

The Relationship between Learning Styles, Stages of Self-Direction in Learning and Academic Performance in a Case-Based Nursing Program

BY

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Dedication

To my husband, Tarek
and my children, Reem and Mohammad

ACKNOWLEDGEMENTS

To Professor Gwele, Director of the masters program and my advisor, I would like to extend special thanks for her care, concern, patience, support, encouragement, guidance and assistance during the completion of this dissertation. I feel fortunate to have her as my advisor whose teaching and thinking I admire.

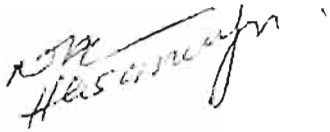
To Mrs Mustafa, Director of the Institutes of Nursing, for her support and encouragement.

To my little two children, Reem and Mohammad, and special thanks for Tarek, my husband, for his support, understanding, encouragement and sacrifice during my study. Without his support, this final triumph would not have been possible.

Declaration

Except for the referenced citations in text, this is the researchers's original work.

Nada Abou Hassanein

A handwritten signature in black ink, appearing to read 'Nada Abou Hassanein'.A handwritten signature in black ink, enclosed within a hand-drawn circle.

ABSTRACT

The Institutes of Nursing in the United Arab Emirates adopted a new approach for educating and training the Diploma Nursing students In 1997. This approach emphasized the use of case-based learning, which was characterized by self-directed and cooperative learning. As the students were experiencing changes in the educational setting and teaching practices .it was important to determine the impact of the teaching and learning approaches on students' learning, and to describe suggestions needed for improvement. The purposes of this study were to determine the learning styles and stages of self-direction in learning for students at Abu Dhabi Institute of Nursing, and to investigate whether there was a relationship between learning style, stage of self-direction and academic performance in courses taught by the case-based method.

This study was guided by Kolb's theory of Experiential Learning, and Grow's theory of the Staged Self-Directed Learning Model. Kolb's learning style inventory and a self designed tool to measure stages of self -direction were administered to 186 students, who agreed to participate in the study. The design was a descriptive correlational one, and data was analyzed by descriptive, correlation, and inferential statistics methods.

The assimilator learning style was the most predominant learning style(35.5%) followed by the converger(29.6%). Accommodators and divergers had equal percentage(17%) for each. As for the stages in self-direction, most of the students rated themselves in the moderate stages of self-direction(67.2%), however, Diploma III had the highest percentage of high self-directed learners (57%). Significant relationship was found between learning styles and academic performance, where convergers and divergers scored higher than assimilators and accommodators. Also a significant relationship was found between the stage of self-direction in learning and academic performance, where students in higher stages of self-direction had higher mean scores compared to students in low and moderate stages of self-direction.

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List of Abbreviations.

LS: Learning Style

LSI: Learning Style Inventory

LSI2: The Revised Version of the LSI that was first published in 1976 to improve the reliability of the instrument.

Types of learning styles:

Ass: Assimilator

Acc: Accommodator

Conv: Converger

Div: Diverger

Modes of Learning

RO: Reflective Observation

AC: Abstract Conceptualization

AE: Active Experimentation

CE: Concrete Experience

SSDL: Stages of Self-Direction in Learning

NO: No ability to use SDL skills

LO: Low ability to use SDL skills

MO: Moderate ability to use SDL skills

HI: High ability to use SDL skills

CBL: Case-Based Learning

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CHAPTER 1

INTRODUCTION

Background to the Problem

"People are different, and it is a good practice to recognize and accommodate individual differences" (Snider, 1990). The teaching/learning process is concerned with human beings, individuals who are different and unique. Any time that we are in a position to influence individuals, it is not educationally sound to think that one teaching style or a variety of teaching styles is beneficial or best for all learners. Keefe (1987) noted that educators must learn to base programs on differences that exist among students, rather than on the assumption that every one learns in the same way. He described learning style as both a student characteristic and an instructional strategy. As a student characteristic, learning style is an indicator of how a student learns and likes to learn. As an instructional strategy, it informs the cognition, context and content of learning. Educators are continuing their search for effective methods to identify individuals' learning differences and develop educational techniques and learning experiences that use this knowledge. Most educators expect students to accommodate to their teaching style or method, but it is imperative for teachers to maximize learning and make it more interesting, thereby motivating students towards their highest achievement potential (Keefe, 1987).

Literature attests to the fact that each learner has distinct and consistent preferred ways of perception, organization and retention (Bloom, 1982; Dunn &Dunn, 1993; Keefe, 1987; Kolb 1984). These learning styles

are characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment.

Keefe (1987) differentiated between cognitive, affective, and physiological styles. Whereas cognitive styles are information processing habits representing the learner's typical mode of perceiving, thinking, problem solving, and remembering, affective styles relate to motivational processes which are responsible for the learner's characteristic way of arousing, directing and sustaining behavior. Physiological styles are biologically based modes of functioning of the human body, which relate to the variables of sex-related differences, nutrition, health and the physical environment.

