solving pathways and critical thinking skills (Creedy, Horsfall, & Hand, 1992).

The Learner's Role in Traditional Teaching

The students in traditional teaching methods are not encouraged to contribute to class discussion by voicing their opinions and supporting their answers, asserts de Tornyay and Thompson (1987). Such a teacher-directed instructional method places the students in a submissive role requiring obedience to the teacher's instructions. This submissive, passive attitude is based on the assumption that learners need to know only what the teacher teaches

them. The result is a teaching and learning situation that promotes dependency on the instructor.

In such traditional programs, the learners are expected to be passive, receive and accept the information from the teacher and/or textbook. Therefore, the students are not responsible for their own education (Mulholland, 1994; Young, 1998).

Criticism of Traditional Education

The traditional educational approach has been criticized by a number of authors (Sims & House, cited in Camiah, 1998). These authors argue that traditional educational philosophy and approaches to education are no longer appropriate or effective because they allow the theoretical content and components of teaching to take the form of blocks of study unrelated to the parallel clinical experience. More importantly, they contend that traditional nurse education has failed to prepare students to meet effectively the changing health care needs of the society due to a failure of nurse teachers to stimulate originality and creativity in students.

Because traditional programs stress memorization of facts from the required textbooks or other written resources in the absence of clinical context, they limit the breadth and depth of learning. Students taught by such traditional methods, Young reports (1998), do not perceive the relevance of their basic science courses to clinical practice, nor can they integrate the basic science information into their clinical courses. These students further forget much of the information soon after the exam, Young adds, and have difficulty reasoning through new problems when these arise.

Furthermore, the nature of knowledge nowadays is no longer a body of absolute and static facts, but a mechanism by which learners make sense of the world and on which operational decisions are based, Mulholland points out (1994). Learning has come to be seen, Mulholland adds, as an individual process, dependent much more than previously realized on

the learners' past experience; a correct response selected by the teacher that does not fit into the learner's schema will not be learned. Moreover, because the students are not provided with a choice of how they learn, rather, they remain passive in the learning process, the resulting type of learning in didactic teaching methods is surface learning where students merely learn facts (Bruner, 1999; Down & Davidhizar, 1999).

In short, in the traditional teaching methods the subject matter dominates in the learning process. de Tornyay and Thompson (1987) maintained that too much emphasis is put on certain facts and materials to be learned and too little emphasis is put on the learning process itself as well as on the desired results. Hence, traditional teaching encourages the retention of facts as an end in itself. Furthermore, the didactic teaching approach emphasizes the wants and desires of the lecturer, yet excluding the students' needs albeit the fact that the student is the actual consumer. It fosters dependence on the teacher as the final authority, thus inhibiting the exploratory aspects of learning. Learning is thus viewed as a passive, feelingless operation wherein the students are the passive receptacles and any talk of skills or feelings that they might nurture or refine is considered vapid.

Review of Related Research

A number of research studies on traditional teaching by lecturing compared this teaching method to teaching by group discussion. de Tornyay and Thompson (1987) report that the results are largely inconclusive, very possibly due to the lack of differentiation of the desired outcomes. McKeachie (1994) summarizes the role of the traditional lecturing in education by pointing out that research results provide little basis for a supportable answer. The research results do not contradict, and sometimes support, the notion that the lecture is an effective way of communicating information. McKeachie reports that the lecture proves to be as effective as other teaching methods in terms of measures of knowledge. However, there is

evidence that other discussion methods of teaching may be more effective than didactic teaching techniques in terms of achieving higher cognitive and attitudinal objectives.

Research measuring retention of information at the end of a course, transfer of knowledge to new situations, problem solving, and motivation for further learning corroborates the evidence that discussion-teaching methods are favored over traditional teaching strategies for promoting learning (McKeachie, Pintrich, Lin, Smith, & Sharma, cited in McKeachie, 1994).

Further evidence is supplied by a study conducted by Vaughan (1990) to examine student nurse attitudes to teaching/learning methods. It reports that students perceived the lecture method as less favorable compared to case-based learning. One reason is attributed to the fact that nursing is a practical profession, that requires students to develop their own interactive skills in learning that is the result of active participation in a meaningful classroom setting, where the facts adopted are relevant in other situations, rather than as a result of instruction. Vaughan further argues that when students are faced with the traditional lecture method in the classroom, where intangible concepts and theories are being explained, they are unable to see the relevance to the reality of clinical practice.

Case-Based Learning

Conceptualizations of Case-Based Learning

Case-based learning was introduced in the 1970s by Harvard School faculty. This method has been used for many years both as a teaching strategy and as a problem solving and decision-making tool (Christensen & Hansen, cited in Waterman & Stanley, 1996; Dailey, 1992; Waterman, 1995). Case studies, according to Woody, Albrecht, Hines, and Hodgson (1999), are instructional methods within the context of student-centred learning that have long been used in business, medicine, education, and other disciplines to teach students about their perspective field. However this teaching methodology is new to nursing curricula (Alavi, cited in Woody, et al., 1999).

Because the primary aim of teaching with cases is to develop problem-solving skills, its application has been encouraged in the area of nursing education (Down & Davidhizar, 1999; Klein, 1999; Silverman, 1996; Waithe, Ducker, Schmitz, Crisham, & Ryden, 1989). The student-centred method of teaching with the longest history of success is the case method, according to Dowd and Davidhizar (1999). In this study the term "case method" will be used interchangeably with "CBL".

Case-based learning can be defined, according to Klein (1999) and Schodt (2000), by contrasting it with the traditional lecture method. Instead of textbooks, the CBL method uses case descriptions of specific situations as a narrative of a realistic problem that typically, but not always, represents actors confronted with the need to make a decision. These situations enable the students to discover and develop their own unique framework for dealing with the case. The case study is a teaching method that integrates concepts, theories and practice over time and can be used in a variety of clinical settings (Andrews & Jones 1996; Baldwin & Schaffer, 1990).

Case-based learning is described as a process by which students learn by using a clinical presentation as a stimulus to acquire additional knowledge concerning a particular clinical entity so that the problem can be solved (Abboud, 2000; Bridges & Hallinger, 1995; Merseth, 1991). According to these authors, CBL is a method of instruction where the students are presented a story in the form of reality-based cases or vignettes with limited information, but not analysis. Then additional information is supplied in response to students' request for specific data because it's the goal of the group discussion to do the analysis.

Eisele (2000) asserts that case-based learning relies on well-developed written cases, which might range from one to one hundred pages. The case-based method, according to Uys (1998), uses sequential management problems, where students have to guide an inquiry and judge which informational and management choice to follow. She stresses the fact that CBL focuses strongly on the process of learning and covers the required content through a set of complete cases, yet she balances the process with the content.

The following organizational structure for a case study is recommended by Ertmer and Russel (cited in Senior, 1998) and Gwele (1999):

1. A case overview: This overview specifies the goal of the case and the content outline, which includes knowledge, skills, and attitudes.

2. Learning objectives: These objectives support concepts and principles students should use in analyzing the case issues.

3. Case Background: This background includes the problem scenario, patient/case data, context, and players.

4. Case Triggers: These triggers include description of relevant data; facts, events, and circumstances that present a clear, concise, and complete narration of all aspects directly related to the situation about the patient or case at the present stage.

5. Case Tasks: These are questions listed at the end of each trigger to instruct the students on what to do about the information they have on the case at the time. Each trigger has a number of tasks. These tasks are the key areas and issues which teachers want students to address. They ensure that the learning objectives are covered.

Case-based learning is thus described as a teaching method that provides learners with an opportunity to make meaning of their own world of nursing through active participation in their own learning, developing inquisitive minds as well as awareness of the relativity of most forms of knowledge (Gwele, 1999). To her, CBL uses clinical cases as a context to introduce the content to be learned. Content in a case-based curriculum is learned through the inquiry process with the case serving as a method to communicate the content (Barrows, 1986).

One further asset to CBL is its flexibility as a model, which is positioned approximately half way between direct instruction and social constructivism since the model can be used in more than one way (Oliver, 1999). In the hands of an instructor who uses leading questions focused to direct students towards a process he or she deems correct, the model is not far deviant from direct, traditional instruction. However, if the instructor allows students to formulate their own opinions of a case by promoting group coordinated research activities, debate, or simulated decision making, the model is more closely aligned with social constructivism and a Friere's dialogue-based model. The key difference is the extent to which an instructor directly leads the student versus promoting activities through which students can lead themselves and develop valuable reasoning skills in the process.

Theoretical and/ or Philosophical Underpinnings of Case-Based Learning

The case-based learning is underpinned by the cognitive learning theory, the one that Skennarian behaviorists ignore. According to this theory, the students in the CBL apply their previous knowledge and experience to the context provided by the case in order to understand and construct new information. In CBL, students need to practice critical thinking in the context of client-based problems to acquire this skill. Context is an important basis for CBL because when knowledge is put into context, it is remembered for a longer period of time and can be easily retrieved when needed for application (Bruning, Schraw, & Ronning, cited in Young, 1998).

Schmidt (cited in Young, 1998) speculates that presenting students with context, which is a real life scenario in the form of cases at the beginning of learning gives them a better opportunity for problem solving. When new information is attained, the brain looks for ways to relate it to the already existing networks and concepts. As a result of this connection, the students then translate the information in their own words and apply it to similar situations. In this way, the students have a better, deeper understanding of the concept discussed in the case.

In addition, case-based learning, according to Canterbury (1999), operates on the philosophy that students are involved in an effective learning process, where they can learn what to learn and how CBL helps them to learn specific knowledge by giving them the appropriate challenges along with a sufficient amount of support and guidance. The end result is a better working knowledge of the product and how to apply it and, more importantly, the ability to solve problems by using all available resources. Loving and Wilson (2000) emphasize that faculties have a responsibility to provide the structure within which students can learn to learn.

Rationale for CBL

The continuing interest in teaching cases stems from an increasing appreciation of the value of realistic thinking as opposed to abstraction and generalization in traditional teaching, Bruner (1999) proposes. He/she summarizes seven rationales for using CBL:

1. The case method is effective as students learn best the lessons they teach themselves. Thus, learning is best when there is a process of self-discovery, as opposed to the passive absorption of what others say. The student ownership of the case of discussion, as well as his/her active engagement with case problem are the keys to the effectiveness of CBL.

2. The CBL builds the capacity for CT and facilitates model skills of questioning. Discussions enhance skills of debate and challenge, students engage actively in this process of exposure and debunking the antagonist argument.

