

*Critical Thinking Skills Development Among the Diploma
Nursing Students In a Case-Based Curriculum*

Lina Abi Faker de El-Kantar

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Lina Abi Faker de El-Kantar

Supervisor

Dr. Oluyinka Adejumo

School of Nursing

University of Natal

Durban

South Africa

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Abstract

Faculty members in many schools of nursing have been urged to include critical thinking in all aspects of the nursing curriculum. The faculty at the Institutes of Nursing in the United Arab Emirates, have adopted in the academic year 1998 a case-based curriculum that teaches nursing courses by using case studies, which represent a terrific and non-threatening method to use to teach and learn either critical thinking skills or clinical decision-making (Robinson, 1998; Glendon and Ulrich, 1992, 1997). The development of critical thinking skills in a case-based curriculum was investigated. A randomly selected, cross-sectional sample of nursing students at the Abu Dhabi Institute of Nursing ($N=88$) was studied. Three groups ($n=30$) from each level of a three-level-diploma nursing program were measured for development of critical thinking skills using the Test of Everyday Reasoning (TER). Relationships were investigated between TER scores, the level of the program and other socio-demographic and academic achievement determinants. Critical thinking ability did not change significantly among the three levels during the educational experience in a case-based curriculum; however, the participants in the highest level of the program were able to get a higher mean TER scores from the other two levels. One of the conclusions that could be drawn from this study was that critical thinking might not change as an associated factor with a case-based curriculum at this premature phase of its implementation until some time after the graduates of this program become

practicing nurses where clinical decision-making would be in action. The other conclusions focused on the necessity of unfolding the utilized cases in the curriculum and on determining whether the construct of critical thinking has been incorporated in them.

Dedications

I dedicate this thesis to my husband and my children Tala and Kareem whose support and appreciation constantly inspire me.

To them I say:

“ I hear and I forget

I see and I remember

I do and I understand” . . . (Chinese proverb)

Acknowledgments

The genesis of this thesis can be traced to two significant events that took place at the Institutes of Nursing. The first was the education reform undertaken by the institutes at the United Arab Emirates and substantiated by the adoption of the case-based curriculum (in 1998), which was a challenge for the staff with voracious appetites for applying self-directed learning principles, eager to challenge the boundaries of the discipline. The second was the successful implementation of the master's degree in nursing education that was offered by Natal University (in 1999), which attracted staff members who are ardently devoted to the purpose of improving the standards of nursing education in the country.

Inspired by the enthusiasm of both students and staff at the Institutes for such challenges, the plan for this study was launched by the author. The thesis couldn't have seen light if those events didn't influence the author in one way or another.

The author acknowledges all the participants in this study for accepting to sit for the critical thinking test, and acknowledges as well the administrative staff at the Abu Dhabi Institute of Nursing for their assistance in the data collection. Special thanks are directed to Mrs. Diab, head of the Sharjah Institute, for accepting to pilot the measuring tool utilized by the researcher.

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List of Abbreviations

APA	- American Philosophical Association
CCTDI	- California Critical Thinking Disposition Inventory
CCTST	- California Critical Thinking Skills Test
GPA	- Grade Point Average
NLN	- National League for Nursing
TER	- Test of Everyday Reasoning
U.A.E.	- United Arab Emirates

Chapter One

Critical Thinking Skills Development among the Diploma Nursing Students in a

Case- Based Curriculum

Introduction

The current changes in the health care system have been driven by a number of powerful societal forces that are producing a gradual but inevitable reshaping of health care delivery. Critical thinking has been more and more widely recognized as a liberating force in education and a powerful resource in one's personal and civic life.

Nursing education has begun to recognize that their graduates need to be prepared for the challenge that is awaiting them in a changing health care system. This challenge has attempted at ensuring the continued quality of nursing programs and making nursing education more accountable for producing knowledgeable and competent professional nurses who can actively think rather than passively accept knowledge from without.

Professional accrediting associations have begun to require student assessment measures of critical thinking as a curriculum outcome. Further emphasis has been made by the National League for Nursing (NLN, 1990) in its stipulation that student nurses should be taught to think critically and that nursing programs should show evidence that students have developed critical thinking skills on

completion of the program. The criterion stated, “The curriculum emphasizes the development of critical thinking and of progressively independent decision making” (cited in Miller & Malcolm, 1990, p. 67). Among the measures set forth by the NLN was, “Required Outcome Criterion 1: Critical Thinking - This outcome reflects students’ skills in reasoning, analysis, research, or decision making relevant to the discipline of nursing” (1990, p. 26).

Maynard pointed out in her study conducted on the relationship of critical thinking ability to professional nursing competence that “the rapidly changing health care delivery system and the nature of client care dictate the need for professionally prepared nurses who are competent and capable of thinking critically” (1996, p.12).

Critical thinking skill, a measurement of expected educational outcome, has been considered an issue of current concern in higher education (Brookfield, 1987; Paul, 1990). The development of this skill is of particular importance to nursing education because it is considered essential for nursing practice (Facione, 1996; Adams, 1999), as well as a measure of the quality of Baccalaureate nursing programs (NLN, 1990).

The faculty at the Institutes of Nursing in the United Arab Emirates (U.A.E) has acknowledged the calls for nursing education reform and has agreed on the importance of teaching critical thinking skills to the Diploma Nursing students to effectively meet the changing demands of the role of nurses. Pursuing from this

and in 1997, the faculty felt the quickening for change and the zest for the reform. The change in nursing education from the traditional curriculum has aimed at responding to and agreeing with the stipulation of the NLN and that of the requirements of the changing health care systems. Hence, the choice of the case-based curriculum in the Diploma Nursing program at the U.A.E has reflected the faculty's request and has mirrored the faculty's conception of the teaching learning process.

Accordingly, the faculty defined learning as, "A continuous process of acquiring knowledge, skills, abilities, and attitudes that lead to change in behavior aimed at reaching a desirable outcome". The teaching and learning process was defined in the Institutes' philosophy as " An interactive process that involves a learner and a teacher who is responsible for facilitating students' learning using student- centered approaches such as self- directed learning and case- based learning emphasizing critical thinking and problem solving skills both in the classroom and in the clinical settings" (see a copy of the Institutes' philosophy in Annex C).

The traditional curriculum, being teacher-centered learning, has been perceived to have drawbacks owing to the insufficient preparation of its learners in assuming responsibilities, adapting to change and practicing competently in the climate of health care change. Dewey (1938) warned educators of the negative impact that such curricula have on learners and described them as being passive

entities, have no role in the learning process but have to merely acquire the previously prepared knowledge. Besides, he emphasized that this imposed knowledge from without will have no directive value for the experience of the learner.

Why the case-based curriculum then? Barnes, Christensen, and Hansen (1994) identified four principles for case method teaching: (a) The primacy of analyzing situations, (b) the imperative relation between analysis and action, (c) the necessity of student involvement, and (d) the facilitating role of the instructors. These principles appeared congruent with works done by Robinson (1998), who confirmed that case studies represent a terrific and non- threatening method to use in order to teach and learn either critical thinking skills or clinical decision-making.

Being a newly applied curriculum with the faculty's assumptions that such a curriculum would develop the learner's critical thinking skills, an increased interest has been solicited by the faculty and the director at the Institutes of Nursing to find out if these skills are developing in the students across the three years of the Diploma Nursing program. Besides, opting for the case-based curriculum has reflected the real concern of the faculty to replace the traditional methods of teaching by strategies that promote active student involvement and participation in the learning process. This process, emphasizing learning rather than teaching, will prepare a different caliber of nurses. According to Glendon

and Ulrich (1992, 1997), the case method teaching has a positive influence in preparing nurses to think critically by problem solving and contextual awareness, interacting with others through utilization of effective communication skills, and making their learning meaningful through reflection.

Purpose of the study

The purpose of this study was to examine whether critical thinking skills incrementally develop from one year of the Diploma nursing program to the other in a case-based curriculum. This was achieved by measuring and comparing the critical thinking skills of the Diploma nursing students at the Abu Dhabi Institute of Nursing during the first semester for each level of the program using the Test of Every day Reasoning (TER).

Research Questions of the study

The question addressed by the study was: Will there be a significant difference among the three groups of students, each representing a level of the program in a case-based curriculum, on total scores of the TER?

Hypothesis of the study

The hypothesis of the study was that the nursing students in a case- based curriculum at the Institutes of Nursing in the U.A.E would show incremental difference in their critical thinking skills with each year spent in the Diploma nursing program.

Assumptions of the study

The development and enhancement of critical thinking skills have been considered as the primary goals in nursing education. Nursing students can be taught critical thinking skills through the case method of teaching, being the instructional method in the case-based curriculum.

Definition of Terms

Critical thinking: Critical thinking in this study referred to the performance of the students on the TER. This test was designed by Facione (1992) to measure induction, deduction, analysis, evaluation and inference as components of cognitive skills or core critical thinking skills.

Critical thinking skills development: The development in this study referred to the changes in the TER measurement of the critical thinking skills of the nursing students from one year to another year spent in the Diploma nursing program.

Case-based curriculum: The case-based curriculum in the study referred to the use of real life situations as the method of instruction. These situations have been presented in all nursing courses in the form of case studies and each case study introduces the content to be learned.

Diploma nursing students: Diploma nursing students are students at the Institutes of Nursing in the U.A.E who are being prepared to be generalist nurses, capable of functioning as competent, caring safe providers in a variety of general

settings and committed to ongoing professional growth and development (refer to Annex C for a description of the purposes of the program).

Rationales and Significance of the study

Where there has been consensus by educators that case method teaching stimulates critical thinking through problem analysis or real hypothetical cases, questions remain regarding its implication in nursing education.

There hasn't been any attempt of any sort by the faculty at the Institutes of Nursing to study the development of critical thinking ability among the nursing students. Besides, there hasn't existed any study in the U.A.E on the relationship between the type of curriculum and the development of critical thinking skills. Additionally, there have been limited studies focusing on the development of critical thinking during the education process and its relationship to the type of curriculum in general and the case-based in specific.

Therefore, the conduction of this study on the development of critical thinking ability in a case-based curriculum would be considered the first of its kind at the Institutes of Nursing in the U.A.E. and the Gulf region as well. The findings constitute an additional support to the limited existing research concerning the type of nursing curriculum utilized and the development of critical thinking ability (Brooks and Shepherd, 1990).

Besides, this study would contribute as a mandate for innovation in nursing education, since the NLN (1990) recommended an opportunity for actualization in the future of nursing education.

Further development of this study would be the impetus for improving the status of nursing education in the country and in the region as well owing to the existing theoretical assumptions of the positive impact that the case-based curriculum has on improving the critical thinking ability of students.

Chapter Two

Literature Review on Critical Thinking in the Case-based Curriculum

Critical Thinking

A review of definitions on critical thinking.

John Dewey (1933) introduced the concept of critical thinking and the role of schools in teaching it when he wrote “How We Think: A Restatement of the Relation of Reflective thinking to the Education Process”. Dewey elaborated on the method of an educative experience and the similarities between the essentials of method and that of reflection. Dewey’s elements of reflection included: (a) exposing the students to a situation (real perplexing event) or experience of interest to them and engaging them in activities of ordinary life; (b) generating the stimulus from the developing genuine problem; (c) possessing the information (knowledge) and making the necessary observations to deal with the problem at hand; (d) suggesting solutions to the problem in an orderly fashion; and (e) availing application opportunities for students to test the ideas, to make clear meanings, and to test the validity of the solutions. Furthermore, Dewey emphasized the existing identity between the elements of reflection and the habits of mind when he stated, “If we were compelled to make a choice between these personal attributes and knowledge about these principles of logical processes, we should decide for the former” (1933, p. 34).

Most educators have emphasized Dewey's "reflective thought" through their calls for educational reform. Nevertheless, each educator has defined critical thinking from a specific perspective, thus resulting in considerable discussion and little agreement on the meaning of critical thinking. This considerable diversity in critical thinking descriptions has been found in the works done by Mezirow (1990), Ennis (1987), Facione (1990), and Paul (1990).

Mezirow defined the term "critical reflection" as "a critique of the pre suppositions on which our beliefs have been built" (1990, p.1). He argued that through reflection one would ultimately achieve "perspective transformation" and suggested that through discussion, reading, or aesthetic experience, an individual or a group might encounter a perspective contrary to his \ her own, thus yielding "disorienting dilemma" that would in turn lead to "critical reflection and transformation". The author addressed the significance of reflection to adult development and called it "emancipatory education". In this context, education has played a significant role and it provided, according to the author, "an organized effort to help the learner challenge presuppositions, explore alternative perspectives, transform old ways of thinking, and act on new perspectives" (Mezirow, 1990, p.18).

Ennis, one of the pioneers in critical thinking measurement, defined critical thinking as being both reasonable and reflective, involving decisions related to how to act or believe. Agreeing with Mezirow and Ennis, McPeck perceived

critical thinking as “the propensity and skill to engage in an activity with reflective skepticism”(cited in Miller & Malcolm, 1990, p.67). To the author, this specific type of thinking correlated with expertise and knowledge.

However, Paul (1990) introduced critical thinking as “thinking about thinking” and explained the impact that “reflective thought” has on determining the quality of thinking in order to improve it. He defined critical thinking as “The systematic attempt to think about thinking in such a way as to take it apart and recognize how it is functioning, evaluate it for its strengths and weaknesses and restructure it to make it better” (1995, p. 1). The author elaborated on the presence of two essential dimensions of thinking that should be mastered by students in order to upgrade their thinking. These dimensions included identifying the elements of thinking and setting criteria for self or other evaluation of critical thinking.

Another often-cited definition has been the one published by the Delphi Group on critical thinking to include: “Critical thinking is the process of purposeful, self-regulatory judgment. This process gives renewed consideration to evidence, contexts, conceptualizations, methods and criteria” (1990, p. 2).

Duldt (1997) derived personal dispositions and skills from areas of critical thinking. Personal dispositions included “truth seeking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness and maturity”, where as skills included “analysis, evaluation, inference, deductive and inductive

reasoning” (p.6). The author added reasoning and assessment elements of critical thinking to the attributes of an ideal critical thinker defined by American Philosophical Association (APA) to draw the complete picture of a nurse with critical thinking skills.

The elements of critical thinking.

Thus far in nursing, Videbeck (1997) claimed that the definitions of critical thinking often were borrowed from other fields and disciplines and were adapted to nursing. Measuring critical thinking skills and deriving models of critical thinking that suit nursing have been perceived as the premises in nursing practice and the ground work for nursing education. Unfortunately, the elements of critical thinking in nursing have been derived from other disciplines and the existing critical thinking measuring tools utilized in nursing reflect the construct of critical thinking that suit the disciplines themselves rather than nursing per se. However, one of the pioneers from other disciplines and who it was worth referring to in this study is John Dewey.

According to Dewey (1910), thinking has involved “ the suggestion of a conclusion for acceptance and also search or inquiry to test the value of the suggestion before finally accepting it”(p.30). He did not hesitate to suggest the essential elements needed for reflective thinking, thus emphasizing that the requirements for the training of thought would require: “(a) The presence of experiences and facts to develop suggestions; (b) promptness, flexibility, and

fertility of suggestions; (c) orderliness, consecutiveness, and appropriateness in what is suggested”(Dewey, 1910, p. 30).

Pursuing from Dewey’s reflective thought and the requirements for training of thought, critical thinking has attracted the attention of proactive educators in various disciplines including nursing. Being a practice science, nursing has its share in this educational reform, substantiated by the establishment of new paradigms in nursing education with the ultimate aim of fostering critical thinking in nursing students.

Paul (1995) categorized the habits of a good critical thinker into “intellectual humility, intellectual perseverance and fair-mindedness”(p. 2). He believed that the critical thinker has knowledge of his/her ignorance, has the ability to work through difficulties in thinking in order to solve problems that have some inherent complexity in them, and has the ability to consider views other than one’s views and justify his/her rejection. Conger and Mezza (1996) elaborated further on the need for these skills to address problems, consider the alternatives, and make decisions about what to believe or do.

Within the context of the need for these skills, Paul (1995) stipulated the essential presence of two components to make critical thinkers. The components encompassed the ability to process information and construct new beliefs and ideas from a set of cognitive skills, and the disposition towards using the

cognitive skills to guide behavior. Moreover, the author addressed eight structures for thinking and reasoning that consisted of:

Think for a purpose or a goal; think to answer a question or a problem to solve; search for data, facts and experience; interpret the data; use concepts or ideas; make assumptions; consider implications and consequences when coming to conclusions on the basis of data; think within a point of view.(p. 2).

Eventually, critical thinkers would not only possess critical thinking skills but they would be also motivated to actively use them to guide them in what they believe and do. In accordance with this dimension of critical thinking, Paul highlighted the need of students to assess the parts of their thinking by utilizing “intellectual standards that are applicable to all thinking. These included clarity, precision, accuracy, relevant depth, breadth and logic” (p.1).

Ennis (1987) had a similar position in his taxonomy of “Critical Thinking Dispositions and Abilities” to include “clarity, basis and inference” as the three constitutive areas of critical thinking. To the author, clarity included the ability of the person to focus on a question, analyze arguments, and ask appropriate clarifying questions. Basis, on the other hand, has been considered the second element in Ennis’s critical thinking since he believed that a large share of what we come to believe has other people as its source, and then it is crucial for the critical thinker to judge the credibility of that source. As for inference, Ennis categorized it into deductive inference, inductive inference and inference to value judgments.

According to the author (1987), deducing and judging deductions have been concerned with “whether something follows necessarily from something else” (p. 20). Inductive reasoning included generalization or the day-to-day inferences leading us to infer in similar situations. Ennis concluded that the significant features of the critical thinking construct should be “focusing on belief and action, making statements in terms of things that people actually do or should do, including criteria to help us evaluate results, including both dispositions and abilities, and being organized” (p. 25). Ennis’s taxonomy has been considered an elaboration of the higher order thinking and has entailed approaches to problem solving.

Rubinfeld and Scheffer (1999) developed five modes of thinking that have collectively represented critical thinking skills in nursing. The modes included “Total recall, habits, inquiry, new ideas, and creativity” (p. 6). Besides, these modes of thinking have their basis from the authors’ assumptions that “enhancing thinking is a deliberate act that can be taught or learned; it does occur through osmosis” (p.7).

It is vital to assume that as student nurses advance through their nursing education program and as they become exposed to active learning strategies, their critical thinking skills become more sophisticated.

How students learn.

While many definitions of critical thinking have been proposed, the researcher's understanding of critical thinking has been largely based on the work of Dewey (1916, and 1938) and Facione and his associates (Facione, 1992; Facione, Giancarlo, Facione, and Gainen, 1995).

Dewey continued to emphasize the development of thinking skills and dispositions as the cornerstone of a democratic society. Dewey's aim of education was first and foremost the development of critical methods of thought with the emphasis on avoiding indoctrination in the classroom and replacing it with generating the learner's powers of assessment and criticism. He addressed that "thinking is method, the method of intelligent experience" (1910, p. 113). And for thought to be aroused in any subject, educators should first furnish the kind of interesting empirical situations with the aim of fostering the learner's engagement in these situations, thus resulting in reflection outside the school. He stressed on the quality of the situations by being problematic, of intriguing uncertainty and connected with habits of mind to elucidate an effective perceptual response, thus coinciding with the premise underlying the teaching with cases. These real life situations or problems should be inherent enough to "stimulate and direct observation of the connections involved, and to lead to inference and its testing" (Dewey, 1910, p. 164).

Similarly, Facione, Facione, and Giancarlo (1997) recommended strategies that would nurture the disposition toward critical thinking and most of which substantiated Dewey's elements of "reflective thought". One of these strategies has been directed to mentors to present information from bottom up through the use of the case study approach where by " the analysis of cases representing the best and the worst of professional practice offer sufficient concreteness to engage learners, whether experts or novices" (Facione et al., 1997, p. 9). Case studies, being authentic and relevant to professional practice, help in connecting skills, content, and dispositions to think critically.

Dewey's second element of thought has been concerned with the availability of "data at command" to help in solving encountered problems. Dewey (1916) stated, "To think effectively, one must have had, or now have, experiences which will furnish the resources for coping with the difficulty in hand" (p. 165). However, Dewey's "data at command" has been perceived as a crucial component in problem solving and decision-making in clinical practice. Besides, this element of thought has been appreciated in the rapidly evolving health care system, and has been mandated as the nurse's ability to collect pertinent and relevant data to determine the considerations required in dealing with the difficulty at hand. The data have to constitute the encountered experiences during classroom discussion and /or during clinical training provided by memory, communication, observation, and reading in proportion of its relevancy to the situation (Dewey, 1916).

Facione et al. (1997) solicited Dewey's first and second elements of critical thinking when claiming that the data acquired from case studies become "... memorably concrete, they can easily be called to mind when their lessons require reinforcement" (p. 80). Facione and Facione (1992, 1996) revealed their insights in critical thinking when addressing health professionals with the significance of relying on critical thinking, experience, and knowledge in their fields of practice in order to come to purposeful self-regulatory judgment in dealing with clinical problems, communication, and leadership. Hence, supporting the reason behind the current focus of health professional education on practical experience, content, knowledge, and critical thinking.

Dewey's third element of thought revolved around the ability of correlating facts, data, and acquired knowledge to bring them about in the form of "suggestions, inferences, conjectural meanings, suppositions, tentative explanations ... ideas, in short" (1910, p.166). The ideas brought about in this manner tend to be on one hand creative and novel, and on the other hand, anticipatory consequences connected to actions. Meanwhile, the critical thinker would test those ideas to confer their meaning and validity in a specific situation. Dewey emphasized the necessity that falls behind practicing the ideas, and confirmed as well "to practice in applying what has been gained in study ought primarily to have an intellectual quality" (p. 168). Gibson, Heartfield, and Smith (unknown) elaborated on the impact that creative thinking has on the outcome of

critical thinking. Facione, Facione, and Giancarlo (1997) assumed a similar stance when defining creative thinking as “ the kind of thinking that leads to new insights, new approaches, fresh perspectives, whole new ways of understanding and conceiving of things” (p. 8).

Dewey’s elements of thought have coincided with educators’ calls for an educational reform to instruct thinking skills. The core skills that are used interactively by the person in the critical thinking process include interpretation, analysis, evaluation, explanation, and self- regulation (Facione, 1992). These core skills have coincided with Dewey’s general features of a reflective experience that include doubt and confusion induced by an incomplete situation; tentative interpretations that may effect certain consequences; analysis of data or considerations to define and clarify the problem at hand; elaboration on the tentative hypothesis to make it more precise and consistent; and finally to take a stand upon hypothesis and act upon the hypothesis to test it and evaluate the anticipated result. Dewey’s elements of reflective experience have coincided with the elements that are utilized in the scientific experimental approach.

Nursing has a scientific nature. To solve problems encountered in the profession, nurses should use the scientific methods to make the necessary observations, to interpret facts, and to develop the hypotheses. Adams (1999) considered the nursing process an expression of the adaptation of the nursing profession to the scientific method. This process has involved: “Analyzing

observations, formulating a problem or nursing diagnosis, developing and implementing creative interventions to solve the problem, and evaluating the outcome with a mind open to revisions of the interventions as needed" (p.111). Pardue concluded as well that the nursing process that has been utilized in the teaching and practicing of nurses requires and depends on critical thinking skills. She stated, "Many of the mental processes needed to successfully implement the nursing process is analogous to the mental processes defined as critical thinking ability" (cited in Adams, 1999, p.113).

The significant role of experience in education was summed up in Dewey's quoted words that "no such thing as imposition of truth from without is possible" (cited in Barnes, Christensen, and Hansen, 1994, p.102). Dewey perceived knowledge as 'truth' for the learners when appreciating its meaning and its impact on their growth process. Growth in this context has had an implication regarding the development of capabilities, awareness, and understanding of the weight that this knowledge has in structuring future experiences when interacting with the environment. He strongly criticized the traditional schools for maintaining the docile, obedient, and receptive role of their learners through out their educational experience and for the use of teachers as agents to print the body of knowledge in the learner's mind (Dewey, 1933).

Similarly, Bough and Wang (1994) argued strongly that so much of how nursing has been taught doesn't allow for the expression of the diversity of

experience among students. Besides, nursing education programs have not capitalized on, or rewarded the student's previous experience. Krieger had a similar stand against the current educational model when claiming that the existing one "fosters conformity, discourages students from taking an active role in their education" (1991, p. 30). The author further confirmed that the wealth and the diversity of the student's experience can empower the nursing profession by stimulating new ideas and exploring and challenging the existing care delivery frameworks.

Dewey's belief that education must engage with and enlarge experience has continued to be a significant stand in the current education practice. Second, and linked to this, has been Dewey's exploration of thinking and reflection that continued to be an inspiration, together with the role of the educator as an accomplice. This was emphasized when he addressed educators with the claim that:

The student learns only by wrestling with the conditions of the problem at hand seeking and finding his own way out, does he think... if he cannot devise his own solution (not, of course, with isolation but in correspondence with the teacher and other pupils) and find his way out he will not learn, not even if he can recite some correct answer with one hundred percent accuracy (cited in Barnes, Christensen, and Hansen, 1994, p. 42).