Bloom (1982) identified three student characteristics, which are determinant of student learning; they are cognitive and affective entry behaviors, and the quality of instruction. These three variables are interdependent and simply say that learning depends upon the extent to which the student is motivated to engage in the learning process, and the extent to which instruction to be given is appropriate to the learner.

According to Dunn and Dunn (1993), when teachers and students have similar learning styles, there is a higher level of satisfaction and achievement, as well as fewer behavioral problems. To this end, there is a need for the assessment of learning style for both the teacher and adult learners in order to enhance the learning experience. Many well-designed and well-conducted studies verify the increased academic achievement that occurs when students are taught through their identified perceptual preferences (Dunn & Dunn, 1993)

A major learning style inventory is the one that was developed Kolb (1976) which provides a framework for examining an individual's strengths and weaknesses in learning. These learning styles are based on the experiential learning theory which stresses that the heart of all learning lies in the way we process experience and in particular the critical reflection of experience. According to Kolb, understanding one's preferred learning style help to understand the areas of weakness and also helps to realize the strengths.

Many studies (Domino, 1971; Hodges, 1988; Nunn, 1995) have focused on using the LSI as a predictor of performance in educational settings. Domino's study (1971), tested the hypothesis that there is an interaction between a student's achievement orientation and the teaching style he/she is exposed to, which differently affect both the amount of learning that take place and the degree of expressed satisfaction with the scholastic environment. One hundred students, selected because of their extreme scores on the achievement via Independence Scale of the California Psychological Inventory, were assigned to Introductory Psychology sections taught in either a conforming or an independent manner. An analysis of variance, correlation analysis, and descriptive statistics were used to answer the research question of whether there is a relation between achievement and the teaching style. An analysis of students' scores on a final examination consisting of multiple-choice items and essay questions, as well as their ratings of teacher effectiveness and course evaluation, indicated a clear interaction effect. Students taught in a manner compatible with their achievement orientation obtained significantly higher means on the multiple

choice items, on factual knowledge, ratings of their essay answers, and on their rating of teacher effectiveness and course evaluation, than their peers taught in an incompatible manner.

Based on a study examining the relationship between learning styles, personality type, and sex role identification, Hodges (1988) reported that the typical beginning student of nursing preferred a learning environment characterized by the following: a caring relationship with teacher; structure; permission to be assertive and utilize nurturing behaviors; use of practical material that relates to the concrete realities of their life; useful skills; learning activities that require touch, muscular sensations, and kinesthetic sense; and direct experience such as small and large group discussion, simulations and role play.

Nunn (1995) examined the effects upon achievement and locus of control of at-risk middle school students who enrolled in a yearlong learning styles/strategies intervention course. Results indicated significant improvement within the "at risk" group in terms of grade point average and locus of control. The analysis provides tentative support for the effectiveness of a learning style/strategies intervention. Nunn stresses further that research in the area is necessary to examine the learning style predictability in various educational settings.

From the above studies, it seems that the interaction of learning styles, achievement orientation, and teaching style is an important dimension in education. Therefore it is desirable to provide students with the type of educational setting that would most effectively utilize their potential, and recognize their diversity.

Matching students' learning styles with teaching strategy, however, is not always feasible, nor is it a desirable approach to teaching and learning.

Firstly, with a class of 30 students, each with her/his own learning style, it might be impossible to cater for each and every student's learning style. The best that teachers can do is to vary instructional approaches, dependent on expected learning outcomes. This brings to the discussion the issue of desirability of matching learning style with teaching strategy. In professional education, such as nursing, cognitive skills such as decision-making, problem solving and critical thinking are highly valued. Different strategies lead to different learning outcomes. Hence, Grow's (1991) concept of stages of self-direction in learning seems more appropriate to professional education. For Grow, the ultimate aim of the teaching/learning process is to help learners develop through various stages of self-direction in learning, rather than to "keep" them where they are. According to Grow (1991), "the goal of the educational process is to produce self - directed life long learners". He proposed four stages with corresponding teaching styles through which learners move from dependency to self - direction. These include (a) Learners of low self-direction, (b) learners of moderate self-direction, (c) learners of intermediate self-direction, and (d) learners of high self-direction. A detailed description of Grow's stages of self-direction in learning appears in the theoretical framework section of this proposal.

According to Grow (1991), learners move from being passive, responding mainly to instructors (teacher centered), to being learners able to set their own goals and standards with instructors being only available to cultivate their ability to learn (student centered). Grow explores the issue of

the importance of matching strategies the teacher uses with the stage the learner is in. It seems, therefore, that educational practice needs to look beyond just catering for individual learning styles but also view learning as developmental, and therefore cater for stages of self-direction in learning as well if the ultimate goal of an educational enterprise as seen by Grow is going to be achieved. Hence, questions such as: What is the relationship between (a) learning style and stage of self-direction in learning, (b) learning style and academic performance and (c) stage of self-direction in learning and academic performance, are important in teaching improvement- oriented practice.