3. Case method is well suited to help students appreciate the need to make timely decisions, being given incomplete theory and data.

4. The case classroom models a learning environment. Through CBL, the student can learn how to achieve trust, respect, risk-taking, and high quality of debate.

5. The case method models the process of inductive learning. This method prepares the student for life-long learning.

6. In CBL, the teacher learns too. Because of the interactivity of CBL, the teacher can encounter fresh perspectives on old problems, or test traditional solutions to new problems.

7. The case method is fun as it motivates students. Moreover, direct debate over practical problems stimulates students' effort and active engagement.

The case method is a useful student-centred learning strategy that can be applied in general nursing education courses to enhance problem-solving skills. It allows students to identify resources and solve real life problems actively through students' involvement in group work in the safe environment of the classroom (Dailey, 1992; Herreid & Schiller, 1997; Schodt, 2000). Case study teaching, according to Down and Davidhizar (1999), provides models of how to think professionally, critically, and productively about problems and concrete experiences. It allows students to think through an experience before encountering it, thus enhancing their ability to learn from their own practices, whether real or simulated. Cases thus help learners how to respond to actual problems that they will encounter in their real fields of work and clinical practice.

Case-based learning is promoted in many universities, according to Merseth (1991), because it teaches these important concepts and facts within the context of authentic or real world situations. Context is thought to be more motivational to learners as it provides a concrete framework from which complex concepts can be more easily understood. Senior (1998) and Stern (1998) assert that CBL enables students to explore, analyze, and examine representations of actual classrooms, which may include large or small group discussions, role-playing situations, analysis, or team-based discussion.

On top of all of these optimal outputs, CBL, according to Dailey (1992) and Mulholland (1994), addresses the cognitive needs of the independent case-based learner, who prefers the challenge of analytical thinking and the active participatory role of discussion learning. Furthermore, the case method can facilitate affective needs that occur as a result of social motivation, personal interest, curiosity, increased conceptual level, and task persistence. By providing experience with a variety of concrete cases, the case study method develops and sharpens students' understanding of the profession. Thus, it has the potential to

provide deep learning, which is active learning that focuses on developing connections and using interactions with others. That is, collaborative learning is at the core elements of CBL.

Indeed, three advantages are proposed for using a collaborative model in teaching nursing (Huff, 1997). First, collaborative learning involves students working in small groups, helping one another learn academic material, hence, they learn to function as members of a team. Second, it enhances the social skills necessary to work cooperatively with others; this learning is stimulating not only socially but also intellectually. Third, it increases the accountability of students for their own learning as well as the learning of the group. Group members share in the give and take of information and explanations when students work together and learning is enhanced for all. By using cooperative learning in the classroom, students are given the opportunity to take an active role in their learning, to work with other students toward success, and enjoy an equal chance for recognition (Schlutz, cited in Huff, 1997).

Collaborative learning is also described as grouping and pairing of students to work together in small groups to meet a common academic goal (Gokhale, 1995). A study has been conducted by Gokhale to examine the effectiveness of individual learning versus collaborative learning in enhancing CT skills. The results revealed that students who participated in collaborative learning had performed significantly better on the critical thinking test than students who studied individually. Students are capable of performing at higher intellectual levels when asked to work in collaborative situations than when asked to work individually (Vygotsky, cited in Gokhale, 1995). Collaborative learning is helpful only if based on CT. Without CT, collaborative learning tends to be collaborative mis-learning (Paul, 1992). Relevant for any discipline, CBL is valuable for promoting reasoning as it engages students in CT and decision making about realistic problems in a discipline.

More importantly, case-method learning invites the defense of personal viewpoints since the solution to the problems is not limited to a single answer. Yet, it encourages meanwhile the understanding of opposing views that may positively or negatively affect solution outcomes. Group interaction promotes acceptance of peers and assists socialization in the role of the professional nursing students. Hence, the CBL encourages student group interaction through discussion of personal attitudes, beliefs, and values that will impact decision making (Dailey, 1992).

Furthermore, using case studies can help to bridge the gap between theory and practice by presenting material in a more natural fashion through bringing the realities of nursing practice into the classroom; that is, reflecting the way that nurses ought to analytically think and problem solve (Down & Davidhizar, 1999; Schodt, 2000).

As a matter of fact, case study method is a reflective activity that gives students the opportunity of learning to read and understand, observe, ask important questions, listen, consider various responses, decide, and contribute to group processes in achieving group goals. Hence, it would provide a broad knowledge base for students to argue for or against different solutions, examine and evaluate particular nursing actions from a variety of perspectives. In this way CBL produces reflective, analytical nurses, who are able to practice in a variety of settings (Camiah, 1998; Jones & Sheridan, 1999; Silverman, 1996; Uys, 1998).

The Teaching/Learning Process in CBL

Uys (1998) and Waterman and Stanley (1996) maintain that CBL presents the case problem first in the instructional sequence. Students are first exposed to the learning material, which is usually based on a real patient or situation. They receive a complete case information before class session and prepare the case in order to analyze the data, evaluate the nature of the problem(s), and solve the problems before discussing them in a large group in

class to validate their own thinking. Next, they generate hypotheses, develop learning issues they agree to pursue, and then use a wide variety of approaches and resources for learning. In this phase students are actively engaged and working together in groups of 8 to 10 students to share what they know, and develop their plans for learning to answer the tasks. Small group work, in or out of class, gives students the opportunity to discuss cases and questions with each other prior to the whole class discussion that follows to decide upon applicable principles and recommend a solution or course of action. The true value of case-based instruction resides in the whole class discussion. Students thus become more directed in their reading and more motivated in subsequent interactive case discussions, where the tutor is a facilitator.

Classroom discussion, Andrews and Jones (1996) confirm, thus provides the opportunity for learners to describe the clinical knowledge obtained. They are assisted in synthesizing information using the nursing process. Although the discussion questions do not specifically ask about the nursing process, learners, assisted by the facilitator, should be able to apply the steps - assessment, planning, interventions, and evaluation - when they need to deliver comprehensive clients' care.

The Teacher's Role in CBL

Grecich and Paraschos (1994) and Gwele (1999) maintain that the teacher's role in creating a learning-centred environment involves helping students to learn how to learn, interpret and analyze information, and critically reflect on their meaning perspectives in the process of learning. A case-based curriculum requires a change in viewing the teacher's role to realize that reproduction of information does not equate learning. Case-based learning requires the instructor to quit the traditional role as a lecturer, controller, and transmitter of information and take on the role of a facilitator, pilot, and manager of the learning process.

He/she performs this role by questioning, listening, challenging, encouraging analysis and problem solving, and helping students test the validity of their ideas through dialogue with their colleagues and teacher. This transition is difficult for many tutors to embrace, as the facilitator has the task of stimulating, guiding, and summarizing the discussion. Through asking probing questions, restatements, and summary remarks at critical points in the discussion, the facilitator ensures that an active discussion occurs in class and that the many issues in a case are properly examined.

Tutors who use the case method, concurs Uys (1998), empower students to be active thinkers in the classroom, rather than passive listeners. They motivate them to think through the complex and often ambiguous problems confronting them. The facilitator prepares the students to learn how to express themselves clearly and concisely, and helps them to explore their thinking and reasoning without leading them. He/she helps them learn to think analytically, independently, and actively in the search for responsible and constructive solutions to the case tasks. Hence, the teacher in small groups helps the learners to clarify and expand their boundaries to deep learning.

Critical to the facilitator's role to be successful is to be able to refrain throughout the discussion from interposing his/her own judgement, asserting or suggesting that some view is clearly wrong, or from asking leading questions designed to get at a particular response. The facilitator's effort as a discussion leader should be to get the comments of various students understood and fully explored, helps guiding the students toward resources when necessary, and focusing the class according to the levels and goals of the students. The instructor's remarks in class should enhance rather than inhibit the discussion. The discussion and the thinking behind it on the part of the students are the chief ingredients of CBL. The active participation of the facilitator is necessary to ensure that the group members meet their goals

by guiding discussion through skilled questioning. He/she aids in the flow of the discussion and helps in clarifying and/or emphasizing what are felt to be important points about the case (Abboud, 2000; Andrews & Jones, 1996; Mulholland, 1994).

It is worth repeating that it's part of the facilitator's role to ensure that students prepare the cases at home, and do not come into the class discussion hoping to pick up all the answers there (Uys, 1998). The instructor encourages explanation of the case and consideration of the characters' actions in the light of the students' own decisions (Waterman & Stanley, 1996).

Moreover, during group work, the facilitator, according to Waterman (1995), wanders from group to group, listens in, and suggests directions for student discussion. However, his/her role is not to provide information during that time. The facilitator helps with the learning process when asked by the group to advise, but it won't be to provide the answers. The instructor is not in charge of the group, the students are. Rather the facilitator in CBL ensures that every member in the group gets a chance to speak, participate fully and actively in the discussion, and explore the topic to reach many possible solutions to the question (Abboud, 2000; Andrews & Jones, 1996; Mulholland, 1994).

Furthermore, the facilitator's role in CBL, Mulholland (1994) summarizes, is to include task and maintenance functions:

First, the **task function** includes four roles.

1. Selection of tasks: The closer the group tasks are to the real clinical world task the more successful and transferable the learning is likely to be.
2. Avoiding time-wasting: Having set the well defined tasks, the facilitator has to ensure that the group is clear about what is required, and to prevent and manage side-tracking or time-wasting on irrelevant discussion. In many instances group members will act as controllers on those whom they think are wasting time.

3. Delaying information: It's not easy for the facilitator to withhold relevant information. Knowing when to provide new information is a highly developed skill. If the teacher gives information too early or too quickly the situation can soon revert to the traditional teacher-centred model. Teachers work together with the students, however, they become less active in discussion and give information only when asked.

4. Summarizing points: An important facilitator task is summarizing or ensuring summary of what has been learned at the end of the process. Unless this is done, there may be a danger that learners are not aware of what was learned. They may consider discussion as time wasting and not covering the content as effectively as in the lecture teaching method.

Second, **Maintenance Function** includes three roles.

1. Development of the group: A facilitator has to ensure that group members know each other and develop the group by working together as a cooperative and supportive team.

2. Identifying any potentially dominant personalities and creating strategies to prevent them from dominating the group: Group norms, certain rules, and codes of conduct are to be acceptable by the group.