Vygotsky (1978) theorized the social nature of learning and that through social interaction students learn higher order cognitive processes. He confirmed that a group of students from various cultural backgrounds would yield a social environment that would in turn foster meaningful discussions. Spencer and Angus utilized Vygotsky's theory to describe discussions when stating, "Meaning is constructed through interaction among individuals before being internalized by individuals" (1998, p. 660).

Sternberg (1987) acknowledged the use of supportive material in teaching thinking and addressed educators when stating, "Educators need to serve not strictly as teachers, but as facilitators, and we must recognize that we, too, are learners" (p. 459). Teaching critical thinking starts with educators themselves who must acknowledge their own need for development and create an atmosphere in the classroom that allows them to be comfortable with the fact. Besides, students must teach themselves, with educators providing "every possible means to enable this self-instruction to take place" (Sternberg, 1987, p. 459). Resnick and Klopfer (1989) supported the concept of teaching thinking when claiming, "The goal of any instructional material is to stimulate and nourish students' own mental elaboration of knowledge and to help them grow in their capacity to monitor and grade their own learning and thinking" (cited in Naumes and Naumes, 1999, p.11).

Critical reflection is a multifaceted construct requiring a multi-dimensional approach. Dewey (1933) identified the three attributes of reflective individuals that would help in developing critical thinking skills: (a) open-mindedness as a characteristic of a person's ability to look at all sides of an issue, (b) responsibility as the perceived duty to search for truth and use of knowledge for positive change, and (c) whole heartedness as the developed capacity to look at ourselves critically in light of research practice. Sternberg (1987) introduced the possibility and desirability of instructing for the development of thinking skills. Naumes and Naumes (1999) supported Sternberg when suggesting the embedding of thinking in the regular content of a course as an approach to teach students how to think. Currently, many nursing educators are designating for their students the process of approaching a problem and are giving them the opportunity of practicing this process in the classroom and in the clinical setting.

Teaching for the development of critical thinking in nursing.

According to Garrison (1992), the educational process has allowed the learners to share control of learning activities in a collaborative setting. He stated, "The development of knowledge, as opposed to acquiring information, ideology or belief, must not only have meaning but it must be verifiable. Through the rational process of reflection and discourse we assess the validity of our ideas" (cited in Cravener, 1997, p. 21).

Nearly all definitions of critical thinking have emphasized the tendency and the ability to gather, evaluate, and use information effectively. Recognized as well in all of the diverse definitions, are hallmarks of teaching for critical thinking (Costa, 1985). Duld (1997) argued, "The educational shift from learning to thinking is a shift in theories of how to teach" (p. 4). Paul and Binker (1992) compared and contrasted between learning and literacy by using the didactic and critical labels. According to the authors, the prevalent didactic theory of knowledge has focused on teaching students *what to think* so that their learning would coincide with that designed by the teacher. On the contrary, the critical theory fosters the students to know *how to think* so that they can find their way through the live problems of every day life. Duld's implication on nursing education coincided with conflicting theories of knowledge and recommended, "Students are to become individual repositories or centers for storing strategies and approaches for gathering, evaluating and using the information" (Duld, 1997, p.4).

There has been an increased emphasis among educators to integrate critical thinking in the curricula of higher education programs and that of the undergraduate level. Being a desired outcome, educators have begun to develop teaching strategies and instructional methods to teach their students how to think critically. The goals for nursing education to prepare students for the changing social and health care systems include developing initiative, working well in

collaborative groups, reasoning, planning and developing multi-cultural skills (Levin, 1994; Duld, 1997).

Potts (1994) suggested cooperative learning as a strategy of teaching critical thinking. This strategy included learning in a group setting in order to promote group discussion so that students would work together to maximize their own and each other's learning.

McKeachie (1994) determined that researches comparing the effectiveness of lectures and discussions indicated that both were equally efficient for knowledge level learning, but results favored discussion methods over lectures. The author concluded that discussion methods were favored regarding improvement in the way the students relate the information after the end of a course, transfer the knowledge to new situations, or problem solve, think, change their behavior and be motivated for further learning. Furthermore, he emphasized that discussion among groups, explicit emphasis on problem solving methods, and verbalization of methods and strategies account for students' gains in critical thinking competencies.

Cravener (1997) introduced her belief on the utilization of the small group instructional strategy to foster learner- centered teaching during which students generate hypotheses about patient care needs relevant to the focus topic.

Similarly, Bevis (1989) stated, "Students acquire information – almost always a passive activity – through assignments of reading, televisions, slides – tapes, and

some [minimal lectures] and [they use] the time in class for valuable student - student and teacher-student interactions structured around reality-like simulated problems and issues” (p. 227). Meyers and Jones (1993) claimed that “ turning students loose in small groups means letting go of the typical classroom power structure and the comfort it affords us as teachers.... and letting our students assume more responsibility for their own learning” (cited in Cravener, 1997, p. 23).

Harrington (1994) supported McKeachie’s claims on discussion teaching when stating, “Dialogue allows students to be aware of what they share in common, as well as the uniqueness of each of them as individuals” (cited in Yost, 2000, p.41). Similarly, Perry (1985) supported McKeachie when he stated:

Because students hear different perspectives on a single issue and are expected to relate what they have learned to their own lives, the small-group presentations also require students who may view knowledge as absolute truths, to entertain the possibility that complex issues can be seen from many perspectives, each of which can add to their total understanding (cited in Robertson and Szostak, 1996, p.553).

The central core to critical thinking is dialogue because it involves an ongoing discussion in putting criteria forward, identifying and considering contexts, and subjecting the process to ongoing assessment (Lipman, 1992).

Robertson and Szostak (1996) devised a two-step approach to be used in classroom dialogue to guide students in developing and applying critical thinking skills. Being a verbal interaction between two or more people, effective dialogue is considered by Ruggerio “The dominant form of communication”(cited in Robertson and Szostak, 1996, p.552). To the author, effective dialogue would develop in the learners the skill of conversing with others, projecting ones view, persuading one’s opinion, and finally encouraging active participation. Sternberg (1987) shared a similar position when describing class discussion as “essential and more than just a peripheral part of a thinking –skill program” (p.459). Moreover, Gokhale (1995) concluded from a research study conducted on 48 undergraduate students in industrial technology enrolled in the Basic Electronic course that collaborative learning fostered the development of critical thinking through discussion, clarification of ideas and evaluation of others’ ideas.

Classroom and clinical activities develop the learner’s understanding of scholarly academic work through the use of intellectual abilities and skills. Students tend to assimilate better and to recall the information when given the chance of elaborating on that knowledge through discussion, response to questions, teaching peers, and critiquing (Schmidt, 1983). Dailey (1992) agreed with Schmidt’s announced benefits of discussion when using cases as a teaching strategy. The author stipulated, “A well-structured case study encourages student

group interaction through discussion of personal attitudes, beliefs and values that will impact decision making” (Dailey, 1992, p. 8).

When considering the necessity of discussion dialogue in case- method teaching, it can be seen developing at various levels. Barnes, Christensen, and Hansen (1994) identified three levels: At the first level, students would explore a problem by sorting out relevant facts, develop relevant conclusions, and present them to others; at the second level, discussion would be more rooted in practical realities; at the third level, discussion would be attained when students on their own initiative, project themselves into the situation. This discussion development has coincided with the rational- analytical method required in problem solving as addressed in Bloom’s taxonomy.

Loving and Wilson (2000) argued that the faculty who long for a new philosophy of infusing critical thinking into the nursing curriculum must introduce students to the expectations and outcomes of critical thinking and must role model critical thinking activities. The authors presented case studies as an example of such role modeling where the faculty preparing these cases would demonstrate the process of thinking by thinking aloud for their students. On the other hand, the students would become involved and more active in the learning process by their participation in the group activity and understanding through these case studies. Facione, Facione and Giancarlo (1997) stressed on “modeling thoughtfulness” of educators by demonstrating to the students the process of

thinking required to solve problems and make decisions. Facione et al. (1997) concluded that the impact of modeling revolves around “ encouraging students to voice their thinking as well, by talking aloud as they work through a problem, can reveal crucial elements in their thinking process or habits of mind which can be explored, reinforced, or amended” (p. 9). Concomitantly, Paul (1990) spoke about the importance of developing the teacher’s capacity of thinking critically so that he /she can appropriately model the behavior. The author proposed three elements for teachers to implement to help learners think well. First, to engage students in tasks and activities requiring thinking; second to focus on the teacher by modeling the thinking process in front of the students; and third to stress on the role of the teacher in holding the students responsible for their thinking. As an application to modeling thinking, Chubinski (1996) developed teaching strategies based on Paul’s theory of critical thinking. For each of the skills identified in the theory, Chubinski developed a strategy for teaching that skill. The skills included “identifying the problem, deciphering the purpose, uncovering the assumptions, recognizing data, creating alternate solutions and evaluating one’s own thinking to improve it” (p. 23).

Nurses almost always engage in problem solving tasks and activities requiring clinical judgment and decision-making and not a repeat back of what was mentioned by the teacher in the lecture once. Nurses develop goals that they must achieve, monitor the means by which they are trying to achieve these goals, and

self-evaluate in order to become more effective. In fact, health professional education consists largely of accumulated experiences in the form of concrete cases. Therefore, these cases make experienced professionals capable of developing knowledge of the kinds of problems encountered in a work setting, of presenting these problems, their causation, and the productive approaches required in solving them.

The Case Method of Instruction

The use of case studies in the academic classroom.

The case study, as a method of instruction, has been considered the means of bridging theory with practice. Introduced in the 1970s by Harvard Law School faculty and adapted for use by other disciplines, the case method is a teaching and learning strategy that stimulates ideas through complex problem analysis of actual or hypothetical situations and principles to practice (Barnes, Christensen and Hansen, 1994; Dailey, 1992).

Case method teaching has advantages over the traditional teaching techniques by promoting theoretical understanding and insight (Levin, 1994), enhancing motivation and psychological involvement, and fostering self-direction in learning (Barrows, 1986). The hallmark of case teaching is the intellectual and emotional involvement of the student (Barnes, Christensen, and Hansen, 1994). Therefore, student involvement is a necessary fundamental principle of case method teaching. In nursing education, where knowledge and application of skills must be

related, student involvement is essential. And since case discussion is a beautiful subset of reality, it allows students to observe, listen, diagnose, decide and intervene in the group process to achieve the desired objectives (Barnes et al., 1994).

The intended role behind teaching with cases is to present real cases to the students to ensure open discussion and promote considerable analyses of the situations at hand for the expression of attitudes or ways of thinking and for implementing the final discussion as practical actions (Dailey, 1992; Barnes, Christensen and Hansen, 1994). Similarly, Aronson, Rosa, and Light (1997) expressed the benefits behind teaching with cases since this method has helped in ameliorating the learners' critical thinking skills by using the nursing process and by applying theory within a safe arena with faculty's feedback and support.

Additionally, Neill, Lachat and Taylor-Panek (1997) proposed the application of the scientific method of nursing process to case studies to foster the active engagement of nursing students in an interactive learning environment. Classroom discussion would then focus on students' answers to questions about assessment, diagnosis, planning, implementation, expected outcomes and evaluation. Paul (1994) proposed the use of assessment questions to direct students in their search for evidence and data to specific aspects of symptoms manifested in the case study. These questions tend to stimulate critical thinking and highlight the

complex rules that students must learn to determine a method to acquire knowledge and frame it in clinical situations (Smoyak, 1993).

As for student involvement in the group discussion revolving around a plan of care in the case study, the assigned questions by the faculty would evoke the judgment of information and comparison of points of view (Paul, 1994). At this stage, students start to think about situation variables so important in moving nurses from singular, objective attributes to clinical experiential insights (Benner, 1984). This has confirmed the fact that critical thinking in nursing does not occur in isolation from the context in which nurses work, but has to include the health settings, the health care professionals, and the thinking patients. Thus, when exposing nursing students to real-life situations in the classroom, the novice nurses reflect on how their thinking is working together with that of the patients'. Rubenfeld and Scheffer (1999) believed that "Critical thinking in nursing is a partnership process" (p. 20). This partnership is determined by the alliance in thinking between the nurses and their patients who have the right to be a part of the decision making relative to the health care that should be provided. Another benefit behind exposure of students to real-life situations is to facilitate the transfer of knowledge from the classroom setting to the nurses' clinical context. The impact that knowledge transfer has is beneficial for practicing professionals who tend to be perpetually confronted in clinical settings. Being acquainted with voicing their thinking and by talking aloud as they work through a problem in a

classroom setting would reveal, “Crucial elements in the thinking process or habits of mind which can be explored, reinforced, or amended” (Facione, Facione, and Giancarlo, 1997, p. 9). Eventually, the students would be prepared to face confrontations or solve problems at work place with “orderliness” in working with the problem, “diligence” in searching for relevant data, “reasonableness” in the selection of the actions, “persistence” through encountered difficulties, and “precision” in implementing the actions. Eventually, group discussions revolving around questions or the implementation and evaluation components of the nursing process focus on implications and consequences (Camevali and Thomas, 1993).

Bevis (1989) confirmed that the essence of nursing curriculum has to rest on the quality of interaction between the students and faculty since classroom and clinical activities will develop the learner’s understanding of scholarly, academic work through the use of intellectual abilities and skills. The quality of interaction while teaching with cases is determined successful and is enhanced by the in-depth preparation of the case by the instructor and students prior to classroom discussion (Romm and Mahler, 1986). The authors have derived a three dimensional model with the underlying assumption that teaching with cases intends to teach problem solving skills, with each of the three dimensions representing a means of achieving this goal. This model figures the decision making as a four-step process encompassing in sequence: (a) the identification of the problem, (b) diagnosing the possible reasons for the problem, (c) the search

for resolutions to the problem, and (d) the determination of the most suitable and relevant resolution after comparing between the various alternatives presented.

Similarities appeared to exist between the steps identified in the rational-analytical model underlying the case method teaching (Romm and Mahler, 1986) and that of the six sub-categories in Bloom's taxonomy (1956). With reference to the rational-analytical model, Romm and Mahler have identified the six sub-categories that are revealed in the case studies in the following manner:

1. *Knowledge* – A starting point that has included both the acquisition of information and the ability to recall information when needed. Case studies tend to involve the student's ability to correctly answer questions by classifying the main characters in the case, giving definitions and examples, and outlining what the characters did independently and \ or in relation to another.
2. *Comprehension* – The basic level of understanding. It has involved the ability to know what is being communicated in order to make use of the information. Students at this level should be able to understand the importance of describing the reason for a problem before considering its possible solutions. Students can achieve this level when they are able to identify the main ideas as presented in the case, identify relationships, order steps in a process, read charts and graphs, and make comparisons.
3. *Application*– The ability to use a learned skill in a new situation. Making

inference and anticipating probabilities will allow the students at this level to point at the owner of the problem and to put the problem in terms that will suggest practical, feasible solutions.

4. *Analysis*– The ability to break down information into its integral parts and to identify the relationship of each part of the total organization. This level will enable the students to analyze a given case by recognizing relevant and irrelevant data and by referring to various theoretical models and concepts as interpersonal communication, conflict resolution, and information processing.
5. *Synthesis*– The ability to combine existing elements in order to create something original. This level will foster the students to suggest solutions that are flexible, creative and varied as identified in a given case. Nevertheless, they will be able to select a solution out of a variety of proposed ones and determine the best means of being effectively implemented.
6. *Evaluation*– The ability to make a judgment about the value of something by using a standard. Students at this level will weigh the appropriateness of a solution proposed in the case study by either obtaining the best solution from experienced professionals, or by implementing them. The implementation will be reported or role – played and the results will be reevaluated for relevance and feasibility of the recommended solutions.

These six cognitive levels in Bloom's taxonomy have constituted the basis for effective and sound problem solving and decision-making which, on one hand, forms the premise of teaching by case method (Romm and Mahler, 1986), and on the other hand, coincides with the steps of the nursing process.

Nurse educators have continued to consider the nursing process as the framework for students to apply critical thinking skills and clinical decision-making (Adams, 1999; Facione, 1996). Therefore, by providing vicarious experiences to nursing students with a variety of concrete cases, the case method would expand and sharpen their understanding of the profession.

The Premises of Case-method Teaching.

Being a practice discipline, nursing has required active learning through the utilization of teaching strategies that aim at fostering the engagement of the learners in activities of significance to the material under study. Hence, ensuring the participation of students (Bevis, 1989).

The most fundamental observation that has been made about case method teaching, being an active learning strategy, is that it is discussion teaching. Through collaboration and cooperation with friends and colleagues, and through self-observation and reflection, discussion teaching can be accomplished. Additionally, a great vitality in the classroom, the satisfaction of true intellectual collaboration and synergy, and improved retention on the part of the students, make the rewards of discussion teaching considerable (Barnes, Christensen and

Hansen, 1994). Barnes et al. (1994) have derived four principles of discussion teaching; the principles of concern in this study were partnership and community.

1. *A partnership emphasized between the teacher and the students.*

According to Barnes et al. (1994), “discussion teaching”, a teaching strategy utilized with cases, has an educational impact on learners since it requires from them to be completely responsible for their own learning and for taking the initiative of exploring the knowledge they need on their own. They introduced “discussion teaching” to enhance the students’ self-esteem as they directly participate in the leadership of their class and to foster the consolidation of what they’ve learnt by teaching others, thus creating partnership. This partnership is “ both a window through which students can observe the teaching / learning process and a mirror that reveals them to themselves” (Barnes et al., 1994, p.25). As for the teaching and learning process, partnership has fostered the learner’s self-direction and decreased the teacher’s imposition.

Dewey (1916) instigated the identity concept between social life and communication when he stated:

All communication is educative. To be a recipient of communication is to have an enlarged and changed experience. . . . seeing it as another would see it, considering what points of contact it has with the life of another so that it may be got into such form that he can appreciate its

meaning. (p.8).

Eventually, communication has an educational impact on the learner since it initiates collaborative learning. A concept that has been widely researched and advocated through out the professional literature to be considered as an instruction method in which students work in small groups toward a common goal at various performance levels (Gokhale, 1995). This approach in learning has made students responsible for one another learning as well as their own. So, one successful student will help in the success of his / her colleagues.

Besides, collaborative learning has facilitated the active exchange of ideas within small groups and has promoted and enhanced critical thinking, thus making cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals (Johnson, Johnson & Smith, 1991).

2. *A learning community.* Being a premise in case-method teaching, a group of students will form a learning community with the fundamental framework of respect for one another opinions and ideas, daring to express one's ideas, innovation, and appreciation of the diversity of the group. Barnes et al. (1994) viewed this framework as essential in formulating group values that would collectively create “ethos that can activate, permeate and enrich a group's minute-by-minute dialogue” (p.26).

Eventually, the students would be made aware of the powerful energy of experience and innovation acquired from the case method teaching.

Dewey explored the essential of communication when he stated, “ People in a community come to possess things in common . . . The communication which ensures participation in a common understanding is one which secures similar emotional and intellectual dispositions...”

(1916, p.7). Similarly, Totten, Sills, Digby, and Russ (1991) exercised their understanding of shared learning in their request for educators to provide learners with opportunities that would engage them in discussion and make them responsible for their own learning. Meyers and Jones acknowledged that collaboration, problem solving, reflection, and extensive discussion constitute the main elements of a successful case study. The authors perceived as well that within a case study “students develop group interaction skills, respond to ideas and contribution of classmates, and apply career and life experiences . . . call for higher order levels of reasoning such as analyzing situations, forming judgments, and evaluating solutions”(cited in Cravener, 1997, p. 22).

The interrelationship between the core practices of case method teaching and education.

Over half a century ago, Dewey expressed the belief that all genuine education would come through experience. Since then, many educators have

struggled with the complex implications of that simply stated notion. Recognizing its complexity, Dewey advised using cases to develop the learner's experience.

In the spirit of Dewey, desirable teaching and learning experiences of educators have been used to develop and refine the core practices of the case method teaching approach. The existing interrelationship between the core practices of case method teaching and Dewey's theories of learning have been related to four aspects of education:

1. *The relationships among teachers, learners, case- based curriculum, and community.* The case-method approach is learner-centered and community- focused. Implementing it requires a give-and-take relationship among teachers, learners, the curriculum, and community. The teacher fosters learners' participation in decisions that affect them, integrate the cases into the clinical practice (being extrapolated from real life situations), and ensure that learning objectives are met. Glick and Armstrong (1996) noted, " A case should serve as an effective vehicle on the two- way street of clinical- scientific education"(p. 24). The authors concluded that the educational objectives of cases should revolve around seeking depth of scientific understanding and establishing vertical and horizontal connections with other learning in the curriculum. Gibbons emphasized that in the case method of instruction, " The teacher is a

discussion leader, not a lecturer or major contributor of fact and analysis” (1994, p.1).

Dewey often wrote about these same interwoven relationships (1910, 1933). He advocated placing the learner at the center of experience, and defined the teacher as “... learner’s co-partner and guide in common enterprise. ... the child’s education as an independent learner and thinker” (1964, p. 10). Elaborating on this relationship in relevance to case method teaching, the case- based curriculum uses cases derived from real life to help the learner bridge theory and practice (Glendon and Ulrich, 1992). In the classroom, the teacher shapes and molds the discussion flow so as to make certain that critical case issues are covered in a disciplined way (Daily, 1992). There exists a synonymy between the discussion class and partnership in which learners and teachers tend to share the responsibilities and power of teaching, and the privilege of learning together. This partnership has an implication on making learning more effective and teaching joyful. Eventually, the use of the case method approach would urge the learners to become profoundly and actively involved in their own learning, to discover for themselves rather than being indoctrinated and accepting verbal and written pronouncements. Besides, this partnership furnishes the ground for establishing a learning community and a milieu in which discussion dialogue can take place successfully. This community

becomes dedicated to learning and emerges when “the context of the discussion supports rigorous intellectual analysis and group collaboration, where an operational contract defines how teachers and students work together, and where there is mutual respect among all participants” (Barnes et al., 1994, p. 25).

On the same wavelength, Catalano (2000) supported Barnes et al. when requesting from nursing education to expose students to “real- life situations that require the use of creativity, intuition, analysis, and deductive and inductive reasoning” (p. 73). These situations were represented by the author in the form of case studies introduced in the classroom and reinforced in the clinical areas through mentoring and guided experience.

2. *How learning occurs.* Case method teaching focuses on active learning, audience, and spiraling. Dewey saw the human mind as a meaning maker organ, relentlessly driven to make sense of its world - an idea that predates today’s notion of constructivism and active learning (Starnes, 1999). Similarly, Walton (1996) proposed case studies as one of the constructivist teaching methods that would stimulate and support students’ active participation in their own learning, thus fostering students to discover and bring meaning to their educational experience. The author stated, “Learning is greatly facilitated if students can tie new knowledge to their

existing framework of experience and knowledge” (p. 405). Starnes (1999) notified educators with the core practices in case- based teaching and requested from them to define and select for their students the most powerful learning experiences that would engage them in posing and solving problems, making meaning, producing products, and building understandings. Gibbons emphasized on the utilization of intelligent analysis by the learners in case method teaching, thus calling for “ the recognition and identification of assumptions”(1994, p.1).

There exists an intersection between Dewey’s theories on the purpose of learning with that of the premises of the case-based approach. For what purpose is the content to be learned then? Dewey called for an audience beyond the teacher for the learners to serve or engage to affirm the importance, need, and worth doing of the work. Besides, he tackled on the continuous spiral notion of linking the learning activities; defining learning experiences as those that “ give rise to the learner’s need to gather more facts, become more skilled, and use lessons learned in one experience as the basis for future experiences” (1938, p. 39). He confirmed this continuous desire for learning when he stated, “All persons have a natural desire-akin to curiosity- for a widening of their range of acquaintance with persons and things. . . . desire for expansion, for self-realization, is its motive” (Dewey, 1910, p. 39).

Facione (1998) complied with Dewey's spiral notion of activities and confirmed the reflexivity of critical thinking when comparing it to a vehicle utilized by the person for the purpose of judging the sensibleness of the theories used for granted, the prudence of the obtainable data and the requested criteria, the relevance of the background elements, or the soundness of the used method of inquiry.

Therefore, transferring the subject matter to students by way of information should have a relation to a question that is perceived by the learner as vital to his or her learning experience. However, if the instructions fail to trigger a problem in the learner, then he/she can't enter the process of reflective thinking and the instructions would act as "obstructions" to the thinking process (Dewey, 1938).

3. *Preparing learners for the future and full lives as individuals and citizens.*

The case method of teaching focuses on process and emphasizes peer teaching, small group work, and teamwork (Starnes, 1999). To live rich and fulfilling lives as citizens and individuals, learners must be prepared for and have access to choices that would affect their future. Dewey believed that "skills must be useful in the here and now . . ." (1938, p. 18), and " . . . make an individual more capable of self- direction and independence" (1938, p. 11).