Significance of the Study

In 1998 the Institutes of Nursing in the United Arab Emirates (UAE) adopted a case-based curriculum. This curriculum uses clinical cases as a context for introducing the content to be learned. One of the reasons for adopting the new curriculum was the need to prepare self-directed learners as well as the development of critical thinking and problem solving skills. Furthermore, in adopting a case-based curriculum the Institutes had hoped to be able to offer the students a variety of pedagogical strategies and therefore, come closer to catering for differences in learning styles than was the case with the old lecture-based curriculum.

Instructional strategies vary with the curriculum approach used. Generally case method discussion produces good student involvement (McKeachie, 1994). Case methods, like games and simulations, are intended to develop student ability to solve problems. Cases provide contextualized learning as contrasted with learning dissociated from meaningful contexts.

Watson (cited in McKeachie, 1994) found that case based learning and teaching offers more variety of techniques that maximize: (a) interaction between learners (snowball groups), (b) generate creative solutions (brainstorming), (c) develop group members' self awareness and empathy (role-play, stimulation), (d) develop group members' presentational ability (debate, peer tutoring), (e) applying knowledge and skills to real life (role play, brainstorming), and (f) develop members' awareness of group processes.

Case studies allow for “students teaching other students” (McKeachie, 1994, p. 160). There is a wealth of evidence that peer learning and teaching is extremely effective for a wide range of goals, content and students of different levels and personalities. In experiments in Educational psychology and general psychology, Gruber and Weitman (cited in McKeachie, 1994) found that students taught in small student led-discussion groups not only scored well on a final examination as compared to students who heard the teacher lecture, but they were also superior in curiosity as well. Another finding was that the poorer students benefited more from the student led discussions. Hall et al (cited in McKeachie, 1994) noted that peer learning, however, works better for some students than others. In a review on co-operative learning, he reported that cognitive differences among students affect learning in co-operative situations. Students strong in induction skill perform better dialogically than individually, while the opposite was true for persons low in induction ability.

The preceding discussion indicates that most researchers in the area of learning styles and teaching styles agree that students differ with regard to learning styles and therefore learning orientation. Research on whether or not

matching learning style to instructional style facilitates learning is inconclusive. On the other hand, it has also been suggested that students can achieve with greater degree of success through the use of many different teaching and learning strategies, as there are differences in students' methods, rates and interests in learning. Recognizing this diversity of style helps to create an atmosphere for learning that encourages each student to reach her/his full potential.

Information obtained from a study examining students' learning styles and stages of self-direction in learning can be used to make decisions about the methods that would most effectively accomplish the desired outcome. Students' learning styles can also be assessed by educators for the purpose of planning, developing, and designing instruction. Perhaps more importantly, data obtained from an assessment of student learning styles could be used for planning individualized orientation programs for students entering non-traditional education programs, such as case-based learning programs. Data on stages of self-direction could help educators plan instruction such that there is congruency between learning and teaching strategies used in the teaching/learning process.

Problem Statement

Polit and Hungler (1991) maintained that "the problem statement should identify the key study variables, which should be amenable to observation and measurement, and the nature of the population of interest" (p.81). These authors further differentiated between two forms of problem statements, the declarative and the interrogative forms. Whereas the former type of a problem statement is a declaration of what the study intends to

achieve, the latter type is stated in the form of a research question. In the context of this study, the declarative form is used.

The purposes of this study are three- fold. Firstly, this research explores the relation between learning style as defined by Kolb (1984) and learning stage as defined by Grow (1991). Secondly, the study aims to investigate the relationship between learning style, and academic performance in case-based learning subjects for students enrolled in a three year nursing diploma program. Thirdly, the purpose is to examine the relationship between stage of self-direction in learning and academic performance in case-based learning subjects for students enrolled in a three year nursing diploma program.

Conceptual Definition of Terms

Learning styles: Information processing habits representing the learner's typical modes of perceiving, thinking, problem solving, and remembering.

Self- directed learning: Is a personal attribute, a tool of thought that develops in stages over time. It involves having autonomy as a personal quality and refers to the degree of choice or control the learners have within an instructional situation.

Academic Performance: A measure of student's performance determined by the cumulative grade average.

Operational Definitions

Learning Style: preferred ways of processing information as determined by Kolb (1984) Learning Style Inventory (LSI).

Self-directed learning: individual level of autonomy and motivation to assume responsibility for learning as measured by an instrument developed by the researcher based on Grow's (1991) stages of self-direction in learning.

Stage of self-direction: a measure of individual sense of autonomy ranging from none to low to moderate to intermediate. The self-directed learning tool is a 16 item four-point Likert scale. Scores were assigned as 1-16 for none, 17-32 for low, 33-48 for moderate, and 49-64 for intermediate (high) self-directed learners.