3. Reforming: when a new stage in the process is reached or new task is to be worked on, different students may adopt different roles within the group. The facilitator needs to help to smooth out the transition period.

The Students' Role in CBL

The emphasis in case learning is on shared learning, Gwele (1999) asserts, as opposed to students' role in traditional curriculum, which is to memorize and accumulate the knowledge. In CBL, students are anticipated to become critical thinkers, problem solvers, and self-directed learners, so educators can no longer subject them to a silence environment in the classroom. Students have to be active participants in the teaching learning process. They take an active role in their own learning and that of others in the class rather than being passive note-takers, as in the lecture traditional classes (Gwele, 1999).

During case discussion, students are actively engaged in interpreting the case, proposing problems and possible solutions, brainstorming, and using resources (Waterman & Stanley, 1996). The learner is no longer seen as a clay to be moulded or an empty vessel to be filled. On the contrary, a student in CBL is viewed as an individual organism growing in his/her own way and requiring to be nurtured accordingly (Mulholland, 1994).

In addition, the active intellectual and emotional involvement of the student is the hallmark of case teaching (Christensen, cited in Uys, 1998). This involvement, Uys (1998) asserts, allows students to grow, and is inherently motivating. Through interactive discussions, CBL students develop confidence in confronting problems, as well as defining, analyzing, and solving them (Klein, 1999; Schodt, 2000).

For learning to be enjoyable students in CBL have to learn to cooperate with each other, as students always learn better when given an opportunity to learn from and with each other. Not to mention that, in a discussion with peers it is much easier for the learner to freely discuss, expand, clarify, and modify understanding of the topic (Mulholland, 1994). Students take on roles as deciding what to focus on, developing questions, and leading the discussion (Gwele, 1999). The chalkboard belongs to the students during case discussions, Gwele (1999)

and Waterman and Stanley (1996) confirm, in order to keep notes or list learning issues, because visual images last longer than the spoken words. This helps students fix some of the content of the discussion firmly in their minds.

It goes without saying that students need to prepare the case prior to its discussion in class, concurs Grecich and Paraschos (1994), since they do not only suggest the course of action they would recommend, but more relatively, they have to defend their analysis of the specific problem and action against the criticism of other members of the group. The discussion is not necessarily intended to culminate in one approved solution, as there is no one correct answer. In preparing the case, the students engage with the characters and circumstances of the case and work to identify problems and relate the problems to situations they encounter in their own experience (Waterman & Stanley, 1996). In using case studies, students might reach valuable conclusions that tutors could use in future cases or research (Down & Davidhizar, 1999).

To sum up, CBL, Waterman and Stanley (1996) reiterate, is student centred where students develop reasonable answers to the questions and provide support for their conclusion. Students generate the questions that will define their own topic of study and structure their own learning using the scenario of the case as a focus. These cases are useful for lifelong learning because they are open ended and are drawn from a broad range of situations in which scientific reasoning can be applied. Cases necessarily shift the focus of student learning beyond the facts of science to include using scientific knowledge to frame questions and use CT to work out reasonable solutions. This in itself is important because in their practice, nursing students may never face the exact problems that they face in CBL.

Learning Outcomes in CBL

CBL provides models of how students learn to use theoretical concepts to illuminate a practical problem and solve it, Down and Davidhizar (1999); Herreid and Schiller (1997); and Schodt (2000) postulate. The case study method promotes CT skills including examining assumptions, identifying and weighing options for care, and setting priorities, Brookfield (cited in Maynard, 1996) asserts.

Yet the outcomes of case method are not limited to enhancing problem solving and CT. Case-based learning also acts as a stimulus for motivation. It encourages active adult learner participation through the application of past and present knowledge to practice. Other outcomes include stimulation of thought in a new concept area that has not been previously discussed and encouraging independent student research. Because the case method is a means for problem solving in simulated practice field, students can develop creative solutions without the danger of harmful consequences to patients. Students can also receive immediate teacher and peer feedback regarding the appropriateness of their solutions (Dailey, 1992).

Furthermore, focusing on specific tasks in CBL provides direction to students in the learning process, Gwele (1999) concedes. This is an advantage of teaching with cases, owing to the fact that with cases, pre-planned tasks keep the discussion focused on specific learning tasks. Since learning in case method occurs around a particular realistic problem, there is greater likelihood that the learned material will be better retained and more easily applied to similar situations (Brown et al., cited in Waterman & Stanley, 1996).

Other outcomes, Barrows (1986) proposes, include the enhancement of structuring knowledge for use in clinical contexts, developing effective clinical reasoning, problem solving, decision making, self-directed learning, and motivation to learning. At the risk of repeating adtedium, CBL, Waterman and Stanley (1996) reaffirm, encourages problem

posing, solving, and persuasion. Instructors as well as students are collaborators in this process. As students pose problems, try to solve them and present conclusions that represent their own findings to others, both the instructor and other students may serve as resources to aid in defining potential strengths and weaknesses in the design of the problem statement and the investigation. The clarification and resolution of the problem and its presentation to other students as well as to the instructor extend opportunities for student practice in utilizing and evaluating scientific approaches to problem solving. As cases are often left open ended, CBL can leave readers with unanswered questions and unknown outcomes and, thus, increase students' inquisitiveness (Jones & Sheridan, 1999).

To recoup, three outcomes for CBL have been suggested by Senior (1998). These include:

1. Enhancing students' analytical and reflective skills: CBL requires students to analyze information in order to determine the problems.

2. Improving students' ability to integrate all elements of knowledge: CBL also improves students' problem solving skills. Cases present students with complex situations and several elements of knowledge. Students are required to analyze each element of knowledge and the interrelation among the whole elements, and eventually integrate them into solutions.

3. Allowing students' views and opinions to be expressed: After the presentation of the analysis, ideas and assumptions will be questioned and criticized by the other students. This kind of dialoguing improves communication skills by re-examining each student's opinions and assumptions.

Case-based learning is definitely an enjoyable experience, nonetheless, despite all its advantages, nurse educators and students may feel uncomfortable with this teaching strategy because generally a case has no room for the single, clear-cut answer, and instructors may feel that they are losing some control over the class. Moreover, learning outcomes cannot be easily measured, and therefore instructors cannot be certain that students are learning all the contents of the subject compared with traditional lecturing. Some students also feel uncomfortable working with others, which is a basic component of CBL (Senior, 1998).

Furthermore, preparing the cases may seem frustrating to the case writer. It's not easy to write case studies for case-based instruction as the amount of teacher preparation time required for case development is a very time consuming process. CBL may take the case author long time to design and develop quality cases, as well as to provide students with sufficient resources to understand the case. Additionally, the information supplied in the case is frequently partial and, at times misleading, as a result, the problems presented are ambiguous and complex (Dailey, 1992; Merseth, 1991; Schodt, 2000; Senior, 1998).

Review of Related Research

Three research projects related to CBL have been presented by Silverman (1996). The first, titled "Student outcomes from teaching with cases" reports the results of a research study with students who had taken a case-based educational course. The findings reveal that, over time, students have become more analytic in their approach to problems. They have been more likely to evaluate a variety of solutions rather than being satisfied with one answer. Moreover, students have grown more open to their colleague students' ideas, applied theory to support their ideas, and showed more satisfaction with the quality and quantity of their learning in their case-based course. Furthermore, over the long term, students who were

exposed to case-based teaching reported that CBL had made them better classroom observers, so that their field experiences made more sense.

The second project, titled "Using case methods to link theory and practice in two educational psychology courses" reports that students in two classes, one case-based and the other lecture-based, have been given the same case to analyze in writing at the beginning and the end of a course. The study looked for evidence of students' ability to link theory and practice. The findings show significant evidence that students in case-based class could apply theory to teaching situations much more than their peers in a lecture-based educational psychology course. The case-based trained students have had a better understanding of the meaning and application of educational psychology theory at the end of their course. Moreover, all students in the case-based class have been able to use applicable theory, while only half of those in the lecture-based class were able to do so.

The last project titled "Teaching without a Net" reports an observational research of students in case-based courses to explore how their training has enabled them to internalize a problem-solving inquisitiveness, which they can apply to teaching situations whether presented in a case form in the college classes or in their own classrooms. The results report that the students in CBL courses have learned how to analyze teaching situations by considering other perspectives, identifying a range of problems, and evaluating a variety of possible solutions. Furthermore, these students have recognized that a CBL approach enabled their learning about teaching to continue outside of the teacher education classroom. They report becoming reflective practitioners, thinking about teaching by considering their own teaching practice. Moreover, these three projects clearly reveal that the most important factor confining prevalent use of case-based methodology is the inability or unwillingness of a large

majority of faculty to use the teaching method effectively. This is because the use of cases requires teaching behaviors quite different from those in the traditional method.

In addition, an analogous study has been conducted by Farreli, Albanese, and Pomrehn (1999) on medical students learning in a case-based method and has found that the students' satisfaction with this case method was highly positive. The results show that 93% of the students agree that they have enjoyed case-based learning and 85% agreed that they have learned more than they would have in the traditional method.

Summary

Nursing education today faces a great challenge as it reviews the outcomes of traditional teaching strategies and seeks to explore new alternatives in preparing the nursing students for the complex and diverse profession of nursing. Traditional approaches of disseminating information do not meet the needs of today's learners. Nurses must be prepared to manage continuous change and to function competently in the practice setting. Owing to the nature of the nursing practice in today's rapid changing health care world, student nurses have to develop adequate critical thinking skills to adapt to new situations, make competent decisions, and teach themselves or transfer new knowledge. One strategy to develop these CT skills is case-based learning.

Case-based learning is an optimal alternative to meet the needs of a society with health requirements as diverse as its population. Nurses must be capable of exploring options, asking questions, articulating explanations, and developing appropriate nursing care plans based on reflective decisions. CBL has proven to be a dynamic and creative teaching methodology with positive outcomes for both students and faculty members. It makes the classroom lively with a stimulation that is nowhere in the traditional teaching. The case method educates best when it is student centred rather than instructor centred.

As a method of student-centred instruction, CBL is a valuable method for teaching, especially in the area of enhancing CT and problem solving (Bruner, 1999). It is considered as one approach to active learning since the realistic nature of case studies makes the students, under the guidance of their instructor, active rather than passive participants in the classroom (Bonwell & Eison, 1991). Furthermore, CBL uses reality-based problem-centred material, according to Bridges and Hallinger (1995). It encourages students to be active learners in the inquiry process, where the tutor is a facilitator, and fosters collaborative and critical thinking skills, according to Bridges and Hallinger (1995). Active learning enhances critical thinking skills, Potts proposes (1994). It is far superior to a mimetic traditional learning environment, in which the students only listen, take notes, and render back what they have been told. It requires that the students themselves tangle single-handedly with the case examples.