Similarly, Gibbons noted that learning by the case method “ is an individual proposition, calling for a maximum of personal effort and responsibility”(1994, p. 2). Learning by group process provides ample opportunity for the learner to compare his/her analysis with what ever is under discussion. Besides, case method teaching calls for belongingness or building of experiences amongst learners and for emphasizing the value of teamwork (Gibbons, 1994). Both, inclusion and teamwork are considered essential elements in the growth of the individual’s social and professional aspects and in achieving the daily living requirements, which Dewey hinted to as “Building a common and shared life...” (1964, p. 11). Barnes, Christensen, and Hansen shared a common insight when emphasizing “Civility, willingness to take risks and an appreciation of diversity of the group members will ensure that the group will venture into intellectual terra cognita, where explorers need one another help and support”(1994, p. 26). Building these values in the learners and in the classroom tend to promote inquisitiveness, open- mindedness, and listening skills. These characteristics enhance the development of comradeship and collaboration between fellow members later while in the practice field (Barnes et al., 1994).

4. *Thinking about what is learned and how.* Reflection is an important activity in case method teaching where teachers will carefully plan time

for their learners to reflect consciously on what they have learned and how they have learned it. Building reflective knowledge fosters knowledge transfer and allows both teachers and learners to be engaged in rigorous, ongoing assessment and evaluation. However, Dewey considered reflection central to all learning experiences, “. . . enabling us to act in a deliberate and intentional fashion . . . [to] convert action that is merely . . . blind and impulsive into intelligent action”(1933, p. 12) Furthermore, Dewey perceived these learning experiences as the solid matrix of the learner’s knowledge, the expressed need to learn, and the process of knowledge acquisition. Therefore, it is through the case method of teaching that the students will be provided with models of how to think professionally about problems and will learn how to use theoretical concepts to illuminate a practical problem. Hence, making teaching by the case method the ultimate help for the nursing students to learn how to think productively about concrete experiences and to enhance their ability to learn from these experiences.

Critical Thinking: To Think Like a Nurse

Literature review revealed that the goal behind transmitting a body of nursing knowledge seemed much easier to achieve than the current goal of developing complex thinking competencies amongst the 21st century nurses. Nurse educators have agreed that not only the amount of information and knowledge in nursing is

increasing, but also the rate of increase is itself increasing. Health problems and situations for which knowledge is required in nursing profession is varied and unpredictable; partly resulting from the unintended effects of knowledge put into practice, and partly because of the high expectation level resulting from information growth and dissemination. Eventually, nurses seeking knowledge for various purposes would increasingly need to extend the knowledge base they have. Managing clients in community settings or managing clients with acute conditions in hospitals, requires excellent analytical, problem solving, decision making, and communication skills, in addition to a scientific body of knowledge and technical skills. Reaching such a stage requires the infusion of critical thinking in nursing curricula (Lindemann, 2000).

In addition, different points of view in relation to health care system or alternative value stances reflect the complex health problems that require problem solving and clinical judgment. What is needed though, is flexibility of thought that is exhibited by nurses in terms of their ability to synthesize deeply different frames of reference, to think broadly, and to weigh competing values. This too requires critical thinking. For only as nurses understand similarities and differences of the various points of view encompassing health and the health care system, can they synthesize alternative perspectives, evaluate and prioritize purpose and goals.

Diversity, another issue in the modern realm of nursing is drawing the awareness of and respect for, within the profession and among societies. As it reflects difference in perspective, diversity necessitates the acknowledgment and intelligent appreciation of the problems facing mankind and the empowerment sufficient to recommend and evaluate possible strategies for their solution. This too requires critical thinking.

Accordingly, the NLN (1990) has incorporated critical thinking into the outcome criteria for accreditation of nursing education programs. By mandating the assessment of critical thinking in nursing graduates, the NLN has helped in modeling the graduate nurses in being able to problem-solve in situations that are novel, complex or ill defined. Moreover, giving weight to the elements of critical thinking in the curriculum will furnish the apt ground for creative and innovative thinking in the realm of deriving solutions to various health problems in an ever changing health care system and environment. Eventually, this weight would have implications on nursing education and the preparation of nurses (Facione, 1996). Therefore, nurses need to be finely equipped with critical thinking skills in order to ensure safety, competence and skillfulness in practice (Miller and Malcolm, 1990). The preparation of the nurses require from nursing curricula to undertake changes that foster the students to solve problems, discuss critical issues, reflect on prior experience, and analyze case studies rather than being passive recipients of knowledge. Besides, "Critical thinking is an approach to inquiry where both the

students and faculty examine clinical and professional issues and search for more effective answers” (Miller and Malcolm, 1990, p.69).

Purposeful thinking pursues from exercising elements of thought. The elements of thought include: (a) Problem identification that has the purpose of thinking about the points of view or world view about the issue or problem, (b) utilization of principles and theories in reasoning about the problem, (c) provision of data to support the claims about the problem, and (d) reaching conclusions. Eventually, attaining conclusions require interpretation, inference, reasoning, and description of the implications and consequences that follow from the position held on the problem (Paul, 1990).

McBride (1999) presented an interpretation of the situation regarding the major paradigm shifts in health care delivery and the congruent changes that should take place in nursing education between now and 2025. The recommended change in the curricula of nursing education should target the preparation of life-long learners and not merely academic degrees. Rubenfeld and Scheffer (1999) shared a common insight as they emphasized the nurse’s need for “. . . research to go beyond doing things based only on tradition and borrowed knowledge, to a research-based practice that can validate the importance of what nurses do” (p. 374). The authors specified the use of the *THINK* modes in nursing practice to include (a) total recall, (b) habits of thinking, (c) inquiry, (d) new ideas and creativity, and (e) knowing how to think. Accordingly, these modes can be

acquired through provoking questions to rationales taken for granted, or adopted from other disciplines, and to wonder about the occurrence of certain situations.

The nursing process is a type of critical thinking (Pardue, cited in Adams, 1999). Nevertheless, in the consistently changing health care system, the nurse's ability to think critically should go far beyond those of the basic nursing process (Catalano, 2000). Yet, critical thinkers in nursing require sound reasoning and nurses should be prepared to encounter increasingly more complex practice situations that require from them to think in a logical and systematic manner with openness to question and reflection on the reasoning process to make correct and safe clinical decisions.

Facione (1996) acknowledged the existence of a strong correlation between critical thinking skills and the disposition to think critically in problem-solving situations when stating the occurrence between both of “ a relationship that has been observed in graduating student samples” (p. 5). Besides, strategies are available to nurture the disposition toward critical thinking. Introduced in this respect is the presentation of information directed from bottom up when using the case study approach whereby “the analysis of cases representing the best and the worst of professional practice offer sufficient concreteness to engage learners, whether experts or novices” (Facione, Facione and Giancarlo, 1997, p. 9). Therefore, case studies being authentic and relevant to professional practice help in connecting skills, content, and dispositions to think critically. And by using

both of the cognitive skills and the disposition to think critically, the clinical judgment of nurses will be enhanced (Kataoka-Yahiro, and Saylor, 1994; Facione, 1996).

Research Findings on Critical Thinking in Nursing Education

Developing skills to think critically has furnished the horizon with which to analyze problems and make decisions. These skills have been considered the premises of nursing education and the foundations for the twenty first century nurses who are expected to encounter more acutely ill patients, highly advanced technology, and increasingly complex ethical issues.

Of the variety of research findings that have been reviewed, most of them have focused primarily on determining whether the critical thinking skills of the student nurses become sophisticated as they advance through their educational program and be more exposed to patients needing more complex care. However, most, if not all of the reviewed studies in this perspective were conducted to determine the relationship between nursing education and critical thinking skill development among professional nursing students by using a standardized critical thinking assessment tool. Besides, each of the existing critical thinking assessment tools has tailored its author's understanding of the critical thinking construct. And of the commonly used tools were the Watson- Glaser Critical Thinking Appraisal (WGCTA) and the California Critical Thinking Skills Test (CCTST).

Considering the impact that the educational program has on critical thinking, Hammes and Duryea's study (as cited in Brooks and Shepherd, 1990) recommended the technique of problem-based learning for teaching problem solving and critical thinking abilities. The authors confirmed that this teaching strategy that has been concerned with how learning takes place and not only with what is learned requires small groups of students to be given the task of solving hypothetical, health-related problems.

Additionally, Sadler and Whimby's study (as cited in Brooks and Shepherd, 1990) concluded the preference of using the holistic approach to teach critical thinking because breaking critical thinking into discrete units would confuse the learner. The holistic approach combined the teaching of analytical thinking with communication in order to improve the students' total intellectual functioning.

Success has been achieved in teaching thinking skills. Working with biology students, Novak and Dettloff's study (as cited in Arburn and Bethel, 1999) concluded that students were able to learn task analysis. When students in a critical thinking course were given insight into a metacognitive approach, they showed a significant gain in thinking skills that occurred following training in and practice of these intellectual skills (King, 1989, 1992). Early studies by King (as cited by Arburn and Bethel, 1999) compared college students' comprehension of lecture content when the lecture was followed by discussion, independent review sessions, and guided self-questioning methods. When the students were targeted

to phrase questions based on question stems provided for their use, they showed significant improvement over their peers. King's comparison study of guided self-questioning, summarizing, and reviewing lecture notes as learning strategies in college students (as cited in Arburn and Bethel, 1999), found that self-questioners performed significantly better than did other groups.

To measure the comparative outcomes of teaching methods and their effect on critical thinking, Kowalski and Louis (2000) conducted a simple comparison study on Bachelor of Science in Nursing (BSN) students who used computer technology activities ($n = 44$) as part of professional nursing course with other students who had traditional classroom activities for the same course ($n = 35$). Accordingly, the authors created an instrument to measure objectively critical thinking as applied in nursing and named it "The Nursing Process Critical Thinking Examination". The instrument was administered to both groups that were given the course by one instructor who used different teaching methods for both groups but in two different semesters. A panel of four nursing faculty members supported the content validity of the instrument, but its internal consistency reliability was of a low 0.53 coefficient alpha, nevertheless they continued to use it. The study's t test indicated that the students who participated in computer technology activities scored significantly, albeit slightly, higher than the control group ($t = 2.31$, $df = 77$, $p = 0.023$). The researchers considered the results as encouraging although they used an instrument with low internal

consistency reliability and the difference in scores between both groups of participants was slightly significant.

Where as Valiga's study (as cited in Maynard, 1996) was concerned about studying the cognitive development of nursing students to determine changes in development over the span of an academic year. Students were measured at the end of the academic year. Findings suggested that there was an increase in cognitive development from year to year but very minimally. Even upon graduation, there continued to be a marked dependency on others for decision-making and problem solving. Valiga attributed the development of critical thinking to the program's curriculum design and the teaching methodology of the faculty.

A similar comparative study was conducted by Arburn and Bethel (1999) using experimental ($n = 45$) and control ($n = 49$) groups of community college students taking Anatomy and Physiology course. The study utilized a quasi-experimental pretest and post-test control group designs to determine whether the experimental groups could improve their academic performance and increase the incidence of critical thinking skills if given the learning strategies as a pre-requisite course. Analysis of variance and covariance in the pre-tests and post-tests of the CCTST and that of the Learning And Study Strategies Inventory (LASSI), revealed no significant difference in the overall achievement or the ability to process information, or the demonstration of critical thinking. Members

of the experimental group did, however, exhibit a change in their ability to select main ideas, apply deductive reasoning and use inference.

Similarly, Leppa (1997) conducted a study to measure and define critical thinking in a RN-baccalaureate program that included an introductory course in critical thinking. Seventy RN-BSN students took the CCTST on the first day of the nursing program and again 10 months later during the fourth quarter. The results were disappointing when analyzing the reliability of the five sub-scales of the test with the second administration. The researcher decided to drop the use of the CCTST for the RN- baccalaureate program due to the poor performance of the participants who had a variety of educational and clinical experiences and due to the psychological burden that this test had on the participants. The researcher replaced this test by the California Critical Thinking Disposition Inventory (CCTDI). However, the reliability scores were not mentioned in the article but were comparable with those reported in the instrument as stated by the researcher.

Proponents of the cognitive-developmental approach conceptualized educational aims and purposes in a distinctive way that placed emphasis on developing problem-solving strategies and decision-making capabilities (Romm and Mahler, 1986). In relevance to that, studies have been conducted to note differences in critical thinking abilities among nursing students by comparing critical thinking scores of nursing students of various education programs. For example, Ketefian's study (as cited in Brooks and Shepherd, 1990) was conducted

on a group of practicing nurses to explore the relationship between critical thinking, educational preparation and the level of moral judgment. Results from the WGCTA showed that the higher the critical thinking ability of the nurse, the higher the moral judgment and reasoning. Concluded too, was that baccalaureate prepared nurses scored higher than the associate and the hospital based nurses.

Another study was conducted by Brooks and Shepherd (1990) to investigate the relationship between clinical decision-making skills in nursing and critical thinking abilities of senior nursing students in four types of nursing education programs: generic, baccalaureate, associate and diploma along with the RN-completion program ($N = 200$). The generic baccalaureate program attained the higher level of general critical thinking ability ($M = 61.3$) compared with the associate ($M = 50.0$) and diploma seniors ($M = 51.3$) when using the WGCTA. As for the RN-completion program, the mean critical thinking score for the generic baccalaureate was 61.1, but the mean clinical decision-making skills was significantly higher ($M = 38.0$) than those of the other three groups.

Moreover, some studies were concerned with determining or identifying the variables that exist among baccalaureate nursing students that contribute to critical thinking ability. For example, a study was conducted by May, Edell, Butell, Doughty, and Langford (1999) for determining the relationship between critical thinking skills and clinical competence in BSN seniors ($N = 143$) using the CCTST and CCTDI. However, the study failed to establish any correlation

between critical thinking and clinical competence but provided evidence for acceptable psychometric properties of the CCTST and CCTDI with a population that differed in demographic profile from the norm group. The CCTST mean score was slightly higher than the norm. The researchers speculated that language, age, and academic standing may have been variables, thus contradicting Facione (1992) who claimed that age and the number of semester college units has no bearing on critical thinking ability.

Where as Tiessen's study (as cited in Adams, 1999) aimed at determining the relationship between the critical thinking ability and the variables of Grade Point Average (GPA), SAT scores, age, and total number of credit hours in the natural sciences, arts and professional nursing courses required for baccalaureate students ($N = 150$). Findings indicated that the SAT quantitative score, total number of credit hours in the arts and humanities, and GPA contributed to the criterion variable of critical thinking score using the WGCTA. However, the coefficient of determination was only 24%, thus making the results of the study not statistically significant.

Recent studies have considered as well changes in critical thinking abilities as the nursing students progress through the educational process. In their study, McCarthy, Schuster, Zehr and McDougal (1999) concluded changes in critical thinking in a cross-sectional study of nursing students ($N=241$) that was comprised of sophomores ($n=156$) and seniors ($n=85$) attending a baccalaureate

program using the CCTST and the CCTDI. The CCTST revealed significant differences in critical thinking from the sophomore year to the senior year. Similarly, Berger (1984) measured critical thinking ability of the baccalaureate-nursing students ($N=137$) as they develop in the educational program. Findings of this descriptive longitudinal study revealed that sophomore students achieved higher scores in the WGCTA as they reached the senior year of nursing education. The author determined a significant increase in critical thinking ability from sophomore to senior year but found out that there was no significant correlation between the critical thinking scores and GPA in either nursing or science courses.

On the contrary, Maynard (1996) studied the relationship of critical thinking ability to professional nursing competence using a randomly selected, cross-sectional sample of nursing graduates ($N=121$). The researcher used the WGCTA to obtain scores that were compared to those obtained prior to admission into the program as sophomores, as seniors, and as practicing nurses. Findings revealed that critical thinking measured over time from beginning nursing student to practicing nurse did not change significantly during the educational experience. However, a significant change was found in scores from the senior level to practicing nurses, thus supporting the experiential component of competence development and reinforcing the premise that the educational process only begins the process of competence development.

Bauwens and Gerhard (1987) conducted a longitudinal study on BSN students ($N=53$) to identify early predictors to successful completion of nursing program. The authors used the WGCTA with no significant change in total WGCTA scores between first and last semesters. The researchers noted that certain specific nursing educational experiences in baccalaureate nursing programs (such as increased exposure to scientific method or nursing process) do not produce significant gains in critical thinking abilities.

The cited studies covered by the researcher of this study tallied six (50%) with significant increase in critical thinking scores and six other studies with no significant increase in critical thinking scores, thus making the results of these studies inconclusive. Even though nursing education values the notion of critical thinking ability as a necessary educational outcome (Bevis, 1989), yet the development of critical thinking as an outcome has not been consistently supported by the existing research (Adams, 1999). This can be attributed to the fact that the researchers have first and foremost ignored the effect that the teaching and learning process has on the development of critical thinking abilities among nursing students and second to all, they have disregarded the appropriateness of the critical thinking assessment tools. Adams (1999) concluded that if nursing education does not teach with methods that foster critical thinking in the program, how would the nursing student learn and use the thinking skills in practice to make the daily complex decisions needed for client care. Poole shared

a common insight when concluding, “Traditional teaching method used in nursing education promotes logical rather than creative thinking” (cited in Adams, 1999, p. 118).

Nursing programs should teach for the sake of developing critical thinking skills among nursing students. This development can be attained by changing the nature of the curriculum to include an increased emphasis on the methodology and the process of learning, a great utilization of group activity and communication and social skills suitable for learning and for developing a broader understanding of the real world (Lindemann, 2000). The author stated, “Well-developed cognitive skills such as critical thinking, clinical reasoning, creativity, and deductive and inductive reasoning are the most important graduate outcome”(p. 10).

On the other hand, Mathew and Gaul (as cited in Maynard, 1996) questioned the appropriateness of the standardized critical thinking skills tests as measuring tools for thinking skills developed through the nursing process. Similarly, Kowalski and Louis (2000) admitted that the available standardized tests measure critical thinking skills of the general population and not of nursing students in specific. The authors stated, “Critical thinking in nursing involves decision making and problem solving in clinical situations that are unlike ordinary human experiences”(p.210). There continues to be a consistent need for a measurement tool to assess critical thinking ability and to monitor the teaching strategies that

prepare nursing students for a “ high level of problem solving”(Berger, 1984, p. 307).

However, the mixed results in critical thinking ability in most of the studies that were reviewed by the researcher and that used either the WGCTA or CCTST have been attributed to the fact that general critical thinking ability is not the same as the abilities used by nursing students (Adams, 1999). Nursing students may need the stimulation of real-life situations to encourage creative interventions (Facione, 1996). Similarly, Adams (1999) emphasized that regardless of whether there was a significant, negative or no change in critical thinking abilities, it would be helpful to know what teaching methods were used before testing the students. In other words, were the students actively encouraged to think and question or to passively listen and accept content from educators?

Based upon conflicting findings in the literature, whether or not nursing students develop critical thinking skills as a result of their educational program remains inconclusive (Maynard, 1996; Adams, 1999).

Frame of Reference

Critical thinking, defined by the American Philosophical Association (APA) and adopted as a construct by Facione (1992), served as the conceptual framework for this study.

The Experts' Consensus on Critical Thinking and the Ideal Critical Thinker

Critical thinking has been considered an integral component and a premise to success in both business and economics, thus yielding according to Facione “democratic citizenship, and a vital part in professional practice in a wide variety of occupations” (1996, p. 2). Being clearly addressed and articulated as an educational outcome by many professional program directors in curriculum review forums, the need for a clear understanding of the critical thinking construct led the APA to undertake a two- year- research project to achieve a consensus definition of critical thinking. Participated in the research project was 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. Using the Delphi methodology, a facilitator coordinated this anonymous intercommunication regarding critical thinking definitions among the selected experts. The goal of the research project was to achieve a consensus regarding what to expect of college freshmen and sophomores in terms of critical thinking. This was the first consensus definition of the domain of critical thinking among

experts in the field (Facione, 1990; Facione & Facione, 1992). The resulting definition of an ideal critical thinker by the APA (1990):

Is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal issues, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matter, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. (p. 3).

This consensus definition has been recently supported by faculty administrators at 80 colleges, government policy makers, and employers from small and large business in a replication study on Post- Secondary Teaching, Learning, and Assessment at Pennsylvania State University. The construct was “strongly endorsed in terms of its description of both the skills and dispositions of good critical thinkers”(Facione, 1998, p.1).

Facione (1992) broadly conceived the construct of critical thinking that emerged from the Delphi group commissioned by the APA, and defined it as, “The process of purposeful self- regulatory judgment. This process gives reasoned consideration to evidence, contexts, conceptualizations, methods, and criteria”(p.2). He affirmed the existence of non- linearity in the cognitive process. As a result of this non- linear recursive process, a person forms a judgment about what to believe or what to do in a given context. In so doing, a person engaged in

critical thinking will use a core set of cognitive skills: “analysis, interpretation, inference, explanation and evaluation, and self- regulation—to form that judgment and to monitor and improve the quality of that judgment” (Facione, 1998, p. 3). The author argued that the non-linear recursive process of critical thinking would allow the person to apply the skills to each other as well as to the problem at hand. By doing so, the critical thinker will then be able to explain one’s analysis, analyze one’s interpretation, or evaluate one’s inference. So, reflecting on the nature, quality, and the process of thinking gives critical thinking the notion of reflexivity. Facione (1998) stated that reflexivity in critical thinking “permits one to use critical thinking in judging the reasonableness of the relied upon theories, the presented evidence, the appealed to judgment or criteria, the relevance of the described contextual elements, or the validity of the used methods of inquiry” (p.5). The nature of non- linearity in the thinking ability has furnished the ground for the reflection process, which in its nature enables the person to deal with problems, whether novel or complex, and facilitates the determination on or explore the belief of what should be done in such circumstances. The variation in the dealing with unstructured contextually- related problems has necessitated the existence of reflection as the basis for sound critical thinking (Facione, 1996).

The Elements of Critical Thinking Utilized by Facione

The cognitive skills that are included at the very core of critical thinking include the skills of interpreting situations at hand, analyzing them, evaluating, inferencing, explaining, and self-regulating (Facione, 1992).

Quoting from the consensus statement of the panel of experts, *interpretation* is defined as the ability “to comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria” (Facione, 1992, p. 4). For interpretation to take place, the person should be able to consider the sub-skills of “*categorization, decoding significance, and clarifying meaning*”(p. 3). These sub-skills were elaborated by Facione to include: (a) The ability to recognize a problem and describe it without bias; (b) read the person’s intentions on the face; (c) identify the main ideas in a situation; (d) categorize or organize, paraphrase someone’s ideas, and clarify what a chart or a graph means.

Analysis was defined by the experts as the ability “to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, opinions” (cited in Facione, 1992, p. 3). Included as sub-skills of analysis, is the ability to “examine ideas, to find and analyze the arguments” (Facione, 1992, p. 3). So, the person who is able to analyze will be able to identify similarities and differences in a situation, identify

unstated assumptions, draw out conclusions with bases and rationale for that, and relate concepts to the existing purpose (Facione, 1992).

As for evaluation, the experts defined it as the ability to:

Assess the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief, or opinion, and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation (cited in Facione, 1998, p. 5).

The sub-skills of evaluation include the ability of the person to assess what others have called for and assess the arguments as well, thus enabling the person to judge the credibility of a source of information, compare interpretation of findings in terms of their weaknesses and strengths, and judge whether the evidence coincides with the conclusion (Facione, 1998).

As for *inference*, the experts meant by it the ability of the person, “to identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information to educe the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation” (cited in Facione, 1998, p. 5). The sub-skills of inference would include “*list querying evidence, conjecturing alternatives, and drawing conclusions*” (p. 4). Facione

verified the use of this skill when conducting a scientific experiment for the purpose of proving something and drawing conclusions accordingly.

Moreover, the experts defined *explanation* as the ability “to state the results of one’s reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one’s result were based; and to present one’s reasoning in the form of cogent arguments” (cited in Facione, 1992, p. 4). The sub-skills under explanation include “*stating results, justifying procedures, and presenting arguments*” (p. 4). The most remarkable of all of the cognitive skills is that which deals with explanation, since it allows the critical thinkers to make their thinking better and improved (Facione, 1992).

Another element of critical thinking is self-regulation. The experts defined it: Self-consciously to monitor one’s cognitive activities, the elements used in those activities, and the results deduced, particularly by applying skills in analysis, and evaluation to one’s own inferential judgments with a view toward questioning, confirming, validation, or correcting either one’s reasoning or one’s results (cited in Facione, 1992, p. 4).

The sub-skills here include those skills of examining personal views on particular issues with understanding of personal biases, monitoring one’s understanding or comprehension, separating personal views from those of others, changing

conclusions resulting from misjudgment and correcting them accordingly (Facione, 1992).