Academic performance: the final grade point average obtained from courses taught by the case-based method.

Study Objectives

The objectives of this study are to:

1. Investigate learning styles of nursing students enrolled in a three-year nursing diploma program taught by means of case studies.
2. Investigate students' stages of self-direction in learning.
3. Examine the relationship between learning style, stage of self-direction and academic performance.

Hypotheses

The following hypotheses are advanced in this investigation:

It is expected that there will be a relationship between learning style, learning stage, and academic performance and that the direction of that relation will be as follows:

1. Students of the convergent and divergent styles will score better than students whose learning styles fall into the other types of learning styles (accommodators and assimilators) because according to Kolb (1984), they are good at problem solving, making decisions based on finding solutions

to problems, and enjoy situations that call for generating a wide range of ideas, as in brainstorming, which fits well with case studies.

2. Diploma III students are expected to be in higher stages of self-direction of learning compared to Diploma I and II students.
3. The higher the level of self-direction, the higher will be the level of academic performance in courses taught by case-method.
4. Students with more person-centered and interactive styles, such as divergent and convergent learning styles, will demonstrate higher stages of self-direction compared to those whose learning styles are more indicative of more individualistic (assimilators) and/or receptive (accommodators) modes of learning.

CHAPTER 2

REVIEW OF LITERATURE

An enduring question for educational research is the effect of individual differences on the efficiency of learning. Aspects of individual differences that have been much explored related to differences in learning styles, strategies, and conceptions of learning. In the context of this research, learning style is taken to mean a consistent or habitual mode of acquiring, perceiving, and processing knowledge (Kolb, 1984). Other aspects include differences in stages of self-direction in learning. Self-direction in learning is a characteristic that exists to some degree in every person and is seen as an ability or willingness of individuals to assume greater control to plan learning efforts, enhance personal skills, and obtain new knowledge. The achievement of self-direction requires the provision of learning environments in which learners perceive as being democratic, flexible, challenging, and most importantly, non threatening (Grow, 1991).

This literature review examines research on learning style, self-direction in learning and educational programs that foster the development of self-direction. This literature review showed the importance of facilitating learners' empowerment and achievement by developing in the students an awareness of their learning styles and stage of self-direction in learning. Research also showed (Cusimano, 1995; Mifflin, Campbell, & Price 2000; Nixon, Morgan, Forsyth, & Ellis, 1996; and Rideout, 1994) that non-traditional teaching programs, as the case-based method, support self-directed learning and help learners tailor the flexible educational strategies used to their

requirements to perform better and to optimize the quality of the learning experience.

Conceptualizations of Learning Styles

Learning style research is eclectic in origin, incorporating principles and theories from many schools of thought. It is drawn out of studies about the psychological, social, and physiological dimensions of the educational process (Bastable, 1997). Principles from the stimulus response (behavioral) theory that are important to the teaching-learning process stress that learning is achieved by doing and not by passively listening, which needs practice and repetition in a variety of situations to acquire skill and retention.

Principles from cognitive theory important to teaching-learning process are: (a) perceptual characteristics, that is, how the individual takes in information from the environment are important conditions of learning, (b) learning with understanding is permanent and transferable, goal setting by the learners is important, and (d) divergent as well as convergent thinking should be nurtured to enhance inventive problem solving (Bastable, 1997).

Motivation and personality theory offer the following principles which apply to the learning process: (a) learners' abilities are important and provisions must be made for differences in abilities, (b) the anxiety level of the individual learner may affect the learner's ability to learn, (c) self-esteem and confidence are important to learning, the group atmosphere of learning (competition versus cooperation, authoritarianism versus democracy, individual isolation versus group identification, which effect satisfaction as well as products of learning (Bastable, 1997).

In an attempt to provide a framework for the growing number of different learning style theories, Curry (cited in O'Connor, 1987) conceptualized the onion model of classification consisting of four layers described as follows:

Instructional and Environmental references are those that describe the outer most layers of the onion, they address the individual preferred environment for learning and encompass the learning style model of Dunn and Dunn (1978). These models stress the importance of environmental, emotional, sociological and psychological preferences of learners.

Social interaction models consider ways in which actors in specific social contexts will adopt certain strategies. Perry's (cited in O'Conner, 1987) well-known model showed how college students developed through different intellectual maturation levels as they progressed through college.

Cognitive models such as information processing theories and experiential learning models. Information processing models describe the middle layers, and are an effort to understand the processes by which information is obtained, sorted, stored and utilized. The most complex approach is Kolb's (1984) approach to experiential learning. He maps out four quadrants and shows how they can serve as stages of holistic learning.

Personality models describe the innermost layers of onion. Personality models assess the influence of basic personality on preferred approaches to acquiring and integrating information. Models stressing personality include Witkin's (cited in O'Conner, 1987) construct of field dependence/ field independence, and the Myers-Briggs Type indicator (cited in O'Conner, 1987)

which categorizes people as extroverts/introverts, sensing/intuition, thinking/feeling, and judging/perceiving.