To conclude, the integrated case teaching method provides an active educational approach with many potential advantages when compared to traditional teaching approaches. This method is consistent with principles of adult learning and encourages the social and contextual basis for learning by promoting conceptual reasoning and holistic reflection of patient situations. Introducing CBL and cooperative learning methods provides opportunities for students to assume leadership and management activities in their groups. A major challenge for the teacher, however, is to monitor the behavior of student groups through (a) probing students' thinking toward conceptual understanding, (b) increasing depth of subject knowledge, (c) providing student learning opportunities, and (d) encouraging the articulation and contrasting of different points of view, in an attempt to allow the emergence of common understanding. Developing individual responsibility and accountability within teams is an important task for educators of future health care practitioners. Therefore, using

case studies from the work place and applying case-based learning methods in groups is more likely to prepare students for the realities of health care team work than traditional learning methods.

CHAPTER THREE

METHODOLOGY

Study Design

This study compares the traditional and case-based education in terms of critical thinking. Thus, the design used in this quantitative research is a "comparative descriptive survey" since it examines and describes differences in variables (CT skills) in two groups (Traditional and CBL programs) in the same setting (Institutes of Nursing).

Selection of Participants and Setting

The MOH Institutes of Nursing in the UAE consist of four campuses, situated in four different Emirates (Abu Dhabi, Al Ain, Sharja, and Fujeira). The targeted population for this study are all the DIII ($n = 145$) students enrolled in the CBL program offered by the MOH four Institutes of Nursing, as well as all the students ($n = 120$) who have recently graduated from the traditional nursing diploma program, then offered by the MOH Institutes of Nursing in July 2000. Whereas the student populations in the Abu Dhabi and Al Ain Institutes of Nursing consist mainly of Arab students of non-UAE nationalities, the Sharja and the Fujeira Institutes admit mainly Arab students of UAE nationality. Moreover, before their enrolment in the diploma-nursing program, all the study participants have graduated from high schools that follow the traditional didactic teaching methods with a general average exceeding 60 %. The entry scores for the students at Al Ain and Abu Dhabi Institutes of Nursing are usually 75% and above. Thus, the Sharja and Fujeira Institutes tend to have more comparable student populations, while the Al Ain and the Abu Dhabi Institutes tend to have more comparable student populations. For this reason, this research chose to include only the Sharja and Fujeira Institutes in the study, as they are more homogeneous.

The nonprobability convenience sampling method was used to involve the readily available accessible population at the desired institutes of nursing. The accessible population for the study then are all the third and thus final year students (n = 71) enrolled in the CBL nursing diploma program at the Sharja and the Fujeira Institutes of Nursing as well as the students (n = 38) who have recently (July 2000) graduated from the traditional nursing diploma program, then offered by the MOH Institutes of Nursing. This constitutes a total of 109 potential participants for the study.

The original intention was for the whole population; namely, the 109 potential participants, to participate in the study. However, there were two variables that could have affected the results of this research and were duly eliminated. Firstly, two students from the Sharja Institute and one student from the Fujeira Institute, however, were repeating the third year of their studies. These three students studied the academic year that they failed via the traditional teaching, which means that they had been exposed to CBL for only two months at the time of data collection; the reason why they were excluded from the study. Moreover, upon interviewing the Fujeira candidates (Diploma III students and recent graduates) in the Institute of Nursing to collect the data, three DIII students were absent and were consequently excluded from the study. Therefore, a total number of six students were excluded from the study. Thus, only 65 out of the 71 DIII students participated in this study, in addition to the 38 recent graduates, constituting a total N of 103 participants.

Instrumentation

The CCTST has been used to collect data on CT abilities of the participants. It is an intellectually challenging 34-item multiple-choice instrument administered over a 45 minutes period, to test cognitive skills. The items are based on common topics, issues, or situations and are intended to be of short, discipline-neutral content; problem statements; and scenarios

grouped into six subscales including analysis, evaluation, inference, explanation, interpretation, and self-regulation (Facione & Facione, 1998). The CCTST comes in two forms A and B; Form B is used in this study. Both forms, A and B are parallel and are each standardized, 34-item, multiple choice tests that target those core CT skills regarded to be essential elements in a college education. The items range from those requiring an analysis of the meaning of a given sentence, to those requiring much more complex integration of CT skills. Some items require the correct inference to be drawn from a set of assumptions; others require that an inference that is provided be properly evaluated. Some other items require that the proper evaluation be justified by the most convincing reason. The CCTST Form B is designed to be equivalent to Form A question for question in terms of logic of each question and answer choice, and in terms of analysis of the CT required for deriving the designated answer. Moreover, Form B parallels Form A in terms of the length of each item and the overall item order in the test. Form B contains 21 new items and 13 items carried over from Form A. In the content, the Form B items have the same kind of topics and situations used in Form A.

The CCTST is an instrument developed by Facione and Facione (1998) to measure CT in college students, graduate students, and adult professionals. It is regularly used for program evaluation and personnel development. It is based on the definition of CT as the process of purposeful self-regulatory judgement that gives reasoned consideration to evidence, context, conceptualizations, methods, and criteria. Possible scores on the CCTST are Total scores from 1 to 34. Subscale scores on the instrument can range as follows: Analysis (1 to 9); Evaluation (1 to 14); Inference (1 to 11); Deductive reasoning (1 to 16); and Inductive reasoning (1 to 14). The sum of the three Delphi construct scores; analysis, evaluation, and inference, is equal to the total score (Facione & Facione, 1998).

Feasibility, Reliability and Validity

A pilot study was done during the last week of September 2000, almost two weeks prior to the date of data collection. The CCTST (Form B) was distributed to a small convenient sample of ten DIII students at Al Ain MOH Institute of Nursing by a facilitator. This pilot study was meant to test the feasibility of using the CCTST with the UAE students who, in addition to being a culturally different group from the original group on which the instrument was tested by its developers, are also non-native English language speakers. The results of this pilot study helped to gauge their English understanding of the test. It anticipated the sorts of understanding or misunderstanding of the questions by the students. Moreover, it checked the approximate time it took the students to complete the questionnaire. The time ranged from one hour to ninety minutes with an average of 75 minutes.

The CCTST has undergone a number of psychometric tests conducted by its developers. The **internal reliability** of 0.70 to 0.75 has been computed using Kuder-Richardson (KR-20) internal consistency coefficients. Nonetheless, a reliability coefficient of 0.80 is suggested for internal consistency on instruments intended to target a single homogeneous ability. However, it has been found that dichotomously scored tests, like the CCTST, typically yield low expected inter-item correlation (Nunnally, cited in Facione & Facione, 1998). The CCTST, though, is not intended to target a single, homogeneous factor. Rather, it measures a variety of cognitive skills (analysis, interpretation, inference, evaluation, and explanation, which comprise five of the core skills from the Delphi research).

Furthermore, in evaluating critical thinking, for instruments designed to measure a variety of aspects of CT, there is no theoretical reason Norris and Ennis (cited in Facione & Facione, 1998) argue for believing that items should correlate highly with one another as in the case of tests that focus on one single skill. It is accordingly recommended, by these

authors, that reliability ratings of .65 to .75 be considered sufficient. Internal reliability for an instrument measuring CT, according to Facione and Facione (1998), should be 0.65 to 0.75, as long as the instrument tests a sufficient range of a concept, items discriminate between participants, and scoring is dichotomous. Accordingly, the CCTST reliability is viewed as highly acceptable for an instrument directed at a construct as multiple faceted and wide-ranged as CT that contains a number of perceivably different elements.

Concurrent validity has been measured by correlating the CCTST with college entry scores such as the Scholastic Aptitude Test verbal scores (correlation alpha = .55 and the GRE = .72). **Construct validity** for the CCTST refers to the extent that the CCTST measures the Delphi conceptualization of CT. It has been supported by significant correlation between the CCTST and student gender, ethnicity, academic major, and critical thinking self-esteem when administered to 1196 university students (Facione, 1997). Correlation between WGCTA and CCTST scores was low however, at 0.54. Because the WGCTA is not based on the Delphi conceptualization of CT, a correlation in the range of about 0.5 does not come as a surprise (Facione, 1997). For the purpose of the current study, however, no psychometric testing of the instrument was conducted by the researcher. The testing conducted by the instrument developers has been found to be adequate.

Data Collection and Analysis

Data were collected at the end of October 2000. By this time the DIII students had been exposed to CBL for two years and two months. These students were well oriented to the case-based teaching learning process. However, the recent crop of graduate students was not at all exposed to the case-based learning all throughout their studies.

All the graduates were sent letters inviting them to participate in the study, since they had left the Institutes by the time the data was being collected. The researcher himself

distributed the CCTST to collect data from all the participants. It was planned that all the participants (students and recent graduates) at each participating Institute would take the test at the same time and in the same environment; that is, each group of CBL students and recent graduates respectively at their particular Institute of Nursing. This, however, was only feasible at the Fujeira Institute. As for the participants at the Sharja Institute, two DIII students as well as six recent graduates were absent on the day scheduled for data collection. The two students were able to complete the test on the next day after securing their own and their parents' permission as they were asked to stay in the institute longer than their scheduled duty time. The other six graduates had to be tracked to their workplace at different hospitals and were personally handed the test there to complete it. The total time to complete the CCTST has been reported as 45 minutes. However, no time limit was set based on the pilot study results. Students were allowed to take as long as they need to take the test. An average time taken to complete the test was 75 minutes.

The data were analyzed using the SPSS software package. Descriptive statistics were used to analyze demographic data of the participating students, i.e., the mean, the standard deviation, and the entire item analysis of the critical thinking scores were computed for each group. In addition, a traditional versus case-based student performance on CCTST was computed using the Independent Samples t test. The t test was used to test for significant differences between statistical measures of the two samples (traditional vs. CBL programs). It used the standard deviation of the sample to estimate the standard error of the sample distribution. Analysis of Variance (ANOVA) is a viable alternative to t test. However the t test, a specialized version of ANOVA was used in this study, as only two means (traditional and CBL programs) were examined. There are a variety of t tests that have been developed

for different types of samples. Independent samples were used because the two sets of data were not taken from the same subjects and the scores in the two groups are not related.