Facione's clarification of the core critical thinking skills has provided the means to present the grounds for his model on "Professional Judgment". This model addresses thoughtful, purposeful judgment elicited from settings that nurture and foster reflective thought over automatic or taken for granted scripts (Facione, Facione, and Giancarlo, 1997).

Research seemed to support the idea that critical thinking is as much a habit of mind. Nevertheless, it has been conceived by Facione (1997) that beyond the core cognitive skills, there exists a set of attributes characterizing the person who has the pervasive behavior and the spirit of using the critical thinking skills in a positive sense. These attributes have been referred to as "personal disposition to open-mindedness, inquisitiveness, and willingness to consider in light of new information" (1997, p.8). Besides, these attributes have been entitled by the author as the habits of mind, thus making critical thinking a skill of thinking and a personal attribute as well. Moreover, these attributes have been utilized to define a nurse who exercises outstanding clinical judgment and that can be nurtured at all stages of cognitive development (Facione, Facione, and Sanchez, 1994).

Facione's Critical Thinking Measurement Modalities

Facione (1990, 1992) presented the California Critical Thinking Skills Test (CCTST) as an instrument that was developed to measure critical thinking in

college- aged students. It has been based on the definition that evolved from a consensus of 46 experts on critical thinking documented in the APA (1990) Delphi Report. The test has targeted those core critical thinking skills regarded as essential elements for an individual's education and defined cognitive skills in the areas of *analysis, interpretation, inference, evaluation, and explanation*, which all "operate in interdependent and interactive ways to facilitate purposeful self-regulatory judgment regarding what to do or how to act in a situation" (Facione, 1998, p. 1).

The CCTST has been considered a widely used, valid, and reliable test that targets critical thinking skills among college students and professionals (Facione, 1992; Adams, 1999). Nevertheless, Facione (1997) has derived another assessment tool for critical thinking, the Test of Everyday Reasoning (TER) based on the CCTST.

Hence, and within the context of the TER instrument, Facione (1998) defined each of the above-mentioned elements of critical thinking briefly to include:

1. Analysis - The comprehension and interpretation of meaning related to a variety of experiences and relationships.
2. Evaluation - The plausibility of statements that describe a person's perception, experience, situation, judgment, belief or opinion and the results of one's own reasoning.
3. Inference - The ability to draw conclusions.

4. Inductive reasoning - The conclusions made from inferences.
5. Deductive reasoning - The drawing of conclusions based on logical reasoning.

A full description of the TER will be discussed and presented in the methodology section of the study.

The Premise Behind Selecting a Standardized Test of Critical Thinking

The assessment of critical thinking has been traditionally accomplished through observation of students by faculty in clinical settings and by evaluating written patient assessments and care plans. Quantitative assessment has become a current focus of nurse educators and program managers. Nevertheless, assessing student critical thinking is an ongoing challenge in nursing education.

The majority of the studies that were conducted to measure critical thinking in nursing used the WGCTA. This test and that of the CCTST have been considered valid and reliable tools to measure the construct of critical thinking. However, the use of the CCTST is encouraged in nursing research because it is “a reservoir of untapped potential because (it has) been under use as a predictor of critical thinking abilities” (Adams, 1999, p. 113). However, the WGCTA was designed to measure critical thinking ability in a general population. The author of the tool defined critical thinking in broad, non-specific terms, thus raising the possibility that the results of the tests conducted to test critical thinking abilities of nursing

students might not be reflective of the critical thinking skills of the unique nursing population (Adams, 1999; Bauwens and Gerhard, 1987).

Nursing is a science and as such may be more accurately tested with a tool developed with that discipline in mind. Facione, Facione and Sanchez (1994) identified critical thinking abilities that nurses should have to develop critical thinking skills that contribute to ideal clinical judgment. According to Adams (1999), the concept of critical thinking amongst nurses has involved “the logical reasoning of the scientific method and nursing process applied beyond the evident central facts” (p.112). This concept has included as well the less evident peripheral facts that have an impact on deriving the nursing diagnosis prior to devising creative and effective interventions (Adams, 1999).

A broad literature review led the researcher to the use of the Test of Everyday Reasoning (TER). This tool was selected based on an extensive reading by the researcher on instrument development and from an explicit discussion with the author of the test and the researcher’s supervisor on the feasibility of its utilization in the researcher’s culture. Additionally, the test seemed to coincide with the philosophy of the Institutes of Nursing and the faculty’s definition of the teaching learning process. Therefore, complying with the “suitability criterion” of the assessment tool (Robertson and Szostak, 1996).

Chapter Three

Methodology

Design

The study was conducted using a cross-sectional design. This design was intended to capture the process of critical thinking at different points in its evolution with different levels in a case-based curriculum (Polit and Hungler, 1998). Besides, this type of design allowed the researcher to evaluate critical thinking skills in each of the three groups of participants, where by each group represented a level of the three- year Diploma nursing program while applying the case method of teaching in the nursing courses.

The newly enrolled participants into the program have had no previous exposure to this learning strategy. Upon comparing the critical thinking skills among the three groups of participants, the variation in the results would be associated with the level of the participants and the extent of exposure of each level to case method teaching.

Population and Setting

The population from which the sample of this study was drawn was from the Abu Dhabi Institute of Nursing. The Institutes of Nursing in the United Arab Emirates at the time of the study encompassed four branches located at various

sites in the country with a distance of 200 to 350 Km away from Abu Dhabi, the capital, and where the mother institute is located.

The program that has been running at the four branches at the time of this study is the Diploma program, which is a three-year program after secondary education, is semester-based and follows the credit system.

Since the inception of the Diploma program in 1986, the content- based curriculum was utilized. But in 1998, the program was completely revised and changed to a case-based curriculum with the new outlook of the staff for a teaching and learning process that is interactive in nature and student centered.

The first batch of students who used the new case-based curriculum will graduate in June 2001. The total number of students in the program at the three levels in the Abu Dhabi branch at the time of this study was 198. The students were distributed in this manner: 84 in level one, 60 in level two, and 54 in level three.

Sample and Sampling Strategy

A convenience sample of 90 participants, representing the three levels of the program, was selected for this study. A simple random sampling of 30 students from each level took place, thus complying with the recommendations of Polit and Hungler that in quantitative non-experimental studies that use non-probability samples “ at least 10, with 20- 30 / type of subject is preferred” (cited in Roberts and Burke, 1989, p. 227). The name of each student in the population was put on

a tag and the tags of each level were placed in a cap. The contents of the cap were mixed thoroughly and then the desired number for the sample was drawn out. This approach was repeatedly applied for each of the three levels respectively.

The TER Instrument

Definition of the instrument.

This 35 item multiple-choice test was constructed to measure critical thinking skills in term of induction, deduction, analysis, evaluation, and inference. In the manual that included the critical thinking skills and how they were reflected in the test items, the California Academic Press (1998) introduced a brief description of the tool to include:

The items range from those requiring an analysis of the meaning of a given sentence to those requiring much more complex integration of critical thinking skills. Some items require that the correct inference be drawn from a set of assumptions; some require that an inference, which is provided, be properly evaluated. Some require that the proper evaluation not only be determined, but also justified by the most cogent reason. Others require that objections to stated inferences are evaluated, and that the evaluation of these objections then be justified. Additional items are quantitative in nature and some require students to analyze charts and graphs (p. 2) (see Annex G for an original copy of the TER).

Facione (1998), the author of the Test of Everyday Reasoning (TER), gave a description of the process he used to derive this critical thinking-measuring tool from CCTST. The author stated:

Since 8 items of the CCTST failed to discriminate among high and low performing students within a representative sample of students, including high school and community college students, they decided to delete them. The core structure of each of the remaining 25 items from the CCTST was the starting point to create 25 new (but parallel in structure to the original 25 CCTST items) for the TER. In some cases the items were only slightly altered; in other items the content matter within an item was changed to be more appropriate for the target population. 10 new items were added to create a 35-item comprehensive assessment. (p. 3).

The researcher administered the test to the participants in the study according to the instructions provided in the exam kit and the results of which were machine scored.

Validity and reliability of the TER.

The researcher used the TER as a critical thinking assessment tool which is highly correlated with California Critical Thinking Skills Test (CCTST), ($r=0.75$). Its reliability (internal consistency) KR- 20 ranged from 0.75 to 0.82 (Facione, 1998).

Adams, Whitlow, Stover, and Johnson (1996) addressed the reliability and the validity of the CCTST as having:

1. A reliability of 0.68 to 0.69 was computed using Kuder- Richardson (KR) internal reliability coefficient.
2. Content validity was confirmed based on the link between CCTST and the APA Delphi Research.
3. Construct validity was supported by significant correlation between CCTST and student gender, ethnicity, academic major and critical thinking self-esteem when administered to 1196 university students.
4. The KR- 20 alpha statistics of the instrument scale for the administration of the test will be compared with KR- 20 statistics published by Facione& Facione (1992) of 0.68 to 0.70.

Data Collection Process

The TER was administered to the participants (N=88) after undertaking the following steps in the introductory- informative stage of data collection:

1. The participants in each level were identified by simple random selection and the groundwork was laid in preparation for the informed consent.
2. The participants were informed about their participation in the study and their consent was obtained (see Annex B for a copy of the Informed Consent).

3. The date, time, and site for examination were considered with the administration and the participants were informed of that as well one week prior to the examination date.
4. The principles and procedure of implementing the TER were followed step by step as instructed in the examination kit issued by the California Academic Press.

Data collection took place over a period of three weeks and at the end of semester one of the academic year 2000- 2001. Of the 90 participants, 88 sat for filling the TER instrument, but two students from level one did not show up during the examination time thus making the response rate 98.78 percent.

The researcher collected the data herself with assistance from the administrative staff of the institute. The data were obtained from the TER instrument, the participants and the admission records. The researcher adjusted the time, date, and venue of the examination; administered the test; and proctored the participants as well. The answer sheets of the TER instrument were mailed to the California Academic Press for correction and scoring.

The socio-demographic and academic achievement variables were collected from the participants and their records with the help of the administrative staff. This was accomplished by designating to the administrative staff the participants from each level and the variables that should be collected from the Institute's admission and academic records. The variables encompassed the age, nationality,

secondary average, semester one average, cumulative average, and secondary stream (scientific versus arts) of the participant. As for the data on the occupation of father and mother, marital status and the number of children of the married participants and the sequence in the family, all of which were collated from the participants themselves via telephone conversation, because the students were having an inter-semester break during this phase of the data collection process (see Annex A for the collated raw data of the participants).

Piloting TER

Upon receiving the TER from the California Academic Press, the researcher piloted it with 12 students at the Sharjah Institute of Nursing. The pilot sample ($N=12$) was randomly selected by the head of the Institute in the range of four students per level. The students were informed of the date, time, duration and premise of the test. The feedback on the test was conveyed to the researcher by conducting telephone conversations with each participant in the pilot study. The comments revolved around encountered difficulties in comprehending long paragraphs to which a set of test items were based and in finishing the test in 50 minutes as required.

The director of the English program was consulted concerning the suitability of the TER language with the English level of the participants in the study. The director advised translation of the test into Arabic. Accordingly, the test was

translated by the researcher and was then translated back into English by two other candidates, thus ensuring test validity.

Ethical Considerations

The ethical considerations in the course of the study included a number of procedures that ensured the protection of the participants' rights. These procedures entailed obtaining an informed consent from each participant and getting an approval for conducting the study from the curriculum committee of the Institutes of Nursing. Accordingly, the researcher submitted the research plan to the director of the Institutes of Nursing for approval and disclosure to the Curriculum Committee members. Pursuing from their approval, the study was conducted accordingly.

The elements of the informed consent.

The researcher grouped the participants from each level, introduced them to an informed written consent, and briefed them verbally of certain aspects of the test in a 20 minutes session. The session included:

- The title of the research project.
- The purpose of the study.
- A complete description of the TER, the length of time required, the administration procedure, and the analysis of the results in terms of comparison between the three levels.

- A clarification on the benefits underlying their participation in the study; particularly of the results that would impinge on the future of nursing education in the country, the Gulf region, and globally.
- An assurance to the participants that the TER scores will neither affect their academic achievement nor would these scores jeopardize their appointment in any health care facility upon graduation.
- An explanation that participation in the test would be within the Institute's time and premises. Besides, the means of compensating for the participants' missed sessions were tackled with the respective tutors and settled successfully.
- A reinforcement concerning the means of protecting the anonymity and confidentiality of the data obtained from the participants via appropriate handling, storage, and accessibility of the researcher to the data.
- The voluntary participation in the study.
- The researcher's contact number in case the participants needed extra information about the results of the study and the TER scores.
- The signature of the participants on the consent form with the date on.

The informed consent was written in English where as the verbal instructions were given in both languages, English and Arabic, thus ensuring the understanding of the participants. Besides, each participant received a copy of the written consent to be submitted with the participant's signature if willing to

participate in the study (see Annex B for a complete view of the written consent).

Surprisingly, all of the selected students exhibited willingness to participate as they all submitted the signed consent to the researcher.

Limitations of the Study

Upon conduction of the study, there was lack of data on the use of TER on college and nursing students in the United Arab Emirates. The TER, being originally constructed in English and in the form of multiple-choice questions, may have posed limitations in the study. The chief reasons for these limitations were apparently: (a) the lack of preparation of the first level students (entry) for such type of tests in their secondary education, and (b) the translation of the TER into Arabic during which the construct of critical thinking may have been misinterpreted in the translated test items.

Generalization of findings was limited due to the sample size and the geographical location of the Institute. The sample size ($N=88$) students may not have been the best sample size from the scientific perspective and may have subjected the study to limitations in terms of generalization of the data to the other branches. These limitations were related to the difficulty in accessing the students at the other Institutes of Nursing as well as to the restraint in the fiscal resources available to the researcher as stated in the sampling section of this study. Being located in Abu Dhabi, the researcher found it feasible to access the students at this

branch. Utilizing other branches posited difficulties to the researcher owing to the following:

1. Time constraint in the data collection process that in turn won't be adequate to prepare assistants at the other sites.
2. Traveling and accommodation costs
3. The data collection took place at the end of semester one of the academic year, thus coinciding with the preparation phase of the final exams. This in turn posited a constraint related to leaving the 'mother' Institute at this time of the semester.

An additional limitation was the maturation status of the learners that could have accounted for the difference in critical thinking skills. The difference in the scores of the participants in the TER may have been attributed to the maturational status of the participants across the three levels rather than to the extent of exposure to a case- based curriculum.

Despite these limitations, the study was still worth conducting because there was no other way of obtaining a control group for this type of study in the U.A.E. The aspect of language has been taken care of to a great extent by using the translated version of the TER.

Measures

Critical thinking, the main outcome variable, was assessed in this study using the standardized TER. According to Facione (1998), the TER instrument has been

developed to measure critical thinking skills based on the Delphi definition of critical thinking; it is a 35 item multiple-choice test that takes 50 minutes to be completed. This tool has been successfully used and validated among American high school students, community colleges, technical schools as well as adolescents and adult populations. Eventually, this test had to be piloted by the researcher in this study because it was constructed for and used by the American population.

The choice of the TER by the researcher was based on answers to queries directed to Dr. Facione, the author of TER and CCTST measuring tools, on the 20th of August 2000 concerning the variables that might influence the results if the TER or the CCTST was to be used. A variety of factors were presented, the most significant of which were the culture of the participants in the study and their English reading level.

It is worth noting here that all of the participants in the study were Arabs and females, being the admission criteria of the Institutes of Nursing in the U.A.E. However, all of the available standardized critical thinking assessment tools have been structured to suit the western culture per se, thus the tool itself was perceived by the researcher as a constraint. Another constraint was the English language difficulty encountered by students upon their entry into the program and throughout it. This perceived difficulty in the language offered the explanation to

why the English language courses continue throughout the program as well as to why the TER was used and translated in this study.

The main determinants of TER were categorized into the following:

1. Socio-demographic variables including age, marital status and number of children, nationality, place of residence, mother's and father's occupation and sequence in the family. Age was left as a continuous variable whereas marital status was grouped into two categories because of the unavailability of other groups (meaning divorced, separated...).

Nationality was entered and kept as is but was later on recoded into three groups that included participants coming from the Gulf region, Middle East and African countries. Residence was grouped into those residing in the city of Abu Dhabi (where the institute is situated) and those staying thirty minutes or more from the city. Mother's occupation was divided into housewife and laborer, whereas father's occupation was regrouped after discussion into seven categories: managerial position (manager, director, investor...), administrative staff (accountant...), professional (teacher, journalist...), skilled (technician, mechanic...), unskilled (driver...), military (police, civil defense...) and free lance (trader...).

Later on, this variable was also recoded into three major categories to avoid appearance of empty cells especially in cross-tabulation analysis. As for the sequence in the family, being the number of the participant

between siblings, it was kept as is (see Annex D for coding of the variables).

2. Educational and academic achievement included the level of nursing education, secondary stream, secondary average, semester one average and cumulative average until the time of the conduction of the study. The level of participants' education was divided into three levels (level one, two and three), whereas the secondary stream was divided into two groups (arts and sciences). The secondary, semester one and cumulative averages were also left as continuous variables (see Annex D for coding of the variables).

Data Entry and Analysis

The data were entered on Statistical Package for Social Sciences (SPSS version 8.0). Bivariate analysis, comparing socio-demographic and educational achievement variables with TER scores and the three educational levels, was performed. Besides, analysis of variance (ANOVA), linear regression and chi square tests were used as statistical analysis methods to check for the statistical associations between the different variables collated on the participants in the study (see Annex E).

Chapter Four

Results

Student Profile

A total of ($N=90$) students were included when this study was initiated. However, due to the attrition rate that was not unexpected in level one, 28 students of the 30 students who were selected from level one have completed the study. The total number of respondents was therefore 88.

Description of the Sample

The participants of this study were all Arabs, Moslems and females. It was revealed in this study that 6.8 % of the participants were married and half of those married have children in the range of one to two (see Table 1).

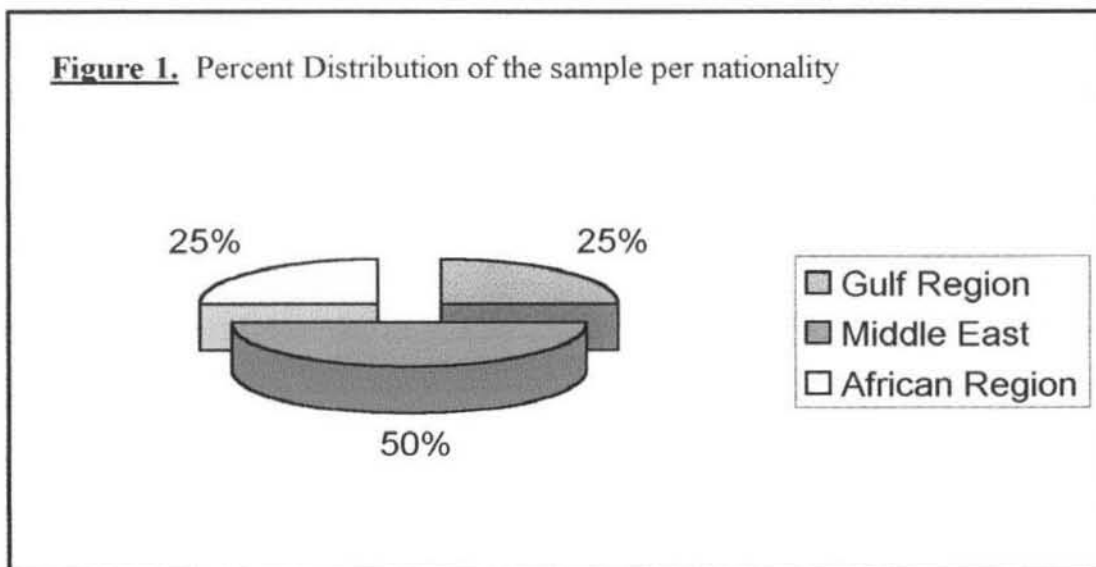
Besides, Table 1 showed that the participants in the study across the three levels of the Diploma nursing program had a mean age around 20 years, had earned a mean secondary school average of 78.1 ($SD \pm 8.2$), had a mean semester one average for the academic year during which the study was conducted of 67.6 ($SD \pm 9.2$), a mean cumulative average till the time of the study of 71.0 ($SD \pm 8.9$), and the mean TER score of 18.1 ($SD \pm 3.7$).

Table 1Distribution of Participants by Demographic and Background Characteristics

Characteristics	N	%
<u>Marital Status</u>		
Married	6	6.8
Not married	82	93.2
<u>Nationality</u>		
Gulf Region	22	25.0
MEA Region	44	50.0
African Region	22	25.0
<u>Levels of education</u>		
Level I	28	31.8
Level II	30	34.1
Level III	30	34.1
<u>Residence</u>		
In the City	49	55.7
Far 30 min from the City	39	44.3
<u>Stream</u>		
Science	64	72.7
Art	24	27.3
<u>Mother's occupational status</u>		
Housewife	65	80.2
Laborer	16	19.8
<u>Father's occupational level</u>		
Manager/Director	5	6.5
Administrative staff	4	5.2
Professional	15	19.5
Skilled	27	35.1
Unskilled	13	16.9
Military	7	9.1
Free Lance	6	7.8
Average age of the participants in the sample (in years)	20.2 ± 1.9	
Mean ± SD		
Secondary average for all the participants (/100) Mean ± SD	78.2 ± 8.3	
Semester I average for all the participants (/100) Mean ± SD	67.6 ± 9.2	
Sequence in the family (Mean ± SD)	3.1 ± 1.9	
Average number of children for those who are married (Mean ± SD)	1.0 ± 0.8	
Cumulative Average for all participants (Mean ± SD)	71.0 ± 8.9	

As for nationality, Figure 1 depicted that 50% of the participants were from the Middle East (Lebanon, Jordan, Syria, and Palestine), where as 25% were from the Gulf region (Emirates, Oman, and Yemen) and 25% were from the African region (Somalia, Sudan, and Egypt).

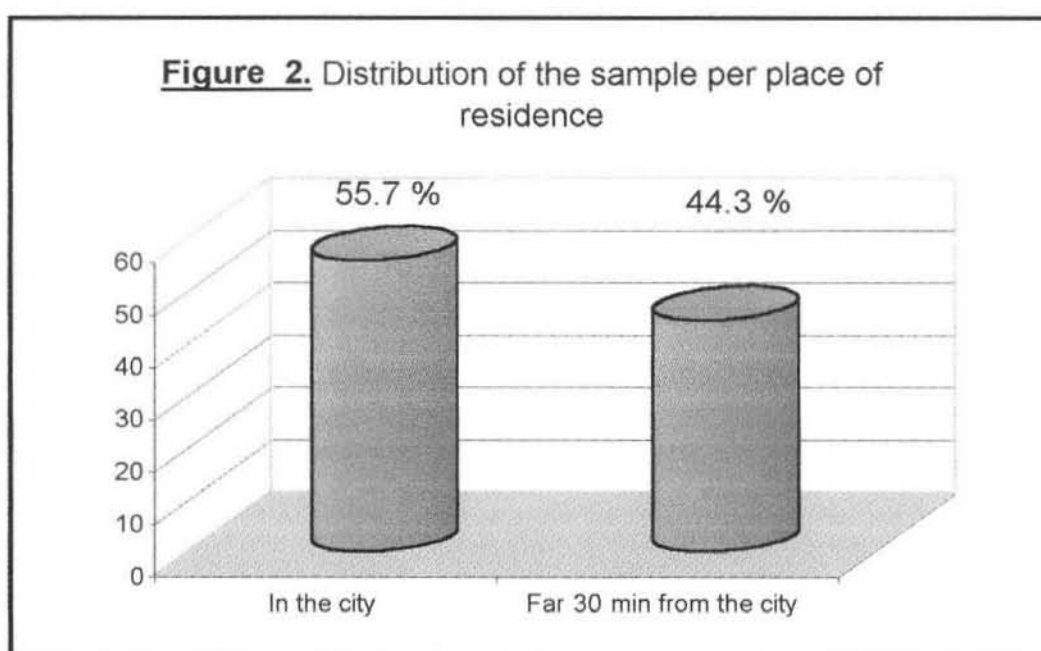
The participants' mean sequence in their families revealed that they were either the third or the fourth child of their parents (see Table 1).



As mentioned before in the methodology section, the number of participants from each level of the three levels of the program was approximately equal. The percent distribution of the sample for level 1 through level 3 was 31.8%, 34.1%, and 34.1% respectively (see Table 1).

Around three quarters of the sample were from the scientific stream. And around 82% of those who lived in areas 30 minutes or more from Abu Dhabi were from the Gulf region compared to 27 % from the Middle East.

It was demonstrated in Figure 2 that more than half of the participants stayed in the city of Abu Dhabi where the Institute is located.