Research on Nursing Students' Learning Styles

Kolb's Learning Style Inventory has been the most frequently used method of measuring learning styles among nursing students. Upon examination of learning style literature, one can find also that a number of other instruments have been used to measure the learning styles. The instrument designs differ and the theoretical constructs upon which they are based also differ. Moreover, the terms "learning styles" and "cognitive styles" are used interchangeably.

Perusal of literature revealed that the most commonly used variables in learning style (LS) research involving nursing students were (a) types of students, (b) type of program (baccalaureate versus associate degree program), (c) nursing education and (d) career choices. A number of studies examining differences between generic (traditional) and RN (non-traditional) students with regard to learning style have reported similar results (Huch, 1981; King, 1984). For instance, Huch (1981) administered Kolb's learning style inventory and Rotter's Internal-External scale along with a questionnaire on demographic data to 163 nursing students, yielding 148 usable sets of questionnaires. There was no significant difference in the two groups of nursing students according to preferred learning style; however, the greatest percentage of RN students was identified as having an accommodator learning style, while the greatest percentage of generic students was identified as preferring the diverger style. Similarly, for the subjects who participated in King's (1984) study, no significant differences were found in the

learning styles of traditional (n=30) and non-traditional (n=49) nursing students. However, King found that for both, generic and RN groups, the most frequently occurring learning styles were divergers and accommodators. King had also used the learning style inventory (LSI) to measure students' learning styles.

Both researchers (Huch, 1981; King, 1984) further reported that the greatest proportion of the subjects who participated in their studies preferred a learning style which included the mode of concrete experience (CE), and that subjects were distributed through out the learning style profile. For the group that participated in King's study, however, the accommodator learning style was the most frequently found learning style.

Using Kolb's LSI, Laschinger and Boss (1984) examined the learning characteristics of incoming nursing students that were then compared to those more advanced nursing students. Subjects invited in this study were students in two undergraduate nursing programs in the same city. Subjects were first year nursing students from a community college (diploma) program and a university baccalaureate program (n= 166) as well as second year community college students and fourth year university students from the same programs (n= 102). Nursing students were represented in all four learning styles, with the largest proportion being divergers and accommodators. Similar to the studies by Huch (1981) and King (1984), these researchers concluded that the majority of the students preferred concrete learning styles, with the advanced students having a greater incidence of concreteness. Laschinger and Boss (1984) suggested that this could be due to increased exposure to nursing education. Diploma students were found to have a higher incidence of

preference for concrete learning styles than the nursing students enrolled in the university programs, who were found to have preference for reflective observation (RO) and abstract conceptualization (AC). This finding was only significant at the 0.1 level. However, It should be recalled that Huch (1981) reported similar findings with respect to RN students.

Furthermore a study conducted by Hodges (1988) that examined learning styles, personality type and sex role of nursing students reported similar findings. A sample of 93 beginning second year nursing students constituted the data-producing sample. On Kolb's Learning Style Inventory, test findings indicated that although all categories of learning style were represented in the sample, the highest percentage of subjects were divergers and accommodators. It could be concluded from these results that non-baccalaureate nursing education programs tend to either attract or emphasize learning by doing, compared to baccalaureate nursing education programs.

Studies by Highfield (1988), Haislett, Hughes, Atkinson, & Williams (1993), Laschinger (1986), and Wells and Higgs (1990) examined the differences in learning styles of nursing students at various stages of a baccalaureate-nursing program. The aim was to investigate whether or not there would be differences in learning styles of beginning nursing students compared to those who had been exposed to nursing programs for a number of years.

The study conducted by Laschinger (1986), though used baccalaureate- nursing students, had similar results of the above studies. Laschinger (1986) conducted a study to investigate student perceptions of the environmental press of two clinical nursing education settings, medical-

surgical and psychiatric nursing. In addition Laschinger wished to compare the predominating learning style of the nursing students in the study to the perceived press of the nursing environments assessed for evidence of a fit between person-environment variables. She hypothesized that nursing students have predominantly concrete learning styles that match the environmental press in nursing settings and that nursing learning environments are concrete in orientation.

Sixty- eight female, baccalaureate-nursing students were invited to participate in the study. Kolb's LSI and the Environmental Press Questionnaire (EPQ) were used in the study following a three months clinical experience in medical-surgical and psychiatry. Results showed that 62.5% of the subjects had either divergent or accommodative learning styles. Concrete experience (CE), the learning mode shared by divergers and accommodators, was the primary strategy used by most of the students. This finding, according to the author, appeared to be consistent with Kolb's contention that human service disciplines have concrete, people-oriented learning orientations.