To determine the significance of the t statistics, the degrees of freedom (Df) were calculated. The level of significance and the degrees of freedom were used to identify the critical value of t. The level of significance was set at .05. This is considered appropriate, since the study does not pose any life threatening consequences through acceptance of 95% confidence level.

Ethical Considerations

Permission was secured from the Institutes of Nursing administration as well as from Sharja and Fujeira Institutes of Nursing head tutors and academic committee prior to the collection of data. The participants were informed adequately of the research, of the purpose of the study, and the type of data to be collected. Moreover, they were assured of confidentiality and anonymity.

To ensure anonymity, each subject was asked to choose her unique code number, which was used in the study. Students were reassured that information would be anonymous and confidential. Appropriate ethical clearance was obtained from all study subjects, who were given a written consent form to sign prior to the collection of data. Subjects were advised of their right to withdraw their participation at any time. The participants were assured that the results of testing would not affect their standing in the program, and that the test results would not be included in the Institute students' files or records. Moreover, participants were informed that the findings might be submitted for publication.

Limitations

The obvious potential limitation concerns the small sample size. The nursing students in this study represented only 103 participants from the diploma-nursing program; 38 of

whom were recent graduates from a traditional program, and 65 of whom were students enrolled in a CBL program (DIII). It should be noted, however, that of the total DIII and recent graduate population (N = 265) at the four MOH Institutes of Nursing, 103 participated in the study. This constitutes 39% of the total DIII and recent graduate population at the four Institutes. Furthermore, of the 109 potential participants constituting the accessible population, 103 did participate in the study, constituting 96% of the total DIII and recent graduate population at the two participating Institutes of Nursing. Though not a large number of participants, the 103 participants are considered adequate within the context of this study.

The other potential limitation was that the traditional program group completed three full academic years, whereas the CBL program group was only exposed to two years and two months by the time of data collection. Furthermore, the participants' levels of proficiency in the English language versus the cultural context for which the CCTST instrument was originally designed pose as limitations as well.

In spite of the aforementioned limitations, this study is considered a landmark study on CT in nursing education in the Gulf. It is significant due to the limited research studies related to CT in the field of nursing education in the region; specifically studies focusing on CBL in comparison with traditional nursing education programs.

CHAPTER FOUR

RESEARCH FINDINGS

Introduction

This chapter presents the sample characteristics, descriptive statistics of the overall scores on the CCTST, and the comparison of the participants' performance on CCTST in the two educational programs under study; namely the traditional and the case-based learning. The data are presented in textual and diagrammatic forms including tables and boxplots. This is followed by a discussion of the results of the study at hand.

Sample Characteristics

Demographic data were obtained for all participants in this study. These included age, gender, marital status, primary language, and educational program in their nursing education. Analysis of the demographic data (Table 2) revealed that the participants from the two programs were similar in most respects. i.e., most variables were controlled. They were all (100 %) females, whose primary spoken language is Arabic.

The mean ages for the two groups were similar. All the participants ranged in age from 18 to 25 years with a mean (M) of 20.55 and a standard deviation (SD) of 1.64 years. Having started their nursing education immediately upon graduation from their secondary schools, the majority of participants in both groups fell into the 19-22 age group (81.5 %). Similar to that of age distribution, the marital status distribution of the CBL and traditional in this study were similar; 93 of the overall participants (90.3 %) were single and 10 (9.7 %) were married. In the traditional program, 4 (10.5 %) were married and 34 (89.5 %) were single, whereas 7 (10.76 %) of the CBL program were married and 58 (89.24 %) were single. This means that the majority of the entire subjects were single.

With regard to educational background, all of the participants have come from an EFL

(English as a foreign language) background, i.e., from Arabic medium schools with English taught as a subject rather than a medium of instruction. Of the entire CBL group (n = 70) of students in the two selected institutes, 65 completed the questionnaire (93 %) while all (100 %) those in the traditional program (n = 38), did so. A more concise demographic profile of the study participants is presented in Table 2 (see Table 2).

Table 2

Demographic Profile of Participants

VARIABLE	N (%)
Gender	
Female	103 (100 %)
Primary Language	
Arabic	103 (100 %)
Age (years)	
Mean = 20.5	-
Range = 18 – 25	-
Marital Status	
Single	93 (90.3 %)
Married	10 (9.7 %)
Educational Program	
Traditional	38 (36.9 %)
CBL	65 (63.1 %)

Overall Critical Thinking Skills

The mean scores for the overall group performance on the CCTST are given in Table 3. The Table also depicts descriptive statistics on the standard deviation, and the minimum and the maximum scores obtained on the CCTST. The participants' total scores in this study range between 4 and 23 with a mean score M of 12.84 and a SD of 3.59, which according to Facione (1997), are generally low. Facione (1998) proposes that the maximum possible score is 34 for the total CCTST, 9 for analysis, 14 for evaluation, 11 for inferences, 16 for deduction, and 14 for induction.

Table 3 reveals the CCTST subscale scores. Subscale 1; analysis, was assessed with nine questions. Correct answers ranged from 0 to 8 with a mean score M of 3.67 (40.77 % of the maximum possible score) and a SD of 1.49. Subscale 2; evaluation was assessed with 14 questions. Correct answers ranged from 1 to 11 with a mean score M of 4.93 (35.21 % of the maximum possible score) and a SD of 1.95. Subscale 3; inference was assessed with 11 questions. Correct answers ranged from 0 to 8 with a mean score M of 4.24 (38.54 % of the maximum possible score) and a SD of 1.70. For the final two subscales, the distribution of the 34 CCTST items was set aside. Of the 34 items, 30 were then reclassified as either inductive or deductive reasoning, according to the test developers' instructions. Subscale 4; deductive reasoning was assessed with 16 questions. Correct answers ranged from 1 to 12 with a mean score M of 6.88 (43 % of the maximum possible score) and a SD of 2.36. Subscale 5; inductive reasoning was assessed with 14 questions. Correct answers ranged from 1 to 9 with a mean score M of 4.43 (31.64 % of the maximum possible score) and a SD of 1.73.

Table 3

Descriptive Statistics of Overall scores on CCTST (N = 103)

Overall Group	Total CCTST	Analysis	Evaluation	Inference	Deduction	Induction
Mean	12.84	3.67	4.93	4.24	6.88	4.43
SD	3.59	1.49	1.95	1.70	2.36	1.73
Minimum	4.00	.00	1.00	.00	1.00	1.00
Maximum	23.00	8.00	11.00	8.00	12.00	9.00

Boxplots were used to present summary information of the medians of CCTST. Figure 1 shows the median of the overall participants' scores on the CCTST. It also depicts the overall groups' performance on each of the subscales (see Figure 1). Then the medians of the groups' scores on the various subscales of the CCTST in each of the two educational programs, the traditional (1) and the CBL (2) will be shown in Figures 2

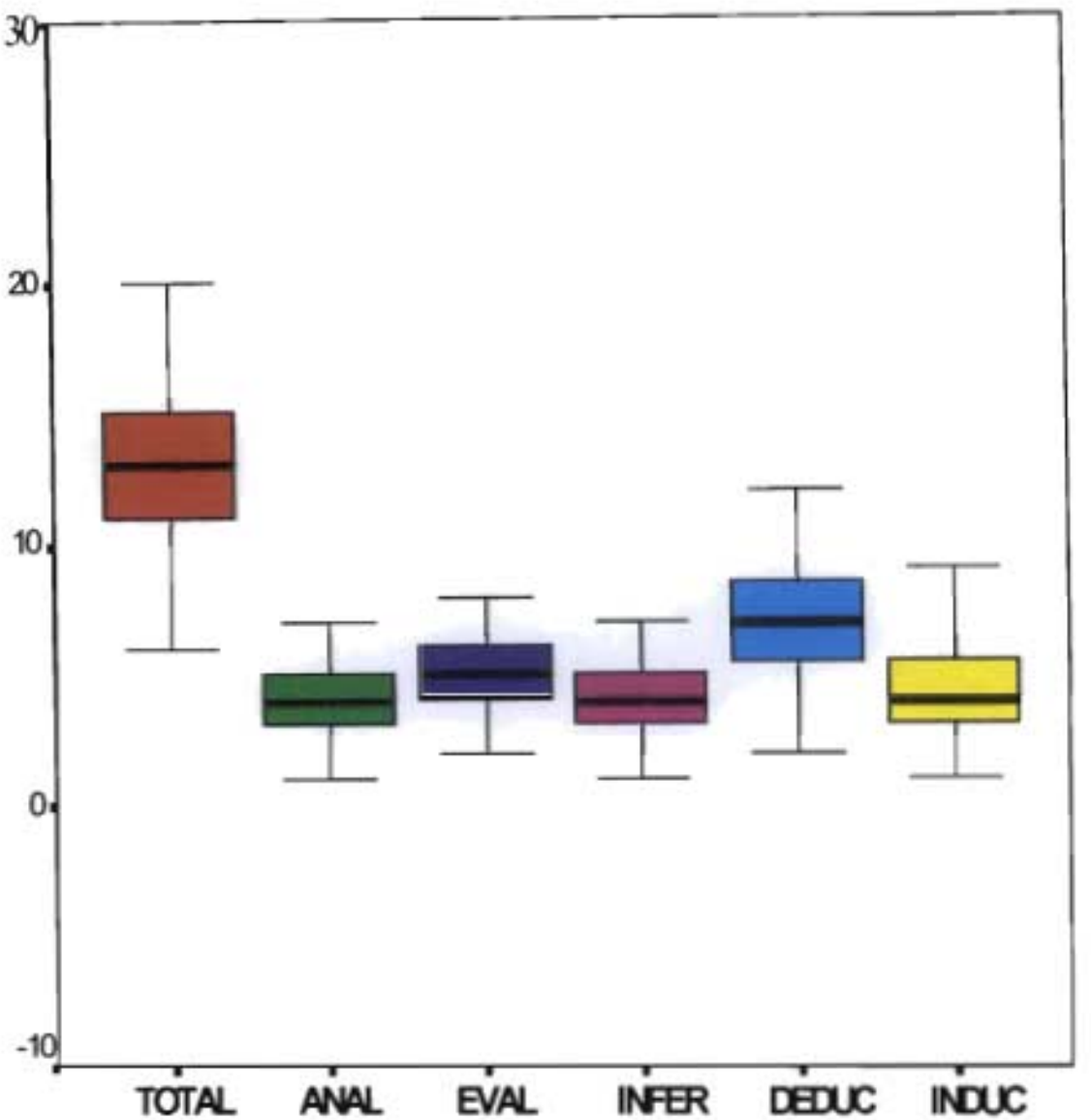

Figure 1. Boxplot of Overall Group's Scores on the CCTST

Note. ANAL = Analysis; EVAL = Evaluation; INFER = Inference DEDUC = Deduction; INDUC = Induction

Participants' Performance on the CCTST by Educational Program

Data from each of the two groups were collected and organized in tabular, graphic, and textual form. Descriptive statistics, for example, the ranges, means, and standard deviations were calculated to describe the CT skills for each of the two groups of participants (see Table 4). The table reveals that the participants' scores in the traditional and CBL programs are varied. The traditional program group scored between 4 and 16 on the total CCTST, 0-7 on analysis, 1-8 on evaluation, 0-7 on inference, 1-9 on deduction, and 1-8 on induction. On the other hand, the CBL program group scored between 9-23 on the total CCTST, 1-8 on analysis, 2-11 on evaluation, 2-8 on inference, 4-12 on deduction, and 2-12 on induction.