Regarding the participants' mothers, and as is expected in an Islamic country where the majority of Moslem women stay at home and assume household duties, 80 % were housewives. Besides, a third of the participants' fathers assumed skilled occupations (see Table 1).

Description of Each Level

Table 2 provided the description of each level by selected socio-demographic and other characteristics. Participants of level one included ($n = 28$) students. These students averaged 19.43 years of age, had earned a mean secondary school average of 79.65, were 71.45 % of the scientific stream, and were enrolled in six credit hours of case- based courses during the conduction of the study. The majority of the students were Jordanian and Palestinian 21.4% each, while others were Omani and Yemeni 14.28% each, Emirati 3.6%, Lebanese, Syrian, and Egyptian 3.57% each, and Sudanese and Somali 7.14% each.

Participants in level two ($n = 30$) averaged 19.87 years of age, had earned a mean secondary school average of 77.19, were 66.66% from the scientific stream, had already completed ten credit hours of the case- based courses during the first level of the program, and were enrolled in 10 credit hours during the conduction of the study. The majority of the students as shown in Table 2 were 36.7% Palestinian, where as the others were 20% Jordanian, 20% Omani, 16.66% Somali, 3.33% Yemeni and 3.33% Syrian.

Table 2

Comparison of Participants' Level of Education by Selected Socio-demographic and Other Characteristics

Characteristic	Level I (in %)	Level II (in %)	Level III (in %)	P- Value	
<u>Marital Status</u>					
Married	3.6	6.7	10.0	.624	
Not married	96.4	93.9	90.0		
<u>Nationality</u>					
Gulf Region	32.1	23.3	20.0	.184	
MEA Region	50.0	60.0	40.0		
African Region	17.9	16.7	40.0		
<u>Residence</u>					
In the City	50.0	60.0	56.7	.739	
Far 30 min from the City	50.0	40.0	43.3		
<u>Stream</u>					
Science	71.4	66.7	80.0	.502	
Art	28.6	33.3	20.0		
<u>Mother's occupational status</u>					
Housewife	80.8	78.6	81.5	.961	
Laborer	19.2	21.4	18.5		
<u>Father's occupational level</u>					
1. Manager/Director	40.0	38.5	38.5	.924	
Administrative staff					
Professional / Free					
Lance	40.0	34.6	30.8		
2. Skilled					
3. Unskilled and military	20.0	26.9	30.8		

Characteristic	Level I (in %)	Level II (in %)	Level III (in %)	P- Value
Average age of the participants (in years) Mean \pm SD	19.4 \pm 2.6	19.9 \pm 1.0	21.1 \pm 1.4	.002*
Secondary average for the participants (/100) Mean \pm SD	79.7 \pm 8.32	77.2 \pm 7.73	77.7 \pm 8.9	.502
Semester I average for the participants (/100) Mean \pm SD	68.6 \pm 10.7	63.6 \pm 9.1	70.6 \pm 6.4	.010*
Cumulative average of the participants (Mean \pm SD)	68.5 \pm 10.7	69.5 \pm 7.9	74.9 \pm 6.7	.011*
Sequence in the family (Mean \pm SD)	3.3 \pm 2.3	2.4 \pm 1.6	3.4 \pm 2.0	.139
Average number of children for those who are married (Mean \pm SD)	.0 \pm .0	1.5 \pm .7	.3 \pm .6	.207

* Significant ($p < .05$)

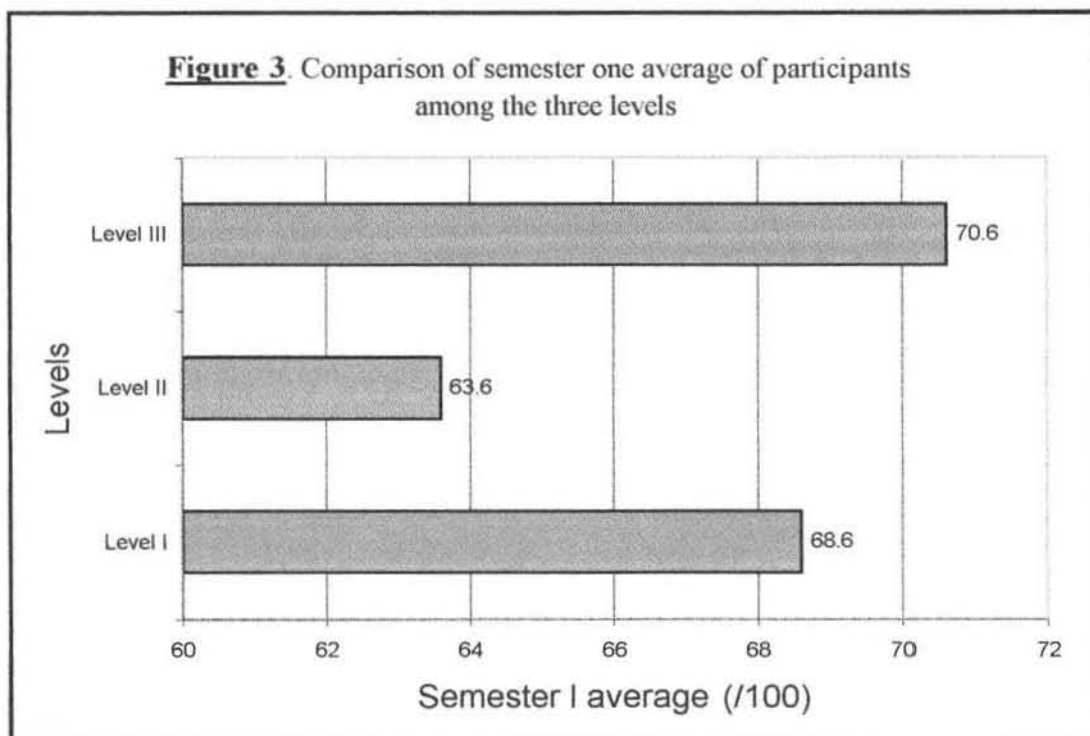
**Borderline significance

As for level three, the students ($n = 30$) averaged 21.10 years of age, had earned a mean secondary school average of 77.70, were 80% from the scientific stream, had already completed 42 credit hours of case-based courses in the first and second levels of the program, and were enrolled in ten credit hours of case-based courses during the conduction of the study. The majority of the students were Somali 30%, while others were Jordanian and Palestinian 20% each, Sudanese, Yemeni and Emirati 6.66% each, and the rest were Omani, Egyptian, and Iraqi 3.33% each.

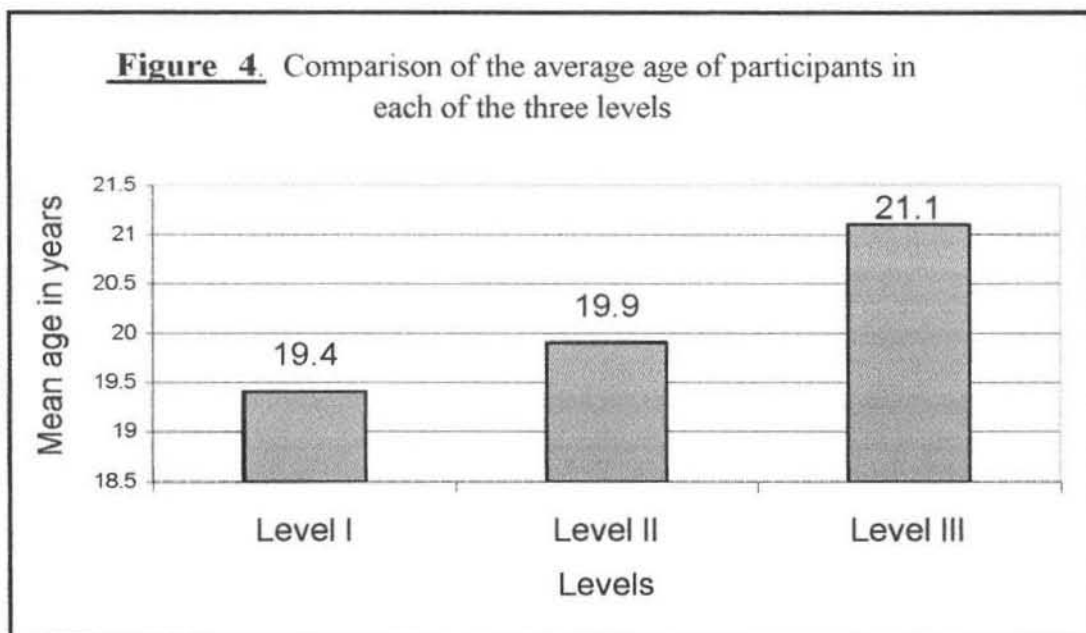
The Difference Between Variables Amongst the Three Levels

Table 2 provided the evidence that all of the background variables did not vary between the three levels. No significant difference was revealed in terms of the participants' nationality (which was recoded into three categories), stream, marital status, number of children, occupation of mother and father, and their sequence in their families.

Regarding academic achievement, there was no difference in secondary average between the three levels, but Table 2 and Figure 3 showed that there was a difference in semester one average where level three participants had the highest average of 70.6 % as compared to 63.6 % for level two and 68.5% for level one.



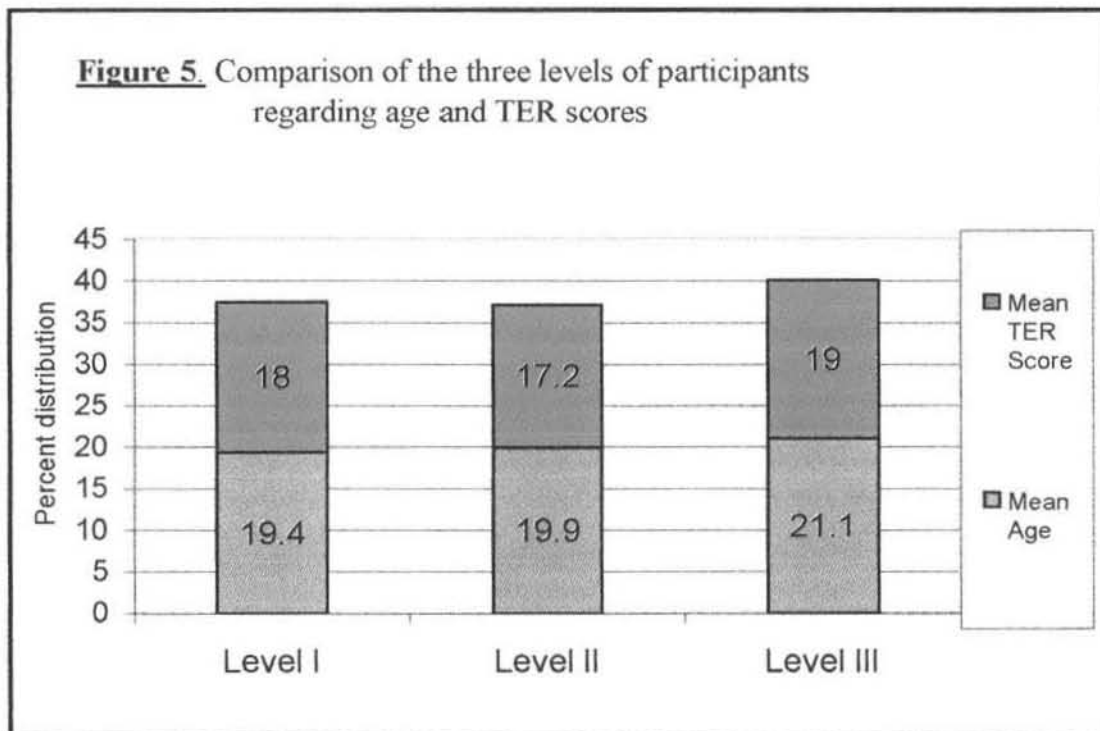
As predicted, level 3 participants had a mean age of 21.1, which is higher than level 2 and level 1 who had a mean age of 19.9 and 19.4 respectively. The analysis of variance indicated that there existed a significant difference among the three levels, $F(2, 85) = 6.80, p < .05$ (see Table 2). This difference in the mean age of participants is attributed to the difference in levels (see Figure 4).



TER Scores and Their Determinants

It was demonstrated in Figure 5 that level three participants have got the highest TER scores. Nevertheless, the results didn't show significance, but findings from independent samples *t* test revealed that there was a borderline significance in the mean TER scores between level 3 and level 2 participants,

where the mean TER scores for level 3 was 19 versus 17.2 for level 2, $t(58) = 1.92, p = .06$ (see Table 3).



Regarding nationality and its relationship to TER scores, Table 3 showed that the mean TER scores was 16.95 for the participants from the Gulf region, which was lower when compared to those participants from the Middle East and the African countries whose mean TER scores were 18.41 and 18.59 respectively. However, the results were statistically insignificant.

As for the mean TER scores of the participants who resided in the city of Abu Dhabi compared to those who stayed 30 minutes or far from the city, the data showed no significant difference as well.

Table 3Comparison of Mean TER Scores by Selected Variables

Characteristic	Mean TER score	Standard deviation	P-value
<u>Marital Status</u>			
Married	20.8	3.8	.059**
Not married	17.9	3.6	
<u>Nationality</u>			
Gulf Region	16.9	4.1	.246
MEA Region	18.4	3.2	
African Region	18.6	4.0	
<u>Levels of education</u>			
Level I	18.0	3.6	.156
Level II	17.2	3.9	
Level III	19.0	3.5	
<u>Residence</u>			
In the City	18.0	3.7	.797
Far 30 min from the City	18.2	3.7	
<u>Stream</u>			
Science	18.6	3.1	.058**
Art	16.9	4.8	
<u>Mother's occupational status</u>			
Housewife	17.8	3.7	.168
Laborer	19.3	3.7	
<u>Father's occupational level</u>			
1. Manager/Director	17.8	3.8	.867
Administrative staff			
Professional/ Free Lance	18.3	3.5	
2. Skilled	18.0	4.1	
3. Unskilled and Military			
<u>Participants' mean TER scores</u>			
Level I	18.1	3.7	.156
Level II	17.2	3.9	
Level III	19.0	3.5	.06**

* Significant ($p < .05$)

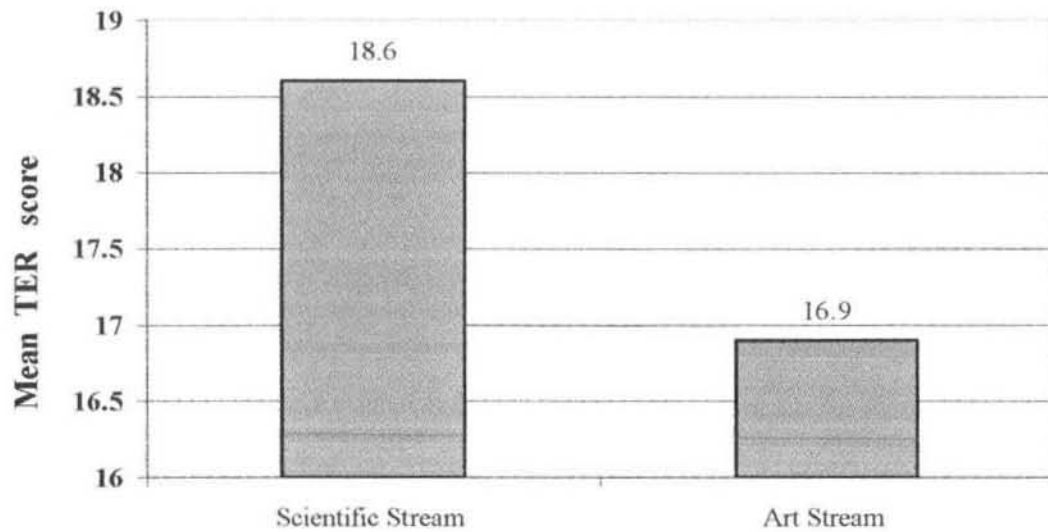
** Borderline significance

In relevance to Figure 6, the mean TER scores for the married participants in the sample was 20.83, which was higher when compared to the single participants who had a mean TER score of 17.89. However, the analysis of variance indicated a borderline significance, $F(2, 85) = 3.67, p = .059$ (see Table 3).



Additionally and upon further dwelling on the secondary stream of the participants, that is their preparation in the secondary education for assuming either the science or the art stream, the mean TER scores revealed a borderline significance. As shown in Figure 7, the science stream participants reported a high TER scores ($M = 18.6$) than did the art stream participants ($M = 16.9$).

Figure 7. Comparison of TER mean scores of participants of scientific and art streams



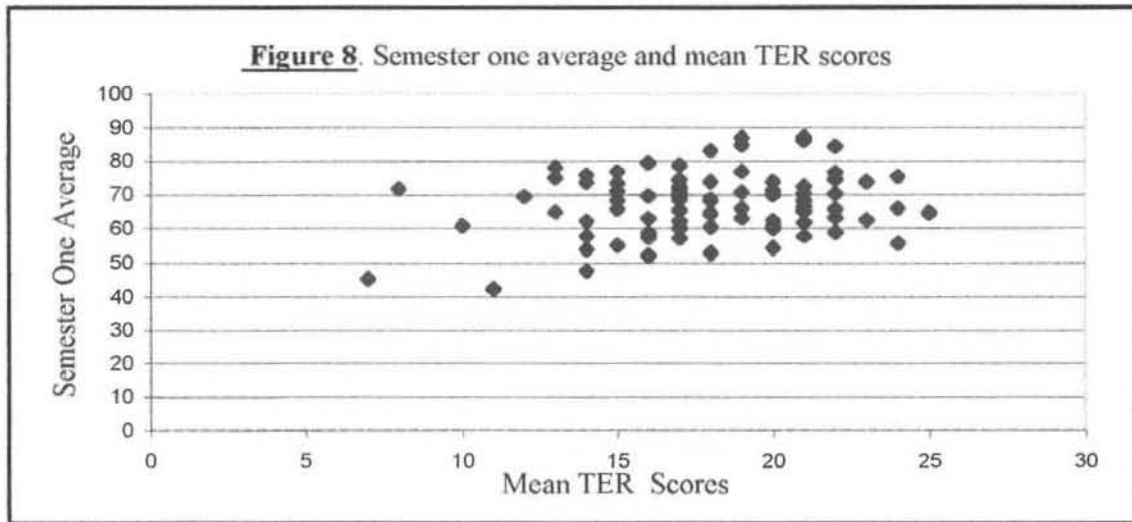
The analysis of variance indicated a borderline significance, $F(2, 85) = 3.69$, $P = .058$ (see Table 3). Moreover, findings from Pearson correlation were documented in Table 4 to reveal that with every unit increase in age there was a .07 unit increase in TER scores ($\beta = .07$). The same trend was applied to the sequence of the participants in their families ($\beta = .12$) and for the number of the children of the married ones ($\beta = .008$). All of which revealed that their relationship with the mean TER scores was insignificant.

Table 4
Linear Regression Analysis for Selected Variables with TER Scores

Characteristic	Beta	P-value
Average age of the participants in the sample (in years) Mean \pm SD	0.066	0.539
Secondary average for all the participants (/100) Mean \pm SD	0.102	0.347
Semester I average for all the participants (/100) Mean \pm SD	0.240	0.024*
Sequence in the family (Mean \pm SD)	0.120	0.312
Average number of children for those who are married (Mean \pm SD)	0.008	0.943
Cumulative average for all participants (Mean \pm SD)	0.230	0.031*

* Significant ($p < 0.05$)

Furthermore, Table 4 revealed that with every unit increase in secondary average there was a 0.1 unit increase in TER scores, yielding an insignificant relationship. Although the latter variable has not shown significance, but semester one average has been highly significant in relation to the TER scores. It was documented in Table 4 that with every unit increase in semester one average there was a positive unit increase of 0.24 in TER scores. The analysis of variance indicated a significant relationship between semester one average and the mean TER scores, $F(2, 85) = 5.26$, $p < .05$. Besides, it was noted in Table 4 that with every unit increase in cumulative average there was a positive unit increase of 0.23 in TER scores. The analysis of variance indicated a significant relationship between cumulative average and the mean TER scores, $F(2, 85) = 4.82$, $p < .05$. An additional demonstration of the relationship between semester one average and the mean TER scores is presented in Figure 8.



Studying the Different Variables Between Each Other

All the variables that have been studied and represented in Table 5 (nationality, secondary stream, marital status, residency, occupation of the father and that of the mother, age, and sequence in the family) have shown insignificant relationship with the secondary average.

Table 5

Comparison of Secondary Average of Participants in the Sample by Selected Variables

Characteristic	Secondary Average	Standard Deviation	P-value
<u>Marital Status</u>			
Married	79.0	5.9	.792
Not married	78.1	8.5	
<u>Nationality</u>			
Gulf Region	76.9	9.3	.673
MEA Region	78.8	8.3	
African Region	78.0	7.5	

Characteristic	Secondary Average	Standard Deviation	P-value
<u>Residence</u>			
In the City	78.7	7.5	.454
Far 30 min from the City	77.4	9.3	
<u>Stream</u>			
Science	78.5	7.7	.576
Art	77.3	9.8	
<u>Mother's occupational status</u>			
Housewife	77.4	8.3	.255
Laborer	80.0	8.1	
<u>Father's occupational level</u>			
1. Manager/Director	78.4	7.4	.358
Administrative staff			
Professional/ Free Lance	78.7	8.6	
2. Skilled	78.7	8.6	
3. Unskilled and Military	75.4	9.4	

However, the data in Table 6 revealed the significant relationship between semester one average and secondary average. The mean semester one average scores of the participants was 67.55, and the mean secondary average scores was 78.14, $t(87) = 10.57$, $p < .05$. Besides, paired sample correlation revealed that with every unit increase in semester one average there was a 0.4 unit increase in the secondary average (see Table 6).

Table 6
Linear Regression Analysis for Secondary Average of the Participants with
Semester One Average

Characteristic	Beta	P-value
Secondary average for all the nurses (/100) Mean \pm SD	.430	.000*

* Significant ($p < .05$)

Additionally, all of the variables that have been studied and shown in Table 7 (nationality, marital status, occupation of father and mother, age, and sequence in the family) have not shown significance in relation to semester one average except for the stream that has shown borderline significance (see Table 7 and Figure 9). The analysis of variance utilized in studying the different variables between each other indicated the presence of a borderline significance between semester one average and the stream, $F(2, 85) = 3.05$, $p = .084^*$.

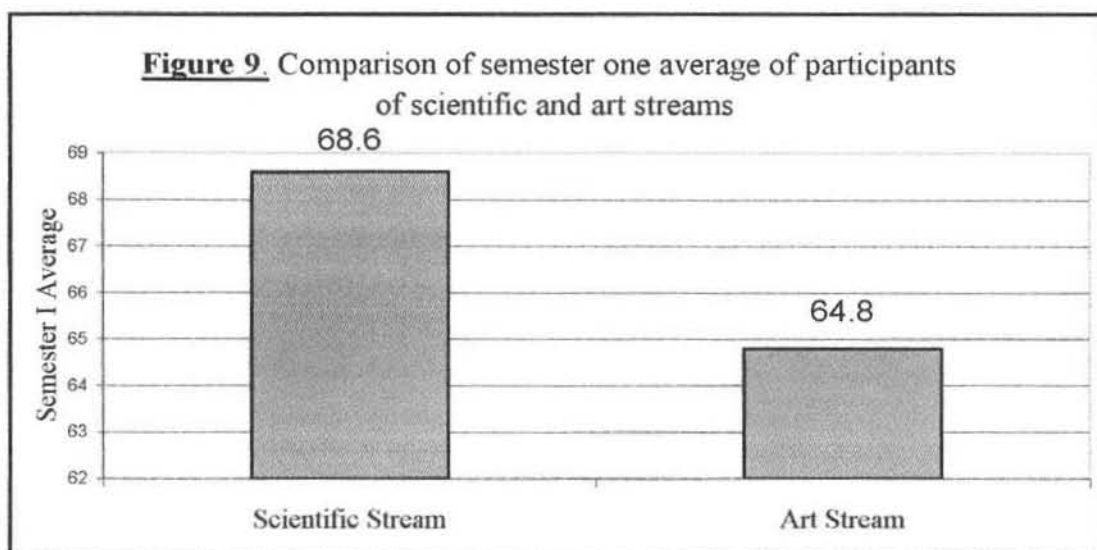


Table 7Comparison of Semester One Average of Participants by Selected Variables

Characteristics	Semester I Average	Standard Deviation	P-value
<u>Marital Status</u>			
Married	72.0	7.0	.228
Not married	67.2	9.3	
<u>Nationality</u>			
Gulf Region	67.1	12.0	.664
MEA Region	67.0	9.0	
African Region	69.1	6.2	
<u>Residence</u>			
In the City	67.4	9.0	.826
Far 30 min from the City	67.8	9.7	
<u>Stream</u>			
Science	68.6	8.9	.084**
Art	64.8	9.8	
<u>Mother's occupational status</u>			
Housewife	66.9	9.0	.206
Laborer	70.1	9.0	
<u>Father's occupational level</u>			
1. Manager/Director Administrative staff Professional/ Free Lance	68.4	8.9	.229
2. Skilled	68.6	8.4	
3. Unskilled and Military	64.5	9.9	

** Borderline significance p close to .05

Chapter Five

Discussion of Findings

Critical thinking ability did not change significantly with each level in the study thus supporting and contradicting other studies. Nevertheless, there was an increasing trend in TER scores with increasing level of nursing education with the highest level getting the highest scores. It should be noted that failure to find significance does not negate the findings of earlier studies that showed that the use of case study technique in selective nursing courses resulted in development of critical thinking skills amongst nursing students (Neill, Lachat, & Taylor-Panek, 1997), but did support other research findings that critical thinking ability did not significantly change during the educational experience (Maynard, 1996).