Another interesting finding in this study was that the overall combined concrete press was significantly higher than the overall abstract press. The divergent competencies received highest scores while assimilative competencies received the lowest scores. It was also found that the convergent press score was higher than the assimilative and accommodative press scores. This, according to Laschinger (1986), reflects the students' perception of the importance of practical application of theory in nursing environments. These findings regarding the learning style are not consistent with the studies done by Highfield (1988), Haislett et al (1993) , and Wells and

Higgs (1990) who found the nursing students' dominant preference to be across the abstract-reflective mode.

A study conducted by Haislett et al (1993) explored the learning styles of 100 baccalaureate- nursing students in the first semester of their freshman year using Kolb's LSI. Analysis indicated that the sample included mainly assimilators and divergers (74%), the remaining 26% fell in the accommodator and convergent quadrants. Reflective observation (RO), the learning preference shared by assimilators and divergers, was the primary learning strategy characterizing nearly three-quarters of the sample.

Using Kolb's Learning Style Inventory (LSI), Highfield (1988) assessed the styles of 65 volunteer, primarily minority baccalaureate-nursing students. The age range was twenty to forty two years with mean age of 26-8. Fifty of the subjects were women and four were men. The differences in learning style between baccalaureate nursing students in the last semester of clinical studies were also investigated.

Contrary to the results of the studies by Huch (1981), King (1984), and Hodges (1988), Highfield found that for nursing students who participated in his/her study the predominant learning style was assimilation (56%), a combination of reflective observation (watching and thinking) and abstract conceptualization (thinking and hypothesis generation). There were significant numbers of assimilators within the junior group ($p < .001$); the senior group ($p < .02$); and the total sample ($p < .0001$). Highfield (1988) concluded that, perhaps progression through nursing education does not affect the learning style of students. No significant differences were found between junior and

senior students' learning styles ($p < .05$). Neither age nor previous nursing education was found to affect learning style ($p < .05$).

Highfield (1988) further reported that approximately one half of the seniors demonstrated a more integrated style of learning evidenced by having their highest score on both ends of the abstract-reflective (AC-RO) continuum. This means, according to Kolb's interpretation of the style across the grid that when the data point falls near the far corners of the grid, people tend to rely heavily on that particular learning style. In contrast, if the data point falls near to the center of the grid, the more balanced is the learning style. Highfield (1988) concluded that the high number of assimilators in the sample may be related to the emphasis in nursing education on information management which tends to attract students with an assimilative style and promote their reflective watching and thinking.

These results contradict with the results found in Huch (1981) and King (1984) studies that found the advanced learning students to have greater incidence of concreteness. This could be due to the fact that students in Huch and King studies were mainly nursing students from Diploma programs, while those who participated in Highfield's study came from a baccalaureate nursing program. This finding is consistent with the results found in Laschinger and Boss (1984) and Hodges (1988) that non baccalaureate nursing programs tend to either attract or emphasize learning by doing, compared to baccalaureate nursing programs.

Wells and Higgs (1990) investigated the learning styles and preferences of first and fourth semester students ($n = 129$) in a baccalaureate degree nursing program using the Gregorc Style Delineator and the Wells

Learning Preference Survey. According to Gregorc, individual learning styles are divided into four categories, concrete sequential, concrete random, abstract sequential and abstract random. The concrete sequential learner is methodical, structured and prefers a step-by-step progression when assimilating material. The concrete random learner is intuitive and impulsive, requiring personal proof when validating new material and orders material in a three-dimensional type pattern. Abstract sequential learners order material in a two-dimensional manner and tend to be logical, intellectual, and rational but are indecisive when forced to make decisions or adjust to change. Abstract random learners are emotional and imaginative, ordering information in a random, nonlinear fashion. They value relationships, think in global terms, and their thinking processes are bound to feeling.

According to Gregorc's model, there is no "pure" style. He believes that people have the ability to operate to some extent in all four styles, although 90% of learners are better to operate in only one or possibly two learning styles. The concrete sequential (CS) and the abstract random (AR) learners possess many of the characteristics of the divergers (CE-RO), as defined by Kolb (1984). The CS learners, like learners who rely on concrete experience mode of learning, tend to operate in a highly structured, conservative, logical manner. Both learners prefer to deal with the obvious, the "here and now" rather than looking for meanings or making relationships between ideas or concepts.

The AR learners share with reflective observer learners the quality that allows them to conceive ideas, to understand and to believe that which they

cannot see. They are able to use their intuition, imagination, and they look beyond what is more than subtle implications.

The predominant learning styles demonstrated by the first semester nursing participants were concrete sequential and abstract random, while the learning styles demonstrated by the fourth semester nursing students were abstract random and concrete sequential. Chi-square statistical analysis determined that there were no significant differences in predominant learning styles between the two groups. Similar to the study conducted by Highfield (1988) and Haislett et al (1993), the baccalaureate nursing students in Wells and Higgs study (1990), preferred reflective styles rather than styles that emphasize learning by doing (active experimentation).