Mean CCTST total score for the participants in the CBL program in this study was higher than that for those in the traditional program. The mean score M for the traditional program group was 10.11 with a SD of 3.15; while the mean score M for the CBL program group was 14.45 with a SD of 2.80. The scores for the CT were extremely diverse both on the overall average score and much higher on each subscale with those of the CBL. As revealed in Table 4, the means of the traditional program participants (Analysis = 3.05, Evaluation = 3.84, Inference = 3.21, Deduction = 5.32, Induction = 3.61) are lower than the scores of the CBL program participants (Analysis = 4.03, Evaluation = 5.57, Inference = 4.85, Deduction = 7.80, Induction = 4.91). This implies that the CBL students performed better in the total and all subscales (analysis, evaluation, inference, deduction, and induction).

Table 4

Descriptive Statistics of CCTST scores by Educational Program

Variable	Traditional Program Group (N = 38)			Case-Based Learning Program Group (N = 65)		
	Mean	Standard Deviation	Range	Mean	Standard Deviation	Range
Total	10.11	3.15	4 – 16	14.45	2.80	9 - 23
Analysis	3.05	1.54	0 – 7	4.03	1.36	1 - 8
Evaluation	3.84	1.75	1 – 8	5.57	1.79	2 - 11
Inference	3.21	1.69	0 – 7	4.85	1.39	2 - 8
Deduction	5.32	2.23	1 – 9	7.80	1.93	4 -12
Induction	3.61	1.59	1 – 8	4.91	1.65	2 - 12

The independent-sample t test was computed to test for significance in the variations of the CCTST and the subscale scores between the two groups. Table 5 presents the results of the two sample t test showing the significance, degree of freedom, and mean differences for the Total CCTST in the two groups, traditional program (Group 1) and CBL program (Group 2). The data in Table 5 indicates that the participants in the CBL program had a higher level of CT ability than did the participants who had undergone a traditional nursing program, as measured by total CCTST scores ($t = 7.24$, $df = 101$, $p = .00$).

Moreover, as revealed in Table (5), the CBL program participants scored significantly higher than those from the traditional program on the CCTST subscales measuring analysis (t = 3.36, df = 101, p = .00); evaluation (t = 4.77, df = 101, p = .00); inference (t = 5.29, df = 101, p = .00); deduction (t = 5.95, df = 101, p = .00); and induction (t = 3.94, df = 101, p = .00). The mean difference indicates the difference between the mean scores of the traditional program group and the CBL program group. For instance, the mean difference (-4.34) on the Total CCTST represents the subtraction of the Total mean of the Case-Based Learning program group (14.45) from the Total mean of the traditional program group (10.11). The 95 % confidence interval of difference in Table (5) designates the probability of including the value of the parameter within the interval estimate. It implies that there is a 95 % probability that the population mean falls within the interval.

Table 5

Variations in CCTST Scores by Educational Program

CCTST Variable	T -Test for equality of means						
	t	Df	Significance (2-tailed)	Mean Difference	St. error Difference	95% Confidence Interval of Difference	
						Lower	Upper
Total	-7.24	101	.00	-4.34	.59	-5.23	-3.15
Analysis	-3.36	101	.00	-.98	.29	-1.56	-.34
Evaluation	-4 77	101	.00	-1.73	.36	-2.45	-1.01
Inference	-5.29	101	.00	-1.64	.31	-2.25	-1.02
Deduction	-5.95	101	.00	-2.48	.42	-3.31	-1.66
Induction	-3.94	101	.00	-1.30	.33	-1.96	-.64

The data from this study's findings support the initial research hypothesis that nursing students in the CBL group would and did obtain significantly higher scores on the measurement of CT skills than those in the traditional program. This is because the CBL program engages them in an active, task-based learner-centered approach that stimulates their cognitive processes and makes them agents in their own learning.

Figure 2 shows the medians of the total CCTST score in the two educational programs. It depicts boxplots of the total CCTST and its subscales in the traditional and CBL programs. The figure further reveals that the scores obtained by the CBL program group are higher than those obtained by the traditional program group on the total CCTST and the five subscales, i.e., analysis, evaluation, inference, deduction, and induction (see Figure 2).

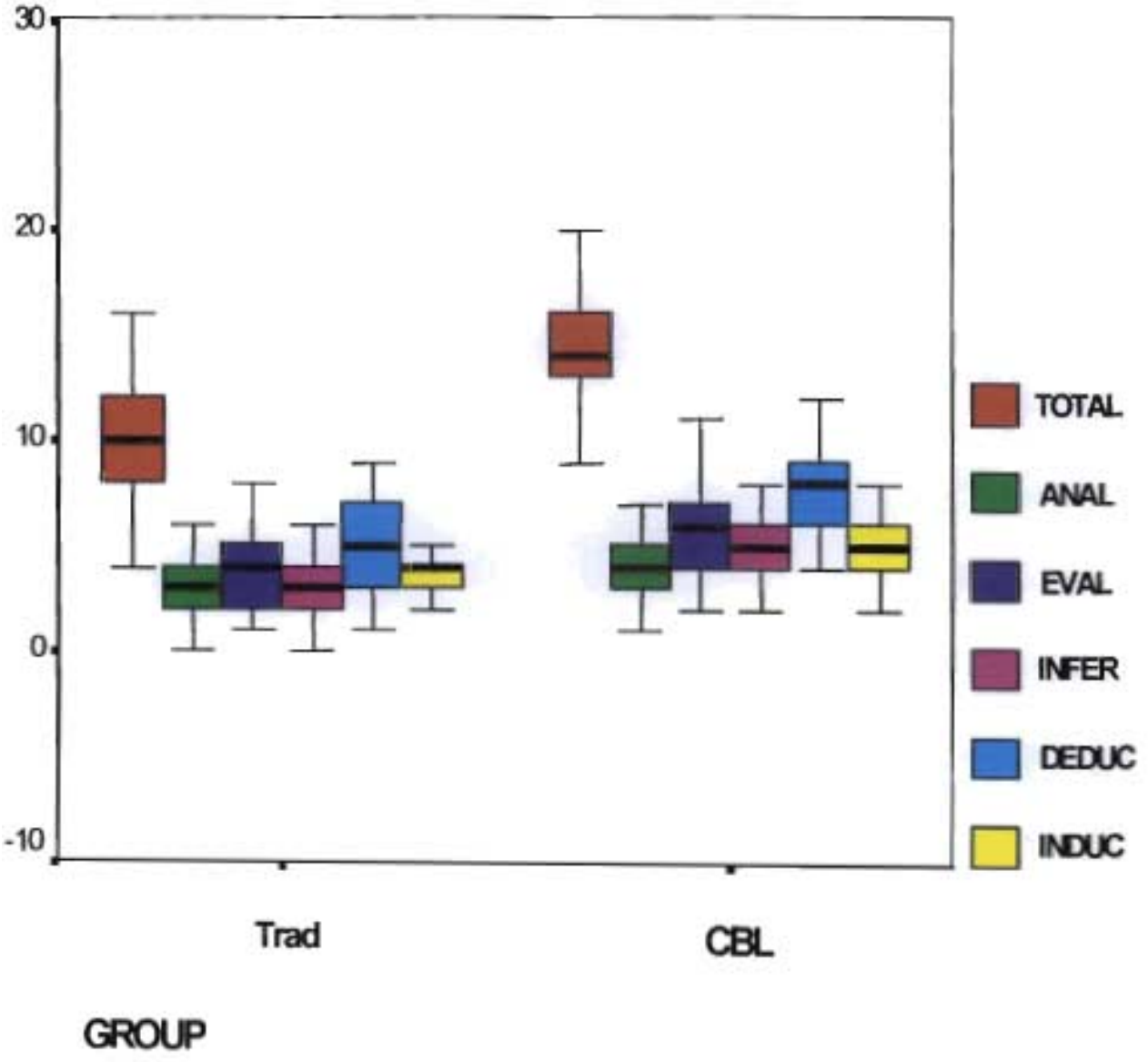

Figure 2.

Boxplot for Total CCTST and Subscales for the two Groups

Note. **TRAD = Traditional; ANAL = Analysis; EVAL = Evaluation; INFER = Inference; DEDUC = Deduction; INDUC = Induction**

CHAPTER 5

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

Discussion

This study contributes to understanding the relationship between case-based learning, traditional education approaches, and the students' CT skills. However, in order to lend more sense to the flow of the discussion, this section will follow the same sequence of presentation as that in the Results subsection.

Overall Group's Performance on the CCTST

A close look at the CCTST scores of the entire participants shows a sorry overall performance level indeed. The findings of this study show that both the traditional and CBL program participants performed badly on the CCTST. Although findings indicate that there has been a significant difference in CT skills between traditional and CBL programs, the low scores achieved by most participants in both groups raise the question of whether these scores represent the best possible achievement for these respondents. Another tentative assumption to be considered is whether these students represent a failure of the current curricula to provide the needed instruction and practice that could have ameliorated their performance in critical thinking skills.

It must be noted, however, that this study has not striven to ascertain whether or not teaching for critical thinking did occur in the CBL classrooms. No classroom observations were undertaken as part of this study. Consequently, questions that are related to exactly what could have attributed to the low performance of the CBL program participants in the CCTST remain unanswered. However, a number of tentative explanations can be proferred.