There are several explanations to the absence of a statistically significant relationship between critical thinking and a case- based curriculum. First, critical thinking and case method teaching are newly defined terms for the faculty and students who have been used to the traditional learning method. Besides, both have been newly adopted and operational in the case- based curriculum with the evidence to the latter that the first batch will be graduating in September 2001. Perhaps an interface between educators who may not be well prepared and the principles of case method teaching that are technically complex and challenging

may be a chasm that requires a longer period of intervention and adjustment in order to be effectively traversed. This is a verification to the Institutes' lack of experienced educators in a case-based curriculum, who and above all have participated actively in its implementation by either developing the cases for every nursing course or by teaching with these cases. It can be concluded that the presence of inexperienced educators in a case-based curriculum would put under scrutiny the quality of the case studies in enhancing critical thinking and would trigger questions concerning the teaching of thinking skills in the classroom. Perhaps the case studies have not been developed with the construct of critical thinking as a premise. Dailey (1992) advised educators who construct case studies to design questions that will promote discussion and elicit a variety of correct problem solutions. The author concluded that by adhering to a systematic process for case construction, classroom discussion will be fostered and case analysis will be enhanced. In addition, the author stated, " Problem solving through case analysis will improve critical and creative thinking skills that are necessary for clinical decision making" (Dailey, 1992, p.11). Smoyak (1993) supported Dailey when addressing educators with the challenge of enhancing critical thinking in the classroom by using case studies with questions assigned to stimulate critical thinking, highlight the complex rules that students must learn to determine a method to acquire knowledge and frame it in clinical situations, and to evoke judgments of information and comparison of points of view. This would help in

deducing that further examination of the construct of critical thinking in the Institutes' curriculum and its incorporation in the developed case studies and in classroom discussion would seem necessary (see Annex F, being a copy of a typical case study given in the Nursing Care of Adults II course).

Second, Adams (1999) speculated that nursing students are taught in class by using the nursing process to real life situations, and general critical thinking ability is not the same as the abilities used by nursing students. Neill, Lachat, and Taylor-Panek (1997) claimed that nursing is a science and nursing students are actively engaged in applying the scientific method of the nursing process to patient case studies during the classroom sessions. This would lead to the assumption that critical thinking and case method teaching can in fact be related but the measuring tool used was not able to capture this relationship. Perhaps the TER is appropriate to measure critical thinking ability aimed for generalized education but inapplicable for nursing education per se. The issue of adequate measurement of critical thinking skills concerns nursing education. Maynard (1996) stated, "Clearly, no one tool is adequate . . ." (p. 17).

Third, Brookfield (1987) posited that critical thinking is a process rather than an outcome. Nevertheless, nursing education valued the notion of critical thinking ability as a necessary educational outcome (Bevis, 1993), yet the development of critical thinking as an outcome has not been supported by existing research (Adams, 1999). Moreover, the use of standardized measurement tools for critical

thinking should be questionable in a case-based curriculum that focuses on both the process in learning and the outcome of learning, thus making the measurement of the process far fetched and impossible with multiple choice questions only.

Eventually, more questions were raised on why level three participants got the highest scores in the TER while the trend was missing in level two. Could it be that level three students were well screened academically in levels one and two and that is why they performed better in TER?

As for level two participants, having scored less than level one, raised concern as to their overall academic achievement. Upon further review of the semester one averages for level two, six of the 30 participants were candidates for dismissal from the Institute owing to their low academic achievement in the semester during which the study was conducted, compared to two from level one. This is unlikely to happen, where attrition and dismissal rates are not unexpectedly higher in level one than level two. This in turn explained the significant correlation of semester one averages and cumulative averages with the mean TER scores. Therefore, supporting Facione (1997), who confirmed in a study of over 1100 college students that scores on TER significantly correlated with college grade point average (GPA). On the other hand, the participants' secondary average did not significantly correlate with their TER scores, thus yielding the supposition that secondary programs do not teach critical thinking skills. Facione (1997) and Sternberg (1987) confirmed that critical thinking skills could be learned, thus

verifying that as one learns critical thinking skills one's GPA might well improve. However, showing that the TER scores did not correlate with the secondary averages of the participants but correlated positively with their semester one averages and the cumulative averages during which the study was conducted, would help in concluding that critical thinking skills did improve with the participants of the study during their nursing education.

On a positive note, it would be constructive to illustrate a benefit that was elucidated as a result of the current study. It can be concluded that the Institutes' academic assessment tools, reflected in semester one averages and cumulative averages of the participants in the study, correlated highly with the TER scores. This correction should provide encouragement and incentive to the faculty in the various disciplines that the Institutes' evaluation system is improving.

Interestingly, the TER scores of the participants correlated significantly with the science stream. This could be attributed to the preparation of the science stream students during their secondary education on the process of applying the scientific method. Pardue (1987) correlated the mental processes to the abilities to conduct the nursing process successfully (cited in Adams, 1999).

However, age was not related to TER scores although the mean age of the participants was significantly different between the three levels, thus confirming according to Facione (1992) that age does not correlate with TER scores.

Will the married students be more exposed to problem solving situations rather than the single ones? In fact, the findings showed that the married participants in the study had mean TER scores of three points more than the unmarried (20.8 versus 17.9) with a borderline significance.

The occupation of the father and mother did not affect critical thinking amongst participants. Therefore, in future work, education of the parents' participants will be considered together with other variables to determine its effect on critical thinking.

The background variables in the study were not related to each other. Therefore it can be concluded that the variables did not confound the results of our analysis.

Recommendations

Intuitively, it would seem that critical thinking and a case-based curriculum are related. Yet findings from this study and the literature review were inconclusive. Perhaps the use of more than one tool to measure critical thinking would be needed to capture all the dimensions of critical thinking inherent in nursing education.

An additional longitudinal research is needed to study the impact of a case-based curriculum on nursing practice. It may be more revealing to study the relationship of a case-based curriculum at six months post graduation when the graduates have been readily exposed to the real- world of professional nursing

practice, thus supporting other studies that critical thinking skills develop with nursing practice and professional experience.

Besides, studies are needed to support or refute the finding that a case-based curriculum improves critical thinking during nursing education. Future research work in this perspective would focus on increasing the sample size, comparisons between the various branches of the Institutes of Nursing in United Arab Emirates, geographical locations, and instrumentation to provide more conclusive data. Utilizing a larger sample within the four branches of the Institutes would provide a broader perspective for generalization of findings. Moreover, qualitative studies to identify the dimensions of critical thinking in nursing and the development of appropriate instruments to measure critical thinking that would combine process and outcome would be highly recommended.

It would be highly recommended as well to analyze all of the developed cases in order to determine whether the construct of critical thinking has been incorporated in these cases. Recommended as well at the Institutes are the continuous monitoring of how case method teaching is conducted in the classroom and the conduction of staff development programs on developing and teaching with cases.

One of the findings from this study would also recommend a necessary change in the admission criteria at the Institutes. The admission criteria of secondary students should not be only based on the candidate's secondary

average, as has been the case; rather other screening tools and criteria should be derived for this purpose.

Conclusion

The educational process prepares nursing students to demonstrate a certain level of critical thinking ability. It remains unclear for nursing educators about the factors that may influence or inhibit the development of critical thinking in nursing students. Since critical thinking has been designated in the case-based curriculum as an outcome in the graduates and since case method teaching is considered by many nursing educators as a challenging teaching methodology that shows students how to think professionally about problems and helps prepare them emotionally for representative problems, the issues of adequate measurement of critical thinking abilities and implementation of the case method teaching remain the concern of nursing education. The individual progresses from one level to a higher one during the educational experience and that is why the experiential component of education is an exponent in the development of the students' critical thinking abilities.

The most disturbing finding in this study was the minimal impact that case method teaching had on the participants' critical thinking scores. This was surprising and raised many questions. Although level three participants in the study have been doing better academically than other levels and have scored higher in the TER, how was it that critical thinking ability did not show

significant development? This question was especially perplexing when considering from the literature review the positive impact that case method teaching has on enhancing critical thinking amongst learners. Another consideration was that a case-based curriculum stresses both outcome and process, and if this is the case, how could both dimensions be measured by using the standardized Test of Everyday Reasoning? There appears to be a missing link or an elusive element of critical thinking that students use in the case method teaching and that cannot be identifiable in quantitative terms. Perhaps it was premature to study the development of critical thinking in a newly adopted curriculum at this stage of its implementation.

Nevertheless, the findings from this study released the rein for questioning the multidimensional aspects of teaching critical thinking in a case-based curriculum. Triggered as well were the necessary follow up on the implementation process of the case-based curriculum, the essential modification in the Institutes' admission criteria, and the establishment of critical thinking measuring tools.

Being the first of its kind a study at the Institutes in the United Arab Emirates and in the case-based curriculum in specific, the researcher projects thanks and appreciation to the impetus generated for growth and development in nursing education that was provoked in this study to the partial fulfillment of the masters' degree in Nursing Education at Natal University in Durban.

Summary

In this study, critical thinking ability did not significantly change during the educational experience, thus supporting and contradicting other research findings. This in turn has raised questions and concerns for the researcher in this study. Does the case-based curriculum allow for critical thinking to occur through the application of the nursing process, exploration and reflective analysis, the exchange of ideas, perspective taking, or is teaching by cases too prescriptive? These questions and many others render this study a study of a work-in-progress. It triggers the need to unfold the cases that have been used in the Institute's curriculum and the necessity to create standardized and reliable instruments to measure critical thinking skills development amongst nursing students in a case-based curriculum.

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List of Annexure

Annex A	:	Raw Data per Level
Annex B	:	Informed Consent
Annex C	:	Philosophy and purpose of the Institutes of Nursing in U.A.E
Annex D	:	Coding Manual
Annex E	:	Syntax of Commands
Annex F	:	A case Study on Angina Pectoris
Annex G	:	The Test of Everyday Reasoning (TER)

Annex A

Raw Data per Level

	level	sernb	age	nation	secav	stream	terscore	semivar	maritals
1	1	101	18	2	81.3	1	19	76.81	0
2	1	102	19	8	82.9	2	8	71.56	0
3	1	103	19	5	75.3	1	16	52.00	0
4	1	104	19	5	70.2	1	13	78.00	0
5	1	105	19	8	81.5	1	21	72.31	0
6	1	106	18	7	73.7	1	17	59.94	0
7	1	107	18	2	93.6	1	22	76.44	0
8	1	108	18	2	76.5	1	20	59.81	0
9	1	109	20	6	71.0	1	17	61.88	0
10	1	110	19	3	85.5	1	16	79.30	0
11	1	111	21	4	87.7	1	17	72.13	0
12	1	112	19	6	87.7	2	20	62.25	0
13	1	113	19	6	83.5	2	21	65.13	0
14	1	114	19	5	81.5	2	22	63.06	0
15	1	115	17	6	74.0	1	21	57.44	0
16	1	116	32	9	76.8	1	18	83.06	1
17	1	117	18	4	87.6	1	23	73.81	0
18	1	118	21	2	70.5	2	11	42.31	0
19	1	119	18	1	76.1	1	22	84.31	0

	child	residenc	sequence	motheroc	fatheroc	nationre	fatherrc	fatherr2	credits	filter_\$
1	0	1	4	1	1	2	1	1	6	0
2	0	1	2	1	2	1	4	2	6	0
3	0	2	99	2	98	1	.	.	6	0
4	0	2	99	1	3	1	7	1	6	0
5	0	2	1	1	3	1	7	1	6	0
6	0	1	2	1	4	3	4	2	6	0
7	0	2	2	2	4	2	4	2	6	0
8	0	2	99	1	5	2	5	3	6	0
9	0	1	1	1	6	2	4	2	6	0
10	0	2	99	9	7	3	3	1	6	0
11	0	1	99	9	8	3	4	2	6	0
12	0	1	2	2	97	2	.	.	6	0
13	0	1	1	1	9	2	2	1	6	0
14	0	2	8	1	4	1	4	2	6	0
15	0	1	5	1	10	2	4	2	6	0
16	0	1	1	2	8	2	4	2	6	1
17	0	2	99	2	98	3	.	.	6	0
18	0	1	4	1	11	2	3	1	6	0
19	0	2	7	1	5	1	5	3	6	0

	cum.avg
1	76.80
2	71.50
3	52.00
4	78.00
5	72.30
6	59.90
7	76.40
8	59.80
9	61.80
10	79.30
11	72.10
12	62.20
13	65.10
14	63.00
15	57.40
16	83.00
17	73.80
18	42.10
19	84.10

	level	sernb	age	nation	secav	stream	terscore	semivar	maritals
20	1	120	18	2	92.6	2	15	71.13	0
21	1	121	19	3	66.0	1	15	70.81	0
22	1	122	20	8	84.8	2	22	58.69	0
23	1	123	20	10	62.3	2	21	86.38	0
24	1	124	20	6	78.3	1	18	64.56	0
25	1	125	18	6	96.8	1	19	84.75	0
26	1	126	20	5	80.9	1	17	69.56	0
27	1	127	19	8	80.2	1	17	65.19	0
28	1	128	19	2	71.3	1	17	57.00	0
29	2	201	20	2	84.9	1	22	65.60	0
30	2	202	19	6	87.8	1	18	68.55	0
31	2	203	19	6	79.2	2	24	65.75	0
32	2	204	20	5	60.5	2	7	45.20	0
33	2	205	19	6	78.0	1	16	62.75	0
34	2	206	19	6	72.2	1	15	54.90	0
35	2	207	20	6	60.0	2	14	62.00	0
36	2	208	20	2	81.1	1	22	74.60	1
37	2	209	23	6	81.8	1	15	68.20	1
38	2	210	19	6	77.3	1	20	70.25	0

	child	residenc	sequence	motheroc	fatheroc	nationre	fatherrc	fatherr2	credits	filter_\$
20	0	1	6	1	12	2	2	1	6	0
21	0	2	1	1	4	3	4	2	6	0
22	0	2	6	1	5	1	5	3	6	0
23	0	1	1	1	13	2	1	1	6	0
24	0	1	4	1	11	2	3	1	6	0
25	0	1	6	1	4	2	4	2	6	0
26	0	2	4	1	5	1	5	3	6	0
27	0	2	2	1	7	1	3	1	6	0
28	0	2	99	1	14	2	6	3	6	0
29	0	1	6	1	98	2	.	.	20	0
30	0	1	1	1	2	2	4	2	20	0
31	0	1	1	1	15	2	3	1	20	0
32	0	2	1	1	14	1	6	3	20	0
33	0	1	6	1	7	2	3	1	20	0
34	0	1	5	1	4	2	4	2	20	0
35	0	2	2	1	16	2	5	3	20	0
36	1	1	2	1	17	2	4	2	20	1
37	2	2	2	1	7	2	3	1	20	1
38	0	1	1	1	2	2	4	2	20	0

	cum.avg
20	71.10
21	70.80
22	58.60
23	86.30
24	64.50
25	84.70
26	69.50
27	65.10
28	57.00
29	74.00
30	79.00
31	65.00
32	62.00
33	66.00
34	60.00
35	66.00
36	81.00
37	74.00
38	74.00

	level	sernb	age	nation	secav	stream	terscore	semivar	maritals
39	2	211	20	4	85.2	1	13	75.00	0
40	2	212	21	6	71.9	2	14	57.60	0
41	2	213	19	5	76.5	1	15	73.30	0
42	2	214	19	9	84.5	2	20	69.95	0
43	2	215	21	5	66.2	1	18	60.25	0
44	2	216	19	5	81.5	1	16	57.15	0
45	2	217	21	4	76.4	1	21	68.15	0
46	2	218	19	6	80.8	1	18	68.15	0
47	2	219	20	2	69.5	2	18	64.15	0
48	2	220	19	4	85.8	2	14	53.65	0
49	2	221	21	6	78.2	1	18	68.30	0
50	2	222	20	5	70.5	2	16	58.40	0
51	2	223	19	2	92.0	1	21	87.15	0
52	2	224	21	8	67.3	1	20	54.00	0
53	2	225	21	6	75.5	1	24	55.45	0
54	2	226	19	2	78.7	1	15	65.65	0
55	2	227	19	5	74.9	1	14	47.45	0
56	2	228	19	2	74.3	1	18	52.70	0
57	2	229	21	4	87.4	2	20	73.80	0

	child	residenc	sequence	motheroc	fatheroc	nationre	fatherrc	fatherr2	credits	filter_\$
39	0	2	1	1	4	3	4	2	20	0
40	0	1	4	1	11	2	3	1	20	0
41	0	2	2	2	3	1	7	1	20	0
42	0	1	2	1	7	2	3	1	20	0
43	0	2	2	1	2	1	4	2	20	0
44	0	2	99	1	11	1	3	1	20	0
45	0	2	1	1	5	3	5	3	20	0
46	0	1	99	1	5	2	5	3	20	0
47	0	1	2	2	2	2	4	2	20	0
48	0	1	99	1	5	3	5	3	20	0
49	0	2	5	2	18	2	1	1	20	0
50	0	1	4	1	4	1	4	2	20	0
51	0	1	2	2	11	2	3	1	20	0
52	0	2	2	1	5	1	5	3	20	0
53	0	2	99	9	19	2	1	1	20	0
54	0	1	1	1	8	2	4	2	20	0
55	0	1	2	1	5	1	5	3	20	0
56	0	2	99	9	99	2	.	.	20	0
57	0	1	2	2	98	3	.	.	20	0

	cum.avg
39	81.00
40	62.00
41	79.00
42	73.00
43	63.00
44	65.00
45	71.00
46	74.00
47	72.00
48	65.00
49	65.00
50	69.00
51	90.00
52	59.00
53	67.00
54	68.00
55	57.00
56	59.00
57	80.00

	level	semb	age	nation	secav	stream	terscore	semivar	maritals
58	2	230	20	4	75.7	2	10	60.65	0
59	3	301	20	4	66.5	1	16	69.41	0
60	3	302	20	6	81.8	1	12	69.29	0
61	3	303	22	4	79.3	2	13	64.76	0
62	3	304	20	6	87.2	1	14	75.65	0
63	3	305	20	8	85.7	1	14	73.59	0
64	3	306	20	6	83.9	2	15	76.70	0
65	3	307	20	4	68.0	1	20	71.17	0
66	3	308	20	2	75.8	1	23	62.29	0
67	3	309	22	2	87.8	1	17	74.24	0
68	3	310	21	2	78.2	1	19	65.76	0
69	3	311	20	1	78.9	2	17	78.52	0
70	3	312	20	4	72.1	1	21	61.59	0
71	3	313	21	5	57.7	2	21	70.29	0
72	3	314	25	3	79.5	2	21	66.41	0
73	3	315	20	6	76.3	1	20	60.64	0
74	3	316	20	4	68.5	1	25	64.71	0
75	3	317	21	2	85.9	2	21	66.42	1
76	3	318	20	4	72.8	1	20	70.17	0

	child	residenc	sequence	motheroc	fatheroc	nationre	fatherrc	fatherr2	credits	filter_\$
58	0	1	2	2	99	3	.	.	20	0
59	0	2	3	1	20	3	4	2	42	0
60	0	1	2	1	21	2	2	1	42	0
61	0	1	4	9	3	3	7	1	42	0
62	0	2	1	1	14	2	6	3	42	0
63	0	2	2	1	3	1	7	1	42	0
64	0	1	6	1	22	2	6	3	42	0
65	0	2	1	1	14	3	6	3	42	0
66	0	1	3	2	8	2	4	2	42	0
67	0	1	4	1	4	2	4	2	42	0
68	0	1	3	1	22	2	6	3	42	0
69	0	2	8	1	97	1	.	.	42	0
70	0	2	1	1	4	3	4	2	42	0
71	0	2	99	1	14	1	6	3	42	0
72	0	1	4	1	5	3	5	3	42	0
73	0	1	6	1	4	2	4	2	42	0
74	0	1	3	1	5	3	5	3	42	0
75	1	2	99	1	3	2	7	1	42	1
76	0	1	4	1	98	3	.	.	42	0

	cum.avg
58	65.00
59	72.00
60	71.00
61	65.00
62	77.00
63	81.00
64	70.00
65	72.00
66	64.00
67	78.00
68	68.00
69	83.00
70	68.00
71	73.00
72	71.00
73	66.00
74	70.00
75	75.00
76	76.00

	level	seimb	age	nation	secav	stream	terscore	semivar	maritals
77	3	319	22	6	68.7	1	25	64.29	1
78	3	320	20	4	90.0	1	19	70.59	0
79	3	321	22	11	94.0	1	21	86.11	0
80	3	322	21	1	93.9	1	19	86.88	0
81	3	323	22	7	79.8	1	24	75.24	1
82	3	324	24	2	69.6	1	17	68.35	0
83	3	325	22	3	75.1	1	24	75.24	0
84	3	326	24	4	80.5	1	22	70.18	0
85	3	327	22	4	73.5	1	18	73.76	0
86	3	328	20	6	64.5	1	19	63.00	0
87	3	329	20	2	85.1	1	17	70.23	0
88	3	330	22	8	70.7	1	17	71.35	0

	child	residenc	sequence	motheroc	fatheroc	nationre	fatherrc	fatherr2	credits	filter_\$
77	0	2	5	1	23	2	1	1	42	1
78	0	1	3	1	5	3	5	3	42	0
79	0	2	5	9	10	1	4	2	42	0
80	0	2	7	1	97	1	.	.	42	0
81	0	1	4	2	4	3	4	2	42	1
82	0	1	99	9	11	2	3	1	42	0
83	0	1	1	2	15	3	3	1	42	0
84	0	2	1	1	4	3	4	2	42	0
85	0	1	5	1	97	3	.	.	42	0
86	0	1	2	2	21	2	2	1	42	0
87	0	2	1	2	11	2	3	1	42	0
88	0	1	4	1	7	1	3	1	42	0

	cum.avg
77	72.00
78	80.00
79	90.00
80	90.00
81	82.00
82	75.00
83	82.00
84	76.00
85	80.00
86	66.00
87	76.00
88	78.00

Annex B

Informed Consent

Dear participant

You have been randomly selected to participate in the research that Lina Kantar is conducting in partial fulfillment of a master's degree in nursing education.

The research project aims at examining the development of critical thinking skills in the case-based curriculum. This requires your participation in a standardized test formed by Peter Facione in 1998. It is the Test of Everyday Reasoning (TER) that aims at testing the critical thinking skills. The test is composed of 35 multiple-choice questions that require 50 minutes to accomplish.

There will be a total of 90 students representing the three levels at the Abu Dhabi Institute, 30 participants are chosen from each level.

Each participant will have an exam and a computer sheet and the results of each level collectively will be compared with the other two levels.

Your participation is significant for the future of nursing education in U.A.E, the Gulf countries, and globally owing to the lack of such studies concerning the development of critical thinking in the case-based curriculum.

- Your participation will not affect your academic achievement or your appointment upon graduation.
- **Your responses on the computer sheets will be handled with extreme confidentiality, no one will access it mainly because the scores will be collected by the researcher and directly sent by mail to be scanned by the California Academic Press in California.** What the researcher is really concerned about is the comparison of scores between the three years and not individual scores.
- Mind you that your participation is completely voluntary.

Feel free to drop by my office if you are concerned about the results of the study.

Signature-----

Date-----

Annex C

Philosophy and Purposes of the Institutes of Nursing in the U.A.E

Statement of Purpose and Philosophy

Using the results of the faculty survey and after lengthy discussions with different people representing the health services in U.A.E. the following statement of purpose and philosophy for the Diploma Nursing Program was developed.

Statement of Purpose:

The aim of the Diploma Nursing Program is to prepare generalist nurses who are capable of functioning as competent, caring safe providers in a variety of general settings and committed to ongoing professional growth and development.

Statement of Philosophy

The philosophy of the Diploma Nursing Program is congruent with the values and philosophy of the School of Nursing.