Haislett et al (1993) noted that this discrepancy between preference for abstract and concrete modes might be due to the composition of the population sampled. In the research establishing concrete experience as the preferred mode of learning (Laschinger, 1986), the students sampled were third-year students. Haislett et al (1993) assumed that these students had experienced at least some of the applied curricula of the nursing program, and had completed the more theory-based science course work and general university requirements typical of the first semester of a nursing program. Thus, their third year learning style could be influenced not only by their naturally occurring preference for concrete experience, but also by the lack of demand for the strategies required to master course work more compatible with abstract conceptualization and reflective observation.

Compared to Laschinger (1986), the sample selected in Haislett et al (1993) study came from a population restricted to first year nursing students

enrolled in a four-year baccalaureate program of study, which lends itself to reflective observation as a learning modality. Therefore, according to Haislett, it made sense that a sample drawn exclusively from this population would mirror reflective observation as a primary learning preference.

Additionally, studies done by Hodges (1988), King (1986), and Huch (1981), examined the learning styles of nurses and nursing students from varied learning environments. Some were enrolled in two-year programs (Hodges, 1988) while others were employed nurses returning for added credentials (King, 1986).

In conclusion, most of the studies suggest that nursing students were represented in all four learning styles. There were variations, and the majority of the studies identified nursing students as concrete as opposed to abstract, except for the studies done by Highfield (1988), Haislett et al (1993), and Wells and Higgs (1990) that identified the majority of nursing students to have preference for abstract learning styles.

Relationship between Learning Style and Academic Achievement

Academic success or achievement has always been a subject of interest to educators. Studies have identified predictors of the successful student, of which learning style has been considered one. Literature conducted about the relationship between learning style and academic success mostly show that understanding the concept of learning style assist educators in maximizing the learning experience of learners. The important contribution of learning style research was to identify students' strengths to support, and those areas of weaknesses to provide interventions. Some studies showed a positive relationship between learning style and academic

achievement. Furthermore, these studies identified that students with certain learning styles tend to achieve better than students with different learning styles, as in studies done by Haislett et al (1993), Wilkerson (1986), Cook (1997) and Lynch, Woelfl, Steele, & Hansen (1998). These studies that found a relationship between learning style yielded different results of what type of learners performed better. Variables that contributed to this difference were the particular profession or major, type of program, testing criteria, and the level of study.

Haislett et al (1993) explored student learning style as an important variable of academic success in a four- year baccalaureate-nursing program (BSN). Student learning styles of 100 volunteers, who were enrolled in the first semester of their freshmen year, were assessed using Kolb's LSI-1985. The author examined the relationship between learning style and academic performance as measured by grade point ratio (GPR).

Analysis indicated that the assimilators and divergers were labeled the most successful academically as was revealed by GPR. The convergers had the second highest GPR. Accommodators were identified, according to this study, as the nursing students at risk in the first year of their program.

Therefore, the author explained that students who relied on such reflective observation preferences (divergers and assimilators) as understanding the meaning and implication of ideas and situations, appreciating what is presented to them from different points of view, and relying on their thoughts and feelings to form opinions, achieved higher GPRs. Those students who employed abstract conceptualization (convergers) preferences such as focusing on logic, concepts, and ideas; taking a scientific

approach to problem solving; manipulating symbols and quantitative analysis; and valuing systematic planning and precision also did well. Those who counted mainly on concrete experience and active experimentation (accommodators) had more difficulty in their first year of the nursing curriculum. Accommodators prefer more trial- and- error and "hands-on" approaches to learning.

Wilkerson (1986) administered the Kolb's LSI to 133 generic baccalaureate-nursing students enrolled in a junior-year course to ascertain the relationship between learning style preference and achievement on four outcome measures. These outcome measures were two quizzes constructed to measure knowledge, recall and comprehension of cognitive material and two clinical process papers designed to measure ability to analyze clinical situations and apply principles of the nursing process.

The author does not report learning styles, such as diverger or converger, but instead report sub-scale results, which are used for statistical calculations. Reliability coefficients for the LSI sub-scales and outcomes measures indicated, in contrast to Haislett et al (1993) results, a negative correlation on all outcome measures for the reflective observation sub-scale and a positive correlation for all outcome measures for the abstract conceptualization sub-scale.

Cook (1997) conducted a study of learning style as a predictor of college academic success and adjustment. According to the author, providing social support and building personal competence are two basic intervention approaches to promote healthy adjustment. The author added that an important area of personal competence for college students is learning styles.

Using Kolb's LSI, the study examined learning styles of freshmen entering college and first year academic achievement to help incoming students negotiate the high school-to-college transition. Participants' (n = 739) GPA was used as a measure of academic success at the university after the first semester of the summer orientation program.