Firstly, this might have resulted from working in English as a second language, or it might reflect other difficulties in reading comprehension. The participants' own working

knowledge of the English language could have contributed to the overall low performance. It's worthy to note that the CCTST was designed for college level English language speakers; yet, the participants in this study only speak English in the classroom. As an indicator of their English level, those of the students who after completing three years of diploma sit for the TOEFL in order to be admitted to a BSN program, score in the range of 300-450, which is relatively low when looked at retrospectively. Their clinical practice language is also mainly Arabic, since the majority of patients they encounter in the clinical setting are Arabic speaking as well.

Secondly, there might have been respondent problems such as fatigue due to the length of time required to complete the tool (an average of 75 minutes). Thirdly, the researcher has no knowledge of the existence of an explicit model of teaching for enhancing development of critical thinking skills at the participating institutions. It might be that the staff have hoped that changing the curriculum from a traditional lecture-based approach to CBL would automatically lead to marked shift in the CT abilities for the students.

This assumption; however, is not peculiar to the current study's participating schools. Madolo (1998) conducted a study examining the development of CT skills in a PBL medical program. She found that, although there was evidence of progression of CT skills from lower levels of the program to higher levels, generally, the CT skills for the participants in her study were low. Based on these results, she concluded that there might be a need for educational programs aiming at facilitating the development of CT skills among their students to make such intentions explicit through the use of a specific CT model in the teaching/learning process.

Variations in Participants' Performance on the CCTST by Educational Program

The CBL participants' total scores on the CCTST were significantly higher than the scores of the traditional program participants. This significantly better performance in the overall total CCTST and subscales' scores obtained by CBL program participants compared to traditional program participants indicates that learners in a CBL program are more likely to learn to think critically than those in a traditional education program. The results reveal that the students who had completed two years and two months of education in a CBL curriculum tended to receive higher CT scores than a comparison group from the traditional curriculum who actually had completed a three-year nursing diploma program at the time of data collection. This suggests that case-based learning might be an effective approach compared to a traditional lecture-based approach for educating nursing students in terms of improving CT skills. This represents a meaningful, positive outcome for nursing educational institutions seeking alternative educational approaches in an attempt to enhance students' CT skills.

Based on the goals of the CBL diploma-nursing program and supported by background reports of prior research in the area under study, it has been anticipated that subjects' scores on all measures would be higher for the CBL participants than their colleagues from the traditional program. These expectations were confirmed by the results of this study. The low CT score of the traditional program participants compared to those of the CBL program participants is in line with those reported by a number of authors (Potts, 1994; Silverman, 1996, Camiah, 1998) in this area. Case-based learning is superior in cultivating CT, Potts (1994) avers, compared to traditional teaching wherein students primarily listen, take notes, and repeat what they have been told. To Potts, the types of open-ended questions asked in the CBL class encourage students to think and respond critically and creatively; teachers provide opportunities for students to see how newly acquired knowledge or skills

can apply to other situations and the students' own experience. He/she contends that such active learning typically results in better understanding and better retention of the concepts and related material than is possible with a more directive teaching method like the traditional didactic one.

Similarly, a relationship is demonstrated between CBL and CT by Silverman (1996) who concludes that case-based learning fosters analysis and critical thinking skills more than the traditional lecture-based teaching method wherein students identify the accurate correct answer. He/she avers that CBL gives students the opportunity to ask important questions, consider various responses, argue for or against various situations, and to be able to think through situations and evaluate several possible solutions, rather than merely identifying the right answers as in didactic teaching. However, these remain assumptions and assertions not backed up by research findings.

A research study aiming at identifying the skills that would be required of nurse teachers in the light of current educational changes has been conducted by Camiah (1998). The results indicate that a number of nurse tutors who perpetuated a didactic approach to teaching and learning failed to develop in students a sense of creativity and critical thinking. Camiah also proposes that the more student-centred approach to education such as CBL develops critical thinking skills. Such an approach has far more advantages over a conventional method of teaching and learning as it involves a self-directed mode of study using more open and flexible learning methods.

The significant differences in the CCTST scores between the two groups may also be explained by the fact that CBL students were engaged in an educational program in which fostering critical thinking skills was an explicitly stated, intended learning outcome. Students in such CBL programs, Gokhale (1995) contends, take an active role, not just in their own

learning, but also in that of other members in class rather than being passive note-takers as in the traditional program. CBL produces, he/she goes on to say, more critical thinking because it relies on collaborative learning rather than the traditional mode of teaching in which students study individually.

The students in the CBL program under study have been exposed to a more active learning process where they may have been encouraged to think critically, as the tutor was supposed to be a facilitator rather than a provider of knowledge. Literature abounds on the emphasis placed on active student learning in a CBL program. Bonwell and Eison (1991), to mention a few, regarded CBL as an approach to active learning as it involves the students in class to be active thinkers. This has been supported by Potts (1994) who asserts that active learning, where the facilitator suggests directions for students' discussion, improves critical thinking much more than the traditional learning does.

The CBL group performed just as well on the CT subscales. Comparison of results of this study with prior work in this area reveals some similarities. The findings are consistent with the views of Merseth (1994), who asserts that CBL intensifies students abilities to explore, analyze, and examine representations of actual classrooms, hence strengthening their analytical critical thinking skills. Yet, this again was not based on research findings.

In addition, the results of this study are consistent with the views of Uys (1998), Gwele (1999), Bruner (1999), Down and Davidhizar (1999), and Schodt (2000), who assert that CBL enriches the students' problem solving abilities and builds their capacity for critical thinking. They also conform with Herreid and Schiller (1997) and Dailey (1992), who maintain that CBL stimulates and substantiates nursing students' critical thinking through involving them in complex problem analysis, examining assumptions, identifying and weighing alternatives, and setting priorities.

The low CT scores obtained by the traditional program participants, however, echo similar findings to those reported by Wrobel, O'Sullivan, and Smith (1997). These authors conducted a study aimed at evaluating the CT skills of students enrolled in a baccalaureate-nursing program using the didactic teaching method for the classes of 1993 through 1996. They found no significant differences in the WGCTA scores between entry and end of the traditional nursing program. They postulated various reasons to account for the lack of improvement in critical thinking scores after a traditional program. The traditional teaching strategies used in conventional nursing programs, Wrobel, O'Sullivan, and Smith postulate, are not designed to enhance critical thinking and thus do not encourage students' CT skills. For this purpose, a paradigm shift to a curriculum that develops critical thinking is strongly advocated by these authors concerned. One choice is CBL, which according to them would encourage CT and facilitate producing nurses that have CT abilities necessary for facing the changes in the world today.

On the other hand, the present study's findings do not support results reported by several studies in which critical thinking skills were found to be unrelated to the educational approach. For instance, "McMillan (cited in Pless and Clayton, 1993) reviewed 27 studies that investigated the effect of instructional methods on changes in college students' critical thinking" (p. 425). The instructional programs included traditional and case-based learning ones. McMillan's review of these studies fails to support the use of specific instructional program, to enhance CT.

Conclusion

The increasing complexity of nursing practice has made it incumbent that nurses have the ability to identify health and illness problems with multiple diagnoses and in a variety of settings. Practice must draw on the critical thinking skills and strategies needed to make

vigorous and honest inquiry into the unique circumstances of such problems (Facione, cited in Phillips, 2000). Today, nursing is a highly complex and challenging profession that exists within a rapidly changing health care environment. Thus it is imperative that nurses be able to think critically.

Researchers continue to concur that critical thinking is necessary to make these rigorous and honest queries (Yahiro & Saylor, 1994). These authors' beliefs support the need for educational research to determine how these critical thinking skills are acquired. Nevertheless, the findings of this study raise some concerns.

The low overall CT scores obtained by this study's participants indicate that these participants would expect to have great difficulty practicing nursing at the advanced level and thinking through the complex issues and problems at the post graduate level or during their prospective clinical experience. Critical analysis of the results shows that participants in this study need to further develop their CT skills. In other words, the researcher believes that more efforts should be exerted to further enhance CT in this particular nursing program.

A positive outcome of this study however, has been the finding that the CBL methodology appears to be more effective in developing CT skills for nursing students than traditional methodology. Case-based learning program participants consistently outperform the traditional program participants both in the total CCTST and in its subscales. It can be justifiably concluded that CBL should be encouraged within the nursing curricula.

Recommendations

Based on the results of this study, the following recommendations for teaching/ learning, curriculum choices in nursing, and further research in nursing education are made.

Teaching/learning in nursing. As a result of this study, it is highly recommended that the use of CBL should be fostered in nursing education as a teaching methodology in conjunction

with more active strategies that better enhance CT to attain educational goals for improving CT performance. If nursing schools are to prepare students to think critically in order to facilitate conceptual understanding as a basis for solving increasingly complex nursing problems, CT skills must be taught, practiced, and continually reinforced in a meaningful context. Developments in CT skills are most successful when such skills are grounded in rich and elaborate content knowledge. It would seem opportune then that case-based nursing learning shift to emphasize the development of well-structured knowledge base through the systematic provision of CT and problem-solving tasks in meaningful contexts. Therefore, it is advised that teaching efforts be mainly directed toward more development of CT because CT skills are central to nursing. It is recommended to integrate teaching strategies and learning experiences which involve more dynamic learning activities that enhance CT and SDL into all courses of the nursing curriculum at all levels in order to contribute to the development of students' CT skills. Such activities would include the use of simulated case studies as stimulus material, small groups in large classes to process course concepts, and asking critical thinking questions during group discussion in a variety of contexts. It must be stressed that the case simulations need to be continually updated and validated to ensure that the course objectives are being met and that learning issues are appropriate.

Empowering nursing students to ask more probing and challenging questions is urged as an educational imperative for promoting CT in nursing education because questioning forces learners to engage actively in the learning process. Rather than question students about what they should know, educators are advised to ask them what they think they need to know and how they plan to seek answers to their questions. Students are also advised to learn to ask exploratory questions, looking for evidence, seeking and scrutinizing alternatives, and critiquing their ideas as well as the ideas of others.