The Faculty believes that:

1. Nursing is an integral part of the health care system. Nursing is a dynamic profession, directed at caring for individuals, families and communities.
 - It involves collaborating with people to optimize their physical, psychosocial, and cultural functioning.
 - The focus of nursing is prevention of disease and disability, health maintenance, health promotion, and rehabilitation.
 - Nursing practice must be founded on an understanding and respect of the social, cultural and value systems of individuals and communities receiving care.
 - 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.
 - Nursing is seen to be a professional activity, which evolves from a sound knowledge base and adheres to the code of ethics evident in the provision of a competent, safe and accountable care.
 - This implies taking responsibility for continued self-development to be able to function effectively in a changing health care environment.

2. **Human** beings: The human being is a complex self-acting being, affected by previous experiences and continually interacting with the environment.
3. **Health**: The faculty believe in W.H.O.'s definition of health, they also believe in Henderson's 1996 definition of health which states "Health is a quality of life basic to human functioning and requires independence and interdependence. It allows people to work effectively and to reach their highest potential level of satisfaction of life. People can achieve or maintain health if they have the necessary strength, will or knowledge."
4. **Illness** is a variation in the health illness continuum, it is the inability to cope or adapt mentally, physically and socially to the environmental stressors, which causes a disturbance in the individual, family and community's functions.
5. **Environment** is a combination of interacting internal and external variables, which affects the individual, family and community's performance and health status.
6. **Learning** is a continuous process of acquiring knowledge, skills, abilities and attitudes that lead to change in behavior aimed at reaching a desired outcome.
7. **Teaching learning process** is 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.
8. **Primary Health Care**: the faculty believe that future graduates should be prepared to function with healthy people as well as the sick, there is a consensus that the basic principles and elements of primary health care should be an integral part of the curriculum, and that the future graduates should be able to apply the concept of primary health care in their daily work.



PROGRAM OBJECTIVES

1. Utilizes the nursing process in the care of the individual, family and community for the promotion and maintenance of health, prevention of illness and rehabilitation.
2. Provides holistic nursing care to groups and individuals from different psycho-socio-cultural backgrounds in a variety of settings.
3. Plans and implement patient teaching and health education activities for healthy and ill individuals, families and communities.
4. Demonstrates the ability to implement nursing interventions using a wide range of interpersonal, psychomotor and cognitive skills in a caring manner in a variety of settings.
5. Demonstrates professionalism by adherence to the ethical code of the nursing profession and by being committed to the rendering of quality nursing care based on up-to-date knowledge.
6. Establishes and maintains effective collaborative relationships with the members of the health team, and clients.
7. Implements planned teaching activities for members of the health team.
8. Demonstrates management skills required to manage client care.
9. Develops and maintains English language skills for academic professional functioning.

Annex D

Coding Manual

Variable Label	Variable Name	Place	Code Labels
Level in nursing education	Level	1	1. Level one 2. Level two 3. Level three 9. Unspecified
Serial number of the participants	Sernb	3	As is 999. Unspecified
Nationality of the participants	Nation	2	1. Emirati 2. Jordanian 3. Sudanese 4. Somali 5. Omani 6. Palestinian 7. Egyptian 8. Yemeni 9. Syrian 10. Lebanese 11. Iraqi 99. Unspecified
Nationality of the participants after recoding	Nationrec	1	1. From the Gulf region 2. From the MEA region 3. From African region
Secondary school average of the participants	Secav	3	As is 999. Unspecified
Stream of education of the participants at school	Stream	1	1. Science 2. Art 9. Unspecified
TER score	Terscore	2	As is 99. Unspecified
Semester I average of the participants	Semiav	3	As is 999. Unspecified
Marital Status of the participants	maritals	1	0. Not married 1. Married
Number of children of the married participants	child	2	0. Inapplicable or no children As is 99. Unspecified
Residence of the participants	Residenc	1	1. In the City 2. Far 30 min from the city 9. Unspecified

Variable Label	Variable Name	Place	Code Labels
Participants' sequence in their families	Sequence	2	As is 99. Unspecified
Mother's occupational status of the participants	Motheroc	1	1. Housewife 2. Laborer 9. Unspecified
Father's occupation of the participants	Fatheroc	2	0. Does not work 1. Mechanic 2. In an Oil company 3. Trader 4. Municipality 5. Driver 6. Contractor 7. Writer 8. Technician 9. Accountant 10. Blacksmith 11. Teacher 12. Administrative staff 13. Matron 14. Police 15. Journalist 16. Transportation company 17. Maintenance company 18. Director 19. Manager 20. Trainer 21. Public relation-Representative 22. Civil defense 23. Investor 97. Retired 98. Deceased 99. Unspecified
Father's occupation of the participants- re-coded into 7 categories	Fatherrc	1	1. Manager/Director 2. Administrative staff 3. Professional 4. Skilled 5. Unskilled 6. Military 7. Free lance 9. Unspecified

Variable Label	Variable Name	Place	Code Labels
Father's occupation of the participants- re-coded into 3 categories	Fatherr2	1	1. Manager/Director <i>Administrative staff/</i> <i>Professional / Free lance</i> 2. Skilled 3. Unskilled and military
Number of credits of case based courses taken until now	credits	2	As is 99. Unspecified
Cumulative average of participants	Cumav	3	As is 999. Unspecified

Annex E

Syntax of Commands**SOME OF THE RECODING:**

```
RECODE
  fatheroc
  (1=1) (2=4) (3=7) (4=4) (5=5) (6=4) (7=3) (8=4) (9=2) (10=4)
  (11=3) (12=2) (13=1) (14=6) (15=3) (16=5) (17=4) (18=1) (19=1)
  (20=4) (21=2) (22=6) (23=1) (SYSMIS=SYSMIS) (ELSE=SYSMIS) INTO
  fatherrc .
EXECUTE .
```

```
RECODE
  fatherrc
  (1=1) (2=1) (3=1) (4=2) (5=3) (6=3) (7=1) (SYSMIS=SYSMIS)
  (ELSE=SYSMIS) INTO
  father2 .
EXECUTE .
```

```
RECODE
  nation
  (1=1) (5=1) (8=1) (11=1) (2=2) (6=2) (9=2) (10=2) (3=3) (4=3)
  (7=3) (SYSMIS=SYSMIS) (ELSE=SYSMIS) INTO
  nationrec .
EXECUTE .
```

ANALYSIS:

```
FREQUENCIES
  VARIABLES=level nation nationre maritals residenc sequence motheroc
  fatheroc fatherrc father2 credits
  /STATISTICS=STDDEV MEAN MEDIAN .
DESCRIPTIVES
  VARIABLES=age secav terscore semivar child sequence credits
  /STATISTICS=MEAN STDDEV MIN MAX .
USE ALL.
COMPUTE filter_$=(maritals = 1).
VARIABLE LABEL filter_$ 'maritals = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .
DESCRIPTIVES
  VARIABLES=child
  /STATISTICS=MEAN STDDEV MIN MAX .
```

CROSSTABS

```

/TABLES=nation nationre stream maritals residenc motheroc fatherrc father2
  BY level
/FORMAT= AVALUE TABLES
/STATISTIC=CHISQ
/CELLS= COUNT ROW COLUMN TOTAL .

```

MEANS

```

TABLES=age secav terscore semivar sequence credits BY level
/CELLS MEAN COUNT STDDEV
/STATISTICS ANOVA .

```

MEANS

```

TABLES=terscore BY level nation nationre stream maritals motheroc fatherrc
  father2
/CELLS MEAN COUNT STDDEV
/STATISTICS ANOVA .

```

REGRESSION

```

/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT age
/METHOD=ENTER terscore .

```

REGRESSION

```

/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT secav
/METHOD=ENTER terscore .

```

REGRESSION

```

/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT semivar
/METHOD=ENTER terscore .

```

REGRESSION

```

/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT sequence
/METHOD=ENTER terscore .

```

USE ALL.

```

COMPUTE filter_$=(maritals = 1).
VARIABLE LABEL filter_$ 'maritals = 1 (FILTER)'.

```

```

VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT child
  /METHOD=ENTER terscore .

```

```

MEANS
  TABLES=secav BY level nation nationre stream marital motheroc fatherroc
  father2 residenc
  /CELLS MEAN COUNT STDDEV
  /STATISTICS ANOVA .
MEANS
  TABLES=semivar BY level nation nationre stream marital motheroc fatherroc
  father2 residenc
  /CELLS MEAN COUNT STDDEV
  /STATISTICS ANOVA .

```

Annex F

A Case Study on Angina Pectoris

Nursing Care of Adults II
Diploma II - Semester II
Duration - 12 sessions

Purpose: Prevention of Coronary Artherosclerotic Heart Disease.

Learning Objectives: Upon finishing this case study, the students should be able to

Knowledge

1. Describe the pathophysiology of coronary atherosclerosis and relate it to development of angina pectoris.
2. Identify the risk factors (modifiable and non-modifiable) that can attribute to development of coronary atherosclerosis.
3. Describe measures to prevent development of coronary atherosclerosis in individuals based on the identified risk factors.
4. Identify the characteristics of angina pain that make it different from other causes of chest pain.
5. Compare and contrast between stable and unstable angina pectoris.
6. Identify the purpose and nursing implications for each of the following diagnostic evaluations of angina pectoris: ECG; Chest X-ray; Exercise tolerance test; Cardiac catheterization for coronary angiographies; Serum- electrolytes and lipid profile.
7. Identify the indications, actions, and major side effects and nursing implications for nitroglycerin, beta-adrenergic blocking agents and calcium channel blockers.
8. Describe the indication of PTCA to patients with angina pectoris.
9. Design a nursing care plan for the patient with angina pectoris.
10. Develop a teaching plan for the patient with angina pectoris.

Skills

1. Demonstrate the skills needed in gathering data concerning chest discomfort in patients with angina pectoris.
2. Administer sublingual nitroglycerin skillfully by adhering to administration guidelines.
3. Design a pamphlet aimed at educating the public on 'prevention of coronary atherosclerosis'.

Attitude

1. Demonstrate understanding in attributing the high incidence rate of coronary atherosclerotic heart disease to life style and personal habits.
2. Appreciate the significance of health promotion programs that aim at individuals, families and communities to change life styles and or modify risk factors associated with coronary atherosclerosis.

Content

Prerequisite:

1. Conduction system.
2. Cardiac cycle

Knowledge

1. Pathophysiology of Coronary Atherosclerosis.
2. Risk Factors - (Modifiable and Non-modifiable) for coronary atherosclerosis.
3. Prevention of coronary atherosclerosis.
4. Definition of angina pectoris.
5. Pathophysiology of angina pectoris.
6. Types of Angina Pectoris (Stable, unstable).
7. Clinical Manifestations of angina pectoris.
8. Diagnostic evaluation of angina pectoris
 - Electro cardiograph
 - Chest X-ray
 - Exercise tolerance testing (ETT)
 - Coronary angiography
 - Laboratory tests: Serum electrolytes and lipid profile.
9. Management of patients with angina pectoris:
 - Pharmacological Therapy:**
 - Nitroglycerin.
 - Beta-adrenergic blockers.
 - Calcium channel blockers.
 - Anti-platelets
 - Surgical Measures:**
 - Percutaneous transluminal Coronary angioplasty (PTCA) (briefing on).
10. Nursing Process: Nursing Care of the patient with angina pectoris.

Medication Knowledge will be on:

1. Nitrates: Nitroglycerin, Isordil
2. Beta blockers: Tenormin
3. Calcium Channel blockers: Diltiazem (Cardizem).
4. Antiplatelets: Aspirin.

Skills:

1. Data collection on chest discomfort
2. Administration of sublingual nitroglycerine
3. Health education on prevention of atherosclerotic heart disease

Background

Ali Ahmed, a 60-year-old Yemeni is a well-known taxi driver in a village in Yemen. Ali responds to any person who inquires about taxi driving that it is a wonderful job and a source of income for him since 1960. He drives nearly every day for almost 40 years from 6 o'clock in the morning till mid night or later depending on the availability of passengers. He takes a noon break during which he gobbles up his lunch to resume driving there after. Ali is married to Noha, who is a lovable and dedicated housewife. They have 3 sons and 6 daughters. Two of their married sons are working in merchandise in Abu Dhabi.

Last week, while Ali was driving his car in the early morning as usual, he had to stop his car suddenly. The passenger who was in Ali's car wondered why the car was stopped, and as he looked into Ali's face to inquire about it, he saw Ali unbuttoning his shirt, massaging the center of his chest and sweating profusely. After few minutes Ali was relieved, so he put the engine on again and headed to where the passenger wanted to be dropped.

The episode was repeated on three consecutive days that made Ali really worried; eventually, he decided to go to the clinic.

Trigger I

Nurse Wafa receives Ali warmly, being his neighbor, and asks worriedly “what is the problem Ali, How can I help you?” Ali informs Wafa in a low tone of voice that he had chest pain while driving the car. She then asks Ali the following questions:

Where was the pain? Was it that severe? How long did the pain last?

Ali describes the pain as “heavy, deep burning heart burn” in the center of the chest that lasted for 7 minutes only. “I felt like I was going to die” he adds. Meanwhile, Ali lights a cigarette and requests from Wafa not to tell his wife because she’ll get scared. Wafa immediately asks Ali about his smoking habit, he responds by giving a history of smoking of 1 pack of cigarettes/day for 35 years and that this amount was reduced to 10 cigarettes/day for the past 6 years when he was diagnosed with hypertension. Wafa now is curious about Ali’s history of hypertension and upon further inquiry she got to know that he hasn’t been taking his anti hypertension medications for the past 9 months because he was free of symptoms. Wafa asks Ali to have a seat and relax while she takes his vital signs:

BP: 184/94	Resp: 16
HR: 66 regular	Temp: 37.1°C

After Wafa documents Ali’s vital signs on the admission note, she refers him to Dr. Nabil. On initial examination, Ali does not appear to be in distress. Normal heart sounds are auscultated. A 12-lead ECG is done that shows normal sinus rhythm. Based on the doctor’s order, Wafa applies one-inch of nitroderm patch to Ali’s chest wall, resulting in a BP of 138/76 after 30 minutes.

The following laboratory tests are requested:

- CBC
- Lipid profile
- SMA6

A chest x-ray is ordered as well.

Dr. Nabil tells Wafa “based on the history that Ali gave, I assume that he had angina attacks”. He requests from Ali to report back to him after 2 days for evaluation of the requested laboratory studies.

Ali asks Wafa at the door “Is it that serious what I have? Should I tell my sons in Abu Dhabi to come over and visit me?”

Wafa smiles at him, taps his shoulder and answers him “what you need is a change in your life style!”

Tasks:

1. What is angina pectoris and why is it considered an atherosclerotic heart disease?
2. What physiologic changes caused the pain and the associated symptoms of angina pectoris? Verify your answer by hinting to Ali's episode of pain.
3. In your opinion, did Wafa gather enough data concerning Ali's chest pain? IF NOT, what additional data would you add to that of Wafa's in order to get the full picture of angina pectoris by history taking.
4. What is the type of angina that Ali has? Verify your answer. What is the other type and in what manner is it different from Ali's type?
5. What factors have contributed to Ali's development of angina pectoris? What factors other than those seen on Ali could put an individual at risk of developing coronary arteriosclerosis.
6. Dr. Nabil did a 12-lead ECG to Ali. Describe a normal ECG tracing and identify the significance of ECG in diagnosing coronary atherosclerotic heart disease. (This will be given as a 1 session of lecturing by your tutor).
7. Explain why CBC, lipid profile, SMA6 and a chest x-ray were requested.
8. Stress test is usually done to diagnose angina pectoris. Describe it and explain why in your opinion it wasn't requested for Ali.
9. What are the major nursing diagnoses that you would formulate for Ali based on the data presented in the trigger.

Trigger II

Two days later, Ali reports to the clinic as told by Dr. Nabil.

The lipid profile

T. Cholesterol	295	<200 mg/dl
Triglycerides	205	<200 mg/dl
HDL – C	31	M >37 mg/dl; F > 40 mg/dl
LDL – C	175	< 130 mg/dl

CBC

WBC	4.5
RBC	5.17
Hgb	14.9
HCT	43.9
PLt	233

Serum Chemistry

Na	140	Urea	21
K	4.3	Cr	1.1
Cl	-		
Hco ₃	29		
Glucose	120		

As wafa looks into the laboratory results, she frowns and asks Ali about the major constituents of his diet. Ali answers “Fried fish, lamb, rice and some fruits”.

Dr. Nabil advises Ali to undergo cardiac catheterization for coronary angiography to be done in Abu Dhabi as he came to know that 2 of his sons are staying there, owing to the advanced techniques utilized in such procedures.

Dr. Nabil prescribes the following medications and tells Ali that he has to stop smoking completely and take the medications regularly.

Tenormin	50 mg OD
Isordil	40 mg bid
Cardizem	30 mg tid
Aspirin	100 mg OD
Nitroglycerin	5 mg S/L prn

Wafa approaches Ali and tells him that she would visit him and his wife in the evening to talk to them about some necessary life style modifications that should take place. Ali left the clinic a bit comfortable but his mind was busy whether he should tell his wife and sons about his illness and necessity of undergoing the “procedure” that Dr. Nabil told him about or keep it to himself.

Tasks:

1. What laboratory values did Wafa infer to when questioning about Ali’s dietary constituents? What would you deduce from Ali’s answer?
2. Explain how Ali’s lipid values reflect the pathologic changes associated with angina pectoris.
3. Why in your opinion did Dr. Nabil require from Ali to do a cardiac catheterization for coronary angiography?
4. Ali will be started on medications. What are the classification, indication, action, and route of administration and side effects for each drug? (This will be discussed during the pharmacology session).
5. What in your opinion should the components of the teaching session that Wafa will undertake with Ali and his family includes? High light the changes required in Ali’s life styles and how can he cope with an anginal attack.
6. You are requested to participate in a health campaign to educate the public to prevent coronary atherosclerotic heart diseases. *Design a pamphlet for that purpose and submit it to your tutor on the last day of the case. (Take into consideration the risk factors that should be discouraged and the healthy life style and habits that should be encouraged).*

Trigger III

Ali kept doing well for 6 months, abiding by taking the prescribed medications and Wafa's teaching guidelines.

While watching television that evening, Ali experienced a 15 minutes episode of chest and jaw pain accompanied by SOB, diaphoresis, and nausea without vomiting. The episode was repeated 2 times in that week but was resolved spontaneously after nitroglycerine S/L tablet.

The next week, Ali went to tell Dr. Nabil about last week episode. Dr. Nabil did a complete physical examination and cardiac assessment. Moreover, he highly recommended Ali to undergo coronary angiography in Abu Dhabi.

Ali left for Abu Dhabi with Dr. Nabil's report. Cardiac Catheterization for coronary angiography was done at Mafraq hospital and the results were significant for:

Right coronary artery		Left anterior descending coronary artery (LAD)	
Proximal 1/3	50% stenosis	Proximal 1/3	within normal
Mid 1/3	25% stenosis	Mid 1/3	75% stenosis.
Distal 1/3	within normal limits	Distal 1/3	25% stenosis.

The cardiologists recommended a PTCA of the LAD artery. Ali consented and the procedure was scheduled for the following morning at 7:00 a.m. Fortunately, the procedure was successful and Ali left the hospital happily.

Tasks:

1. Has there been any change in the type of Ali's angina pain? If yes, verify your answer.
2. What is the purpose of coronary angiography in the evaluation of Ali's angina?
3. What preparation did Ali undertake prior to coronary angiography?
4. What post angiography interventions would be done for Ali?
5. Are there any potential complications of coronary angiography? Explain.
6. What does the PTCA procedures involve? Why Ali was a candidate for PTCA?

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Extra Readings

1. *Pathophysiology of Atherosclerosis*. A publication of the Institutes of Nursing, 1995.
2. Montes, P. (1997): Managing Outpatient Cardiac Catheterization, AJN, 97 (8), 34-37.

Annex G

The Test of Everyday Reasoning

TER

The Test of Everyday Reasoning

This is a reasoning test. So, unlike other tests you might have taken, this is not a test of factual knowledge or of special vocabulary. Words are used in their ordinary, everyday meanings. The test questions are about everyday situations. The questions themselves supply most of the information a person would need to know in order to reason to the correct answer. Your experience living in human society, your elementary education, and, most importantly, your thinking skills supply the rest.



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Instructions:

1. Use the *Test of Everyday Reasoning Answer Sheet*.
2. Bubble in your ID number and write your name on the Answer Sheet.
3. When answering, select the best choice from among those provided.
4. Read questions carefully.
5. Respond to all the questions.

EXAMPLE QUESTION:

E.g. Three friends, Anna, Barbara, and Carolyn, completed the same computer skills course. The three of them studied together the whole time. When the final grades came out, Anna had earned a higher grade than Carolyn. And, Carolyn had earned a higher grade than Barbara. Carolyn also earned a higher grade than their classmate David, who had said the course was really easy. Given this information only, it follows that

- A= David deserved a higher grade.
- B= Barbara's grade was higher than Carolyn's.
- C= Barbara's grade was higher than Anna's.
- D= David's grade was lower than Anna's.
- E= Anna will decide to take a more advanced course.

EXAMPLE ANSWER SHEET RESPONSE:

	A	B	C	D	E
E.g.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Explanation of choice D:

- A: Perhaps, but too little is known about this.
- B: No. Actually we can infer Carolyn's grade is higher.
- C: No. In fact, we can infer Anna's grade is higher.
- D: Yes. David's grade was lower than Carolyn's and, so, lower than Anna's. Choice "D" must be true.
- E: Maybe, but from the information given we cannot determine what she will decide to do.

Every correct answer earns equal credit.

There is no penalty for an incorrect answer.

There are 35 questions and some are easier than others.

The first three questions ask you to evaluate how reasonable it is to draw a specific conclusion.

1. In the Midwestern United States summer days are generally hot and humid with the threat of severe thunderstorms in the afternoon. You find yourself on the highway in that part of the country one hot summer afternoon. Looking off to the western horizon you see a line of huge clouds forming. The sky in the west is growing dark. Which of the following would be the most reasonable thing to think?

- A= It is surely going to rain.
- B= It is probably going to rain.
- C= It is probably not going to rain.
- D= It is surely not going to rain.

2. The teams in the city's youth recreational soccer program are meant to be evenly matched. Yet some teams are a little better than others. Suppose that last Saturday a team called the Sparklers defeated one called the Wildflowers. Suppose that the previous Saturday the Wildflowers had defeated a team called the Mustangs. What is likely to happen next Saturday when the Sparklers play against the Mustangs?

- A= The Sparklers will certainly win.
- B= The Sparklers will probably win, but might lose.
- C= The Sparklers will probably lose, but might win.
- D= The Sparklers will certainly lose.
- E= The soccer game will end in a tie.

3. Consider the claim: "Even the heroic Nelson Mandela used angry language sometime or other." Suppose that the person who made that claim gives this reason: "After all, every leader negotiates delicate agreements. And Nelson Mandela, an internationally known champion of human rights, was an extraordinary leader. Nobody can be a leader without using angry language at least on some occasions." Assuming all the statements made as part of the reason are true, the initial claim

- A= could not be false.
- B= is probably true, but may be false.
- C= is probably false, but may be true.
- D= could not be true.

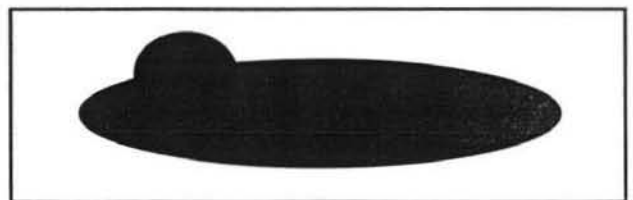
In the first three questions, the conclusion was already drawn and your job was to evaluate it. Move onto Questions 4 through 25 now. They invite you to draw the conclusion. Each question offers you a series of possible choices. Your job is to judge which is the most reasonable.

4. Suppose we are given these three facts as true: "Person L is shorter than person X. Person Y is shorter than person L. And, person M is shorter than person Y." Which additional piece of information permits us to know that "Person Y is shorter than person J," must, therefore, also be true?

- A= Person L is taller than J.
- B= Person X is taller than J.
- C= Person J is taller than L.
- D= Person J is taller than M.
- E= Person M is taller than Y.

5. Suppose every place in the world where people live is represented by the space inside the rectangle below. Suppose the long gray oval represents all the wooden houses in the world. And, suppose the black circle represents Canada. It would be most reasonable to interpret the figure as meaning that:

- A= All wooden houses are in Canada.
- B= Everyone lives in a wooden house.
- C= No one lives in Canada.
- D= Wooden houses are places people live.
- E= None of the above.



6. If any bicycle rider violates the traffic rules the police can give that person a traffic ticket. Suppose the police give Mr. Smith a traffic ticket. This **must** mean that:

- A= Mr. Smith violated the traffic rules when he was riding a bicycle.
- B= The police do not like the way Mr. Smith rides a bicycle.
- C= Mr. Smith did not violate the traffic rules when he was driving his car.
- D= Some people violate traffic rules but the police do not give them traffic tickets.
- E= None of the above.

7. Regardless of the historical facts, consider these statements to be true: "Nero, a cruel Roman emperor who ruled in the First Century would become thirsty from time to time. And, like all Roman emperors, whenever he was thirsty Nero drank wine. When they drank wine, Roman emperors used pewter goblets. Whoever drinks from pewter, even once, gets lead poisoning. Lead poisoning always manifests itself through insanity." Given these statements, which of the following **must** be true?

- A= Those who suffer from insanity used pewter at least once.
- B= It was so long ago that it is impossible to draw any conclusion about Nero's sanity.
- C= Exclusive use of pewter was a privilege reserved for Roman emperors.
- D= Lead poisoning was common among the citizens of the Roman Empire.
- E= Whatever else, Emperor Nero was certainly insane.

Questions 8, 9, and 10 are related.

8. Uncle Roger has brought his nieces and nephews to a restaurant. He plans to order one large pizza with exactly five different toppings. The restaurant manager informs Roger that he can select the five from among these seven only: cheese, mushrooms, olives, ham, sausage, onions, and anchovies. Roger's niece Danielle says that there must be anchovies on the pizza. Nephew Michael says that there can be no olives. Nephew Sean says that if there is going to be sausage, then there must be ham too. Which combination of toppings should Roger select, if he is to satisfy the combined demands of all of his nieces and nephews?

- A= anchovies, onions, cheese, mushrooms, and sausage.
- B= cheese, sausage, ham, olives, and anchovies.
- C= cheese, mushrooms, ham, onions, and anchovies.
- D= sausage, mushrooms, onions, cheese, and ham.

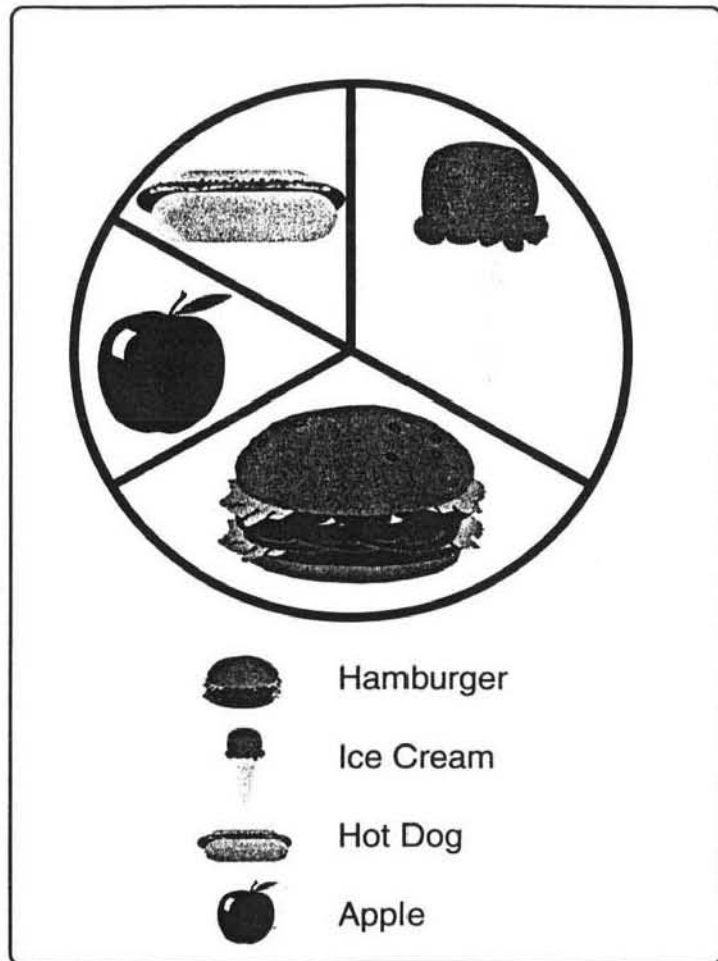
9. Because he loves sausage, cheese, and onions, Uncle Roger includes those three among the five toppings he selects. Given the three toppings Roger has already decided to include and the combined demands of his nieces and nephews, which of the toppings listed below will **not** be on the pizza?

- A= anchovies
- B= sausage
- C= ham
- D= mushrooms

10. While Roger was thinking about his choice, the restaurant manager informed him that onions were no longer available. In their place the manager offered chopped green peppers as a topping. As fate would have it, none of Roger's nephews or nieces will accept green peppers on pizza. Given these developments, which two toppings must Roger include no matter what, if he is going to select five different toppings and satisfy the combination of demands being made by his hungry nephews and nieces?

- A= sausage and ham
- B= cheese and green peppers
- C= onions and artichokes
- D= mushrooms and olives

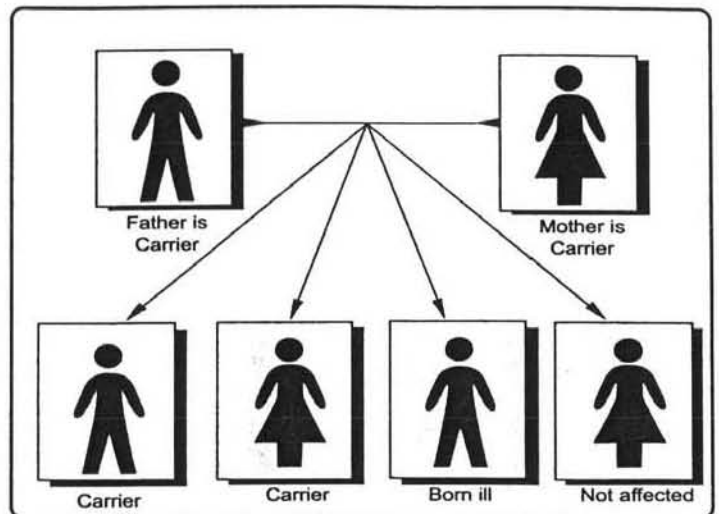
For Question #11, use this diagram.



11. When he was in the seventh grade Tyler did the picture above showing his favorite foods and how much he liked each in comparison to the others. Which would it **not** be fair to say?

- A= Tyler liked hotdogs as much as he liked hamburgers.
- B= Tyler liked hamburgers as much as he liked ice cream.
- C= Tyler liked apples half as much as he liked hamburgers.
- D= Tyler liked ice cream twice as much as he liked hotdogs.
- E= Tyler cannot decide which foods are his two most favorite.

For Questions #12 and #13, use this diagram.



12. Tay-Sachs is a genetic disease. The genes for this disease can be passed from a parent who is a carrier to that person's biological child. The chart above indicates the probable pattern of passing Tay-Sachs from parents to their biological children. It would be reasonable to interpret the chart as meaning, more or less, that:

- A= All their children will be born ill.
- B= Three out of four will be born ill.
- C= Half will be born ill.
- D= One out of four will be born ill.
- E= None will be born ill.

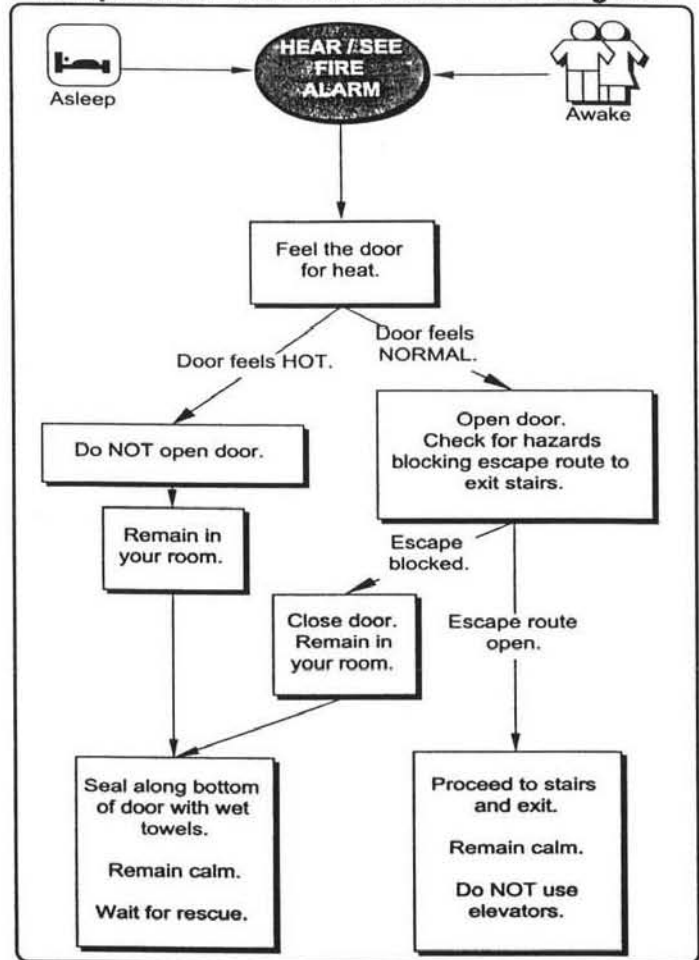
13. If both parents are genetic carriers of Tay-Sachs, their biological children have roughly a 75% chance of being affected. The probabilities break down this way: each biological child of two Tay-Sachs carriers has about a 50% chance of being a carrier and about a 25% chance of actually having the disease. Assume that Harvey and Sharon, who are married, are thinking that they want to have a child. When Harvey and Sharon undergo a Tay-Sachs screening test, they learn for the first time that they are both Tay-Sachs carriers. Given the information presented here, it follows that:

- A= Their biological child will either have Tay-Sachs or be a Tay-Sachs disease carrier.
- B= Although the risks are high, it is possible that their biological child will be unaffected.
- C= Harvey and Sharon will think about the risks and decide not to conceive a child.
- D= Harvey and Sharon will still want to be parents and decide to adopt a child.

14. Consider this passage: "Research at the Rainy-Days Pre-School showed that four-year-old children in preschool all day scored an average of 58 points on a test to see if they were ready for kindergarten. Those four-year-olds who attended only half-days averaged 52 on the same test. A second study of four-year-olds who attended Little Friends Pre-School all day showed these children averaged 54 on the same test. A third study of four-year-olds who did not attend any preschool program reported an average score of 32 on that same test of kindergarten readiness. The difference between their average score of 32 and the higher average scores of the other groups of children who did attend preschool was large enough to be important." What would be the most reasonable thing to conclude from the information in this passage?

- A= A child who scores 50 or higher on this test is ready to attend kindergarten.
- B= Children who do not attend preschool should not be allowed to go to kindergarten.
- C= Preschool attendance is in no way related to being ready to go to kindergarten.
- D= There should be government funding so that all four-year-olds can attend preschool.
- E= Attending preschool may prepare a child for kindergarten better than not attending.

For questions #15 and #16 use this diagram



15. Based on the chart above, if you were in your room on the fourth floor of a ten floor hotel watching television and you heard the fire alarm sound, you probably should

- A= exit by the stairs.
- B= go to sleep.
- C= exit by the elevator.
- D= remain in the room.
- E= feel the door.

16. Suppose you wake up to the sound of the fire alarm and when you check the door it feels normal. Then you check the hallway. In the hall on the floor by each door you see a folded copy of the morning's newspaper. Next to one door you see some glasses, cups and dirty dinner dishes stacked on a room service tray. And, you see a few people with their suitcases calmly getting on the elevator to go down. And suppose the elevator is closer to your room than the stairs. In this case, you probably should

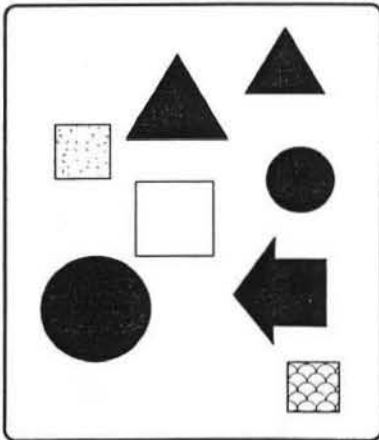
- A= exit by the stairs.
- B= remain in your room.
- C= pack your suitcase.
- D= go down on the elevator.
- E= phone the desk for advice.

17. "In a study of male high school students, it was found that 75% of those who drank two or more beers each day for a period of 60 days experienced liver damage. That this damage could have happened to them just by mere chance or bad luck was ruled out." If true, this study would tend to support the view that:

- A= Drinking does not cause liver damage in adults.
- B= Drinking causes liver damage in adolescents.
- C= Being male or female is not a factor in the relationship between alcohol and liver damage.
- D= The researcher had a personal reason to want to prove young people should not drink.
- E= The drinking age laws are out of date and should be changed.

18. Consider this group of statements true: "If Alex loves anybody, he loves Barbara. There are many people whom Barbara does not love, and Alex is one of them. But, everybody in the world loves somebody." Which of the following **must** be true, if all of the above are true?

- A= Somebody loves everybody.
- B= Barbara loves nobody.
- C= Alex loves Barbara.
- D= Somebody is not loved by anyone.
- E= None of the above.



19. Which of the rules below best describes the shapes in the rectangle above?

- A= If the shape is not a circle it is a square.
- B= If the shape is not a circle it is gray.
- C= If the shape is not a square it is white.
- D= If the shape is not a square it is gray.
- E= None of the above.

The next two questions are based on the following situation:

Central High School has exactly seven student clubs: Debate, Math, Choir, Astronomy, Chess, Electronics, and Community Service. The principal wants to form a group of students to give advice about school policies regarding student clubs. There must be exactly five people in this advisory group. Each of the five must be members of one of the seven clubs. Any combination of five people will do, except that if someone from the Debate Club is selected, no one from the Chess Club can be selected. Also, if someone from the Choir is picked, someone from the Chess Club must be picked. And, if someone from the Math Club is put on the committee, a member from Electronics must also be put on the advisory group.

20. Here are five possible combinations. Which is the only combination that meets all the conditions?

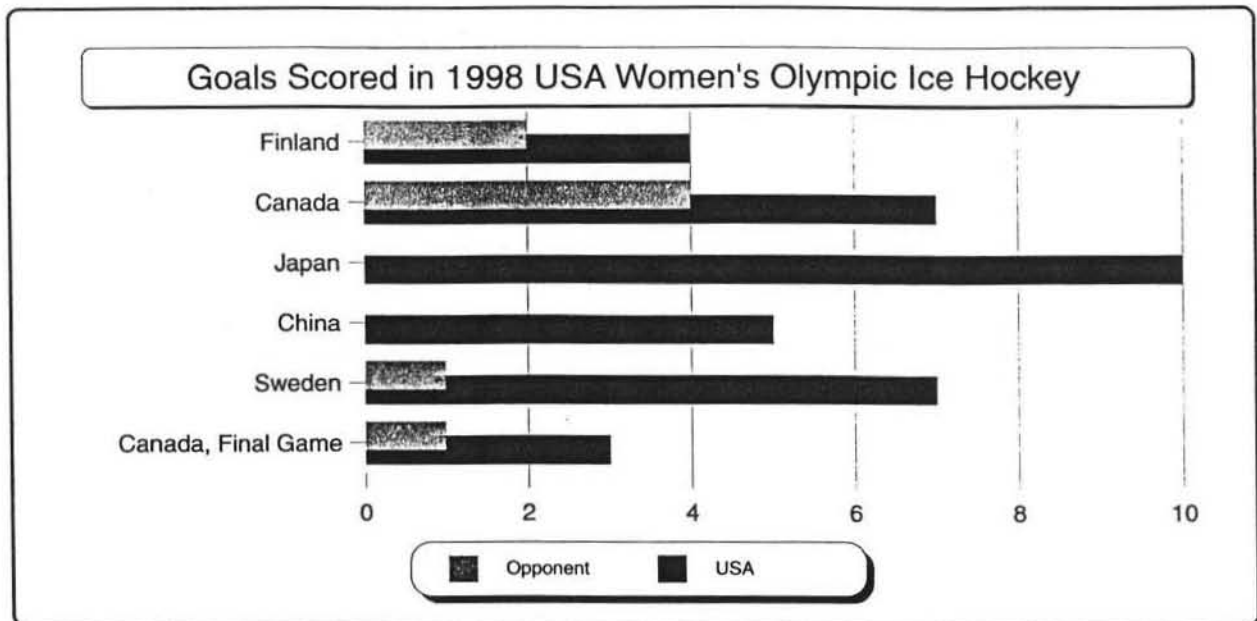
- A= Debate, Math, Astronomy, Chess, Electronics.
- B= Math, Choir, Astronomy, Chess, Electronics.
- C= Math, Choir, Astronomy, Chess, Community Service.
- D= Debate, Astronomy, Chess, Electronics, Community Service.
- E= Debate, Math, Choir, Electronics, Community Service.

21. Assume nobody who participates in Astronomy is selected. In that case, which other club **cannot** be represented?

- A= Debate
- B= Math
- C= Choir
- D= Community Service
- E= Chess

The next three questions relate to the graph below.

The 1998 Nagano Japan Winter Olympic Games was the first time women's ice hockey was an Olympic event. As it happened, the US team won the Olympic gold medal for finishing in first place in 1998. The graph illustrates the final scores of all six of the games the US women's hockey team played at the Nagano Olympics. You can see that the US team played against Canada twice. The second game between the US and Canada was for the gold medal.



22. Which is the best explanation for why the graph shows China and Japan with no goals?

- A= No information was available on their goals when this graph was designed.
- B= Japan and China did not send women's ice hockey teams to the 1998 winter Olympics.
- C= Neither country scored any goals against the US women's ice hockey team.
- D= The person who designed the graph is biased against China and Japan.
- E= There is no way to determine why the graph does not show any goals by these teams.

23. On average, how many goals per game did the US women's ice hockey team score in the Olympics?

- A= On average, 3
- B= On average, 4
- C= On average, 5
- D= On average, 6
- E= On average, 7

24. Looking at the ratio of US total goals scored to Opponent total goals, how does the US team's success against Finland compare to the US team's overall success against Canada?

- A= The US women's team did better against Finland.
- B= The US women's team did better against Canada.
- C= The US women's team was equally successful against Finland and Canada.
- D= There is no way to determine against which country the US team had more success.

Move on now to the next five questions. In each case, your job is to interpret what individual sentences mean.

25. "Not all teenagers deserve a driver's license," expresses the same idea as:

- A= No teenager deserves a driver's license.
- B= One or more teenagers do not deserve a driver's license.
- C= If someone deserves a driver's license the person is not a teenager.
- D= Someone who is not a teenager deserves a driver's license.
- E= All of the above mean the same thing.

26. "Strangers cannot be trusted," means the same as:

- A= If anyone is a stranger, then that person cannot be trusted.
- B= If anyone cannot be trusted, then that person is a stranger.
- C= There is at least one stranger whom we can trust.
- D= People can be trusted unless they are strangers.
- E= All of the above mean the same thing.

27. "Only those who want to be leaders and serve others should become nurses," means the same as:

- A= You shouldn't become a nurse unless you want to be a leader and serve others.
- B= All who want to be leaders and serve others should become nurses.
- C= You shouldn't want to be a leader or serve others except by becoming a nurse.
- D= All who became nurses wanted to be leaders and to serve others.
- E= All of the above mean the same thing.

28. Which of the following "Instant News Headlines" cannot be true?

- A= HORSE WINS RACE, LOSES RIDER
- B= EARTH SPINS DAILY ON AXIS
- C= SCIENTISTS INVENT FOUR-SIDED TRIANGLE
- D= CIGARETTES CAUSE CANCER AND HEART DISEASE
- E= HUMANS VISIT MARS BEFORE 2050

29. Which of the following "Instant News Headlines" cannot be false?

- A= SCIENCE EXTENDS LIFE SPAN TO 130 YEARS
- B= CAVE MEN KEPT PET DINOSAURS
- C= LAWS DO NOT APPLY TO JOURNALISTS
- D= PRESIDENT BARBECUES IN WASHINGTON DC
- E= 50 TONS OF LEAD NO HEAVIER THAN 50 TONS OF FEATHERS

Move on to the final six questions. These invite you to evaluate someone else's reasoning. Your job is to decide if the reasoning is good or poor and to identify the best reason why.

30. Two people in bathing suits and cotton T-shirts are enjoying a beautiful sunny day at the beach. One person, concerned about the skin cancer risks from too much exposure to direct sunlight, goes to sit in the shade under a beach umbrella. The other stays sitting in the sun saying, "It's too late to sit under an umbrella, we've been in the sun for an hour already, so the umbrella will do me no good." What would be the best evaluation of this person's reason?

- A= Good reason. The cooler shade will repair the damage already done by the sun.
- B= Good reason. The cancer risk of sunlight has been exaggerated by the media.
- C= Poor reason. But the umbrella's shade does not reduce the cancer risks anyway.
- D= Poor reason. Sitting in the shade of the umbrella should limit any further damage.

31. Suppose someone reasons this way: "There are three popular reasons in favor of the death penalty. One is that the threat of death should make people not commit terrible crimes. The second is that it should save money, as compared to keeping these criminals in prison for the rest of their lives. The third is that being put to death is the only fitting punishment for the harm these criminals caused to civilized society by breaking its laws. But history shows that the threat of life imprisonment is actually more powerful in keeping people from committing terrible crimes. And careful studies show that the total cost, when you include mandatory court reviews and legal appeals, makes the death penalty more expensive in practice than life imprisonment. So, there is no good basis for supporting the death penalty." The speaker's reasoning is best evaluated as

- A= good. It demolishes the main arguments for the death penalty.
- B= good. But, unfortunately, factually mistaken.
- C= poor. The victim of a violent crime has a fundamental right to revenge.
- D= poor. It did not address the idea that death is proper punishment for harming society.

32. "In the half-light of predawn, little Caitlin and her cousin Jerome pressed their tiny noses against the cool glass of the living room window. They wanted it to be morning so they could go out and play. Concentrating very hard, they both wished and wished for the sun to appear. And as they made their wishes, the sky began to brighten. They kept right on wishing. And, sure enough, the sun kept moving up over the horizon and into the morning sky. How proud the two of them were. Caitlin and Jerome talked about what had happened and decided that if they wish hard enough they can make any cold dark night turn into a bright happy day." The kind of reasoning exhibited by the children in this story is best evaluated as

- A= good. What evidence is there that if they had not wished it, it would not have happened?
- B= good. It's obvious, as long as the children kept wishing the sun kept rising.
- C= poor. That the sun rose while they wished it, doesn't mean it rose because they wished it.
- D= poor. The planets have been going around the earth for centuries.

Go on to the next page.

For the final three questions focus on the faulty inference in the following entirely fictional story:

A malicious speech writer, working for a White supremacist hate group, claimed: "Whites are genetically more intelligent than all other people including Blacks, Hispanics, Asians, and Middle Easterners." To support his claim, the speech writer referred to research that compared two groups of tenth graders. Each group was given the same exam about European geography. The exam focused on facts, such as names of European rivers, mountain ranges, countries, capital cities, agriculture, industry, religion, music and languages. Group A was 35 tenth graders, 34 of whom were Whites with Anglo-European family names. Group A students attended a college prep school with high admission requirements. To advance to the tenth grade in that school all ninth graders must pass a year long course on European geography. Group B was 40 tenth graders, all but four of whom were Hispanic, Black, Asian or Middle Eastern. Group B students attended a public high school located in an impoverished, violent, gang and drug infested part of the city. Ninth graders at that public high school have the option of taking a year of world history, but many take algebra instead. According to the research, Group A students did much better on the European geography test than Group B. The speech writer said that this proved that Whites are genetically more intelligent.

33. Suppose a State Senator objected, saying, "The speech writer's reasoning is faulty because he never mentioned the guarantees in the US Constitution regarding equal educational opportunity." If it is true that the Constitution guarantees equal opportunity, is this Senator's reason for objecting good or not, and why?

- A= Good reason. A violation of key rights makes a study unacceptable.
- B= Good reason. Equal educational opportunity is a vague concept.
- C= Poor reason. By law these rights were respected in the original research.
- D= Poor reason. These rights are irrelevant to the research as described.

34. Suppose a psychologist argues, "The speech writer's reasoning is faulty because the study does not address the possible impact of environment on intelligence." If it is true that environment might impact intelligence, would this psychologist's reason for objecting be a good or a bad reason, and why?

- A= Good reason. This factor should have been taken into account.
- B= Good reason. Environment, not genetics is the major factor in determining intelligence.
- C= Poor reason. Nobody had proven that environment can affect learning geography.
- D= Poor reason. It is very difficult to measure the effects of environment on intelligence.

35. Suppose a tenth grade teacher at Group B's high school angrily objected, "What do you expect! Those others studied European geography for a whole year, but the kids at our school may not have studied any geography at all. Sure, the kids in that rich, fancy private school are going to have learned more facts about Europe." If true, would this teacher's reason for objecting be a good reason or a bad reason, and why?

- A= Good reason. Knowledge of geography facts does not measure intelligence.
- B= Good reason. The year of geography gave Group A an advantage on that exam.
- C= Poor reason. The teacher probably does not have a very good education either.
- D= Poor reason. The teacher feels insulted and is obviously responding defensively.

That was the last question. If there is time left, go back and check your answers.