Results indicated a great diversity in learning styles at the university based on academic major. In the nursing profession the preferred learning style was the diverger. Two 2x2 ANOVA determined the relationship between the two experiential learning axes (i.e. concrete-abstractness and active-reflective) and GPA. There was no significant difference between the concrete learners and the abstract learners in terms of GPA. A significant difference between the active and reflective learners in terms of learning style was found. Active learners had a higher GPA than reflective learners. Divergers and assimilators were having the most academic difficulty. Convergers and accommodators were doing better academically.

The author maintained that there is a definite trend in terms of what learners do best academically in their first semester. The reasons for this could be related to students' learning styles mismatch with the career fields, or the means of testing and assigning grades utilized by the curriculum. Cook (1997) suggested that it is important for administrators and professors to consider the diversity to more fully harness each students' learning potential, and to teach from a more eclectic method, to address the needs to offer competence building services to help students successfully make adjustment.

Lynch et al (1998) conducted a study to determine if learning style correlates with objective multiple choice and clinical measures of performance

of third year medical students (n=227) using Kolb's LSI. Performance was assessed using the United States Medical Licensing Examination step1 (USMLE1), THE National Board of Medical Examiners (NBME), Multiple Choice Surgical subject examination (MCQ), and the NBME computer-based case simulations (CBX).

The USMLE1 and NBME subject examinations rely on a single best answer multiple choice question formats to assess knowledge. The CBX is a complex, unprompted, dynamic computer simulation intended to measure clinical case management skills. Analysis revealed that convergers and assimilators performed better on USMLE1 and NBME subject examination. A positive correlation of the learning orientation with abstract conceptualization and active experimentation on USMLE1 and NBME performance was found. Analysis of variance demonstrated significant differences based on learning style in performance on the USMLE1 and NBME. Learning style was not associated with performance on CBX. None of the learning orientations measured by the LSI correlated with clinical performance assessed by the CBX. The data suggest that students who described themselves as highly abstract have a distinct advantage when performance is measured by multiple- choice type instruments. The author maintained important implications from this study for medical education. Knowledge of the strengths and weaknesses of various learning styles along with their implications for academic performance, may give students insights into their own conceptual pattern and thus allow them to modify non-productive habits and strengthen beneficial ones.

Lynch et al (1998) noted that medical educators should be cautioned against relying too heavily on objective, multiple choice type instruments in assessing student achievement. Instruments assessing academic and clinical performance are not fully correlated. The data demonstrate the importance of evaluating students by using more than one type of examination format. Multiple choice examinations favor individuals with abstract orientation. However, this orientation does not correlate with performance on a clinical simulation. Clinical performance requires additional cognitive skills, abilities, and behaviors that are not adequately reflected in objective measures of academic performance.

In contrast to those studies that found a relationship between learning style and academic performance, studies by Joyce-Nagata (1996), Decoux (1987), and Zemaitis (1987), identified no relationship between learning style and academic achievement in nursing students.

Joyce-Nagata (1996), administered Kolb's Learning Style Inventory and a Descriptive Data Questionnaire to a sample of 334 baccalaureate nursing students and their perspective nurse educators from two different nursing schools to obtain data in order to determine the effects of teacher/student learning style congruency on academic performance. The sample consisted of traditional baccalaureate nursing students, registered nurse baccalaureate nursing students, and baccalaureate nursing students holding a previous non-nursing degree. The learning styles scores were computed and faculty and student learning style congruency was described as (a) matched on both abstract-concrete and active-reflective dimension (b) matched on only the abstract-concrete and active-reflective dimension; (c)

matched on only the abstract-concrete dimension; (d) matched on only the active-reflective dimension; or (e) not match on either dimension.

While there were variations in nursing students' learning styles, the predominant learning style of the sample was assimilation. Analysis of variance revealed no statistically significant difference in learning styles of traditional and registered nurse baccalaureate students. Also there was no significant difference at the .05 level in the academic performance among the three groups of nursing students.

Decoux (1987/1988) conducted a study that identified no significant relationship between learning style and achievement. The relationship between academic achievement (GPA) and the variables of learning style, intellectual development, and age were investigated. Kolb's LSI 1985, Erwin's scale of Intellectual Development and a brief demographic data sheet were administered to 113 freshman and sophomore associate degree nursing students. On analysis of the data using multiple linear regression no significant relationship was found between academic achievement and learning style, stage of intellectual development or age. The associate degree-nursing students were predominately cast as divergers and assimilators.

Zemaitis (1987) investigated the relationship between learning style, learning preference, and years of experience in nursing, clinical specialty, and grade point average. The Kolb's LSI 1985 and the Rezler Learning Preference Inventory were administered to 121 RN students in five baccalaureate nursing programs. Statistical analysis revealed no significant relationship among the variables. There was no relationship also between

learning style and achievement (GPA). The greatest percentages of RN students were identified as accommodators, demonstrating a preference for concrete experience and active experimentation.

The above research review is divided in favoring the relationship between learning style and achievement. However, assessing student learning style is recognized as a valuable resource in authentic identification of the varying needs and