Along with enhancing the effective use of questioning, it is suggested to vary the teaching-learning strategies for better engagement of students in deeper and more active learning, concentrating on developing CT principles in more than one way. In order to accommodate these varied learning methodologies, nursing educators should take more time to monitor each student's progress. They can monitor students' progress by supporting and supplying prompt feedback to the students as well as by stimulating the students to question and to negotiate for information not found in textbooks through enhancing their communication skills. Tutors should encourage more cooperative learning groups, arguments, debates, and role-playing during the students' classroom discussions. They should also give students plenty of freedom and encouragement to explore learning issues and search for answers to their questions on their own. Additionally, it is recommended that educators encourage and support self and peer-evaluation in the teaching-learning process. Faculty are further recommended to increase the students' involvement with the subject matter and the process of learning to develop their skills in analysis, inference, evaluation, deductive, and inductive reasoning.

Furthermore, as educating students to become critical thinkers is related to opportunities for deep learning, the educators have a particular responsibility to facilitate this approach. Modelling CT effectively would communicate and facilitate students' CT skills. Facilitators need to ensure that they display the characteristics of CT when interacting with their learners. Tutors can enhance the effectiveness as models by thinking out loud frequently. The thinking aloud approach is one wherein the nursing educator; the more proficient, verbalizes or summarizes the thought process and rationale of actions rendered either while the situation is occurring or shortly thereafter. This is important in nursing education because if tutors just deliver their conclusions without going over their process in

defining the problem, examining assumptions, and generating and evaluating options, they might deprive the learners of opportunities to think critically. On the other hand, if the faculty demonstrates the process of thinking through case studies by thinking aloud for the students, the students will be more likely to understand, to model after, and to actively participate in the group activities

Curriculum. It is recommended to adapt the nursing curricula to the changing needs of the country and the technological advancements. The nursing students are expected to demonstrate enthusiasm, independence, and willingness to learn. In order to graduate competent and accountable nurses, the concepts of critical thinking, inquiry or problem solving, and self-directed studies are essential. Thus, changing the curriculum to focus on teaching strategies of CT, decision making, and problem solving is highly recommended. In brief, the nursing curriculum needs to be reexamined and evaluated for teaching strategies to determine how tutors could better provide the experience for students to improve their CT skills. The findings of this study bring to mind the researcher's dissatisfaction with the traditional teaching curriculum. Concurrently, the researcher believes that the CBL, as an educational program, is able to promote CT in nursing students much more than the traditional program, albeit the fact that students' scores on CCTST were low. Hence, it is recommended to keep to minimum the traditional teaching practices from the nursing curricula and to transform most of the lecture classes into more active learning classes, unless it's a foundation course wherein a large number of students are enrolled in their sophomore year in order to obtain the background knowledge needed to process information and work in cases. One recommended option is CBL, whereby the educator's role is that of a facilitator and students are challenged, stimulated, and supported in discovering the means to solve their questions by using a range of resources.

The objectives of the course should clearly state that fostering CT is an explicit course output, and the content of the courses in nursing education should be modified to reflect a persistent effort to infuse CT into the entire curriculum. Because CT enables students to analyze, make inferences, recognize assumptions, make interpretations, and evaluate arguments to reach deductions and inductions; teaching a CT specific model is recommended to be included in the curriculum as a separate course starting the first level of the nursing program. This is in accord with the Modolo's (1998) conclusion (aforementioned in the discussion section). In this course, faculty should carefully introduce students to the CT concepts, skills, and subscales in addition to the expectations and outcomes of CT. To promote CT in the nursing curriculum, faculty and students should be more outspoken about course goals and learning activities designed to help students think critically. The CBL program should explicate a clear definition of CT, identify specific learning outcomes reflective of CT abilities, and select appropriate methodologies to further promote students' critical thinking skills. However, one should not expect that a single CT course would develop students' competencies in this area if students were not to use these skills in their different courses because if these courses do not have CT as a core component, the skills will simply degenerate and disappear. Teachers at all levels must manipulate the course syllabus in such a way that it calls for the use of CT in many assignments or class activities, so that students end up using these skills in every class and evaluate their skills accordingly. It is then important to implement the use of CT to solve problems and make decisions in a wide variety of situations. In today's rapidly changing context, it is solving real problems and making correct decisions based on CT that is valued, rather than simply demonstrating a narrow set of skills in a highly structured academic setting.

Furthermore, it is recommended that a Curriculum Development Committee be formed within the nursing curricula. A major outcome of this committee is that the schools of nursing use a framework that makes CT a central component of all the courses. The committee should frequently revise and develop a range of teaching skills to continue emphasizing the importance of the outcome measures in the nursing curriculum, the most significant of which is CT. The committee should also design workshops for preparing the faculty to integrate more CT strategies throughout the curriculum. In such workshops, courses need to be regularly examined for their entire inclusion of CT activities.

Finally, it is imperative that there should be regular development and subsequent evaluation of innovative nursing curricula. This is essential in order to meet the complex demands of health care delivery in the coming decades as regards enhancing critical thinking skills and implementing them. The vision is to graduate professional nurses who are able to assess clients' health care problems systematically and pragmatically, take actions based on theoretical knowledge, and evaluate the care provided. The graduate professional nurses are also viewed to contribute to the health care system and enhance the quality of nursing care through nursing research, which adds to the nursing body of knowledge. Education must place more emphasis on producing health care providers able to practice in acute and community health settings and able to work within collaborative practice. Nursing faculties must enable their students to use the academic tools of research and educational methodology so that students become able to identify, select, and organize the nursing body of knowledge interdependently with the other relevant disciplines. This would enable students to contribute significantly in the design and implementation of nursing care for individuals and families in acute and community health settings.

Further research. Based on the results of this study, which demonstrates a significant difference in CT of students in two different nursing programs, traditional and CBL, some recommendations for further research in nursing education are suggested; hopefully to be implemented. Little is known about how nurses build critical thinking skills. The findings that both groups got low scores on the CCTST might be correlated with the facilitators' abilities to facilitate CT to their students or rather a lack of an explicit model for developing critical thinking in the nursing curriculum. On that account, further studies are recommended to discover the most effective or optimal strategies for teaching CT for nursing students in the classroom. Nurse educators need to continue investigating techniques that best improve the students' CT abilities, and to use a CT measure to assess whether their faculty are implementing optimal methodologies to favor the use of CT skills in their courses. Dialoguing, debating, and clinical rounds have been found to be quite effective in fostering scepticism, analysis, inference, and synthesis.

In addition, research has to be maximized as it is crucial in upgrading the level of nursing. A longitudinal study to track patterns of growth in CT as the nursing students progress through each semester of the nursing program would assist nurse educators in evaluating the curriculum for areas of strength and weaknesses in delivering CT skills. Tracking these skills after graduation during the first years of practice would also help in evaluating CT skill development. Critical thinking should be used in the on-job- nursing activities through the in-service education after graduation. Accordingly, it would be useful to follow up on and continue longitudinal data collection after graduation to describe changes in CT skills once graduates are exposed to the clinical practice environment.

Moreover, the relatively small sample size in this study would suggest that it might not be representative of the larger population of nursing students. For purposes of reliability,

repeating the study in multiple settings with different types of programs in diverse geographical locations and using a larger sample such as the entire nursing institutes in the gulf region might be a good option. Thus, it is recommended to ascertain the CT ability of nursing students more clearly by replicating this study on a randomly selected larger sample so that results can be more reliable and more valid and can thus be generalized to greater populations.

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APPENDIX A

Sample Questions from the California Critical Thinking Skills Test

CCTST

(Form B)

Read each question carefully, then select the best choice from among those provided.

1. Suppose a biologist lecturing about household pets said, "The dog offers several temperaments." Which would be the best interpretation of this claim?

A = There is a dog which has more than one temperament.

B = All dogs have several temperaments

C = Not every dog has the same temperament

D = There is a thing that has more than one temperament and it is a dog.

E = All of the above are equally acceptable interpretations.

2. Consider the "goladern" relationship. It is defined as follows: "Only humans are goladerns. But not every member of the human species has goladerns. Nobody can be a goladern to themself, but today every human is someone's goladern. If someone is your goladern, then all that person's goladerns are your goladerns too. If someone is your goladern, then you cannot be that person's goladern. Assume the first two humans, the long ago deceased ancestors of our species, were named Sara and William." Given this meaning of "goladern" we can say for sure

A= All of us are goladerns to Sara and William.

B= Sara and William are goladerns to one another.

C= Sara or William is each their own goladern.

D= Someone is neither Sara's nor William's goladern.

E= None of the above because this concept does not make sense.

3. "In a scientific study of college women who smoked one or more packs of cigarettes a day for at least two years, 85 % of the women who quit smoking showed a 15 % improvement in lung capacity within 45 days of quitting. That this improvement could have happened randomly or by chance was ruled out experimentally with high levels of confidence."

If the information in this case were true, which of the following hypotheses would not have to be ruled out in order to confirm the claim that for about 85 out of 100 adults who smoke one or more packs of cigarettes a day for at least two years, a 15 % improvement in lung capacity can be obtained within 45 days of quitting smoking?

A= Improvement in lung capacity is limited to females, but improvement in lung capacity will not be evident in males who quit smoking.

B= Since smokers under-report the amount they really smoke, the actual relationship between quitting and lung capacity improvement is greater than indicated.

C= Since the women studied were predominantly Hispanic or Asian, these findings do not apply to the adult population of the United States in general.

D= Since college officials failed to keep this research project confidential, the college women and the scientists involved knew the purpose of the study.

E= In college women, changes in lung capacity result from other factors, such as changes in physical fitness, health, blood pressure, and fatigue level.

APPENDIX B

The Cover-Page of the CCTST

Dear Graduate / Student:

I am conducting a Master's research study on Critical Thinking in a Case-Based curriculum and a Traditional Didactic Curriculum. This study will compare the new curriculum that was adopted by the MOH Institutes of Nursing in the UAE in 1998, the "Case-Based Curriculum" with the old curriculum " Traditional Teaching Program" in terms of developing students' critical thinking skills. This is a partial requirement for my degree " Masters in Progressive Education for Health Professionals". In this domain I am seeking your support to fill in the Questionnaire in hand "CCTST, Form B".

Your kind and sincere participation will be of great help to my study.

You are selected to participate in my study, as you are a graduate / student nurse from the Sharja or Fujeira MOH Institutes of Nursing.

I would like to reassure you that the data collection is an anonymous process; your name will never be revealed under any condition. To ensure anonymity, a code number will be randomly assigned to you to be used in the study. Moreover, all the information will be treated with an ultimate confidentiality. It's only the researcher and one assistant will access the raw collected data. The results of the study will be accessible to participants upon request.

Please feel free to contact me for any query or clarification concerning this questionnaire or for the future findings and results of this research (See my address on the next page).

Yours thankfully,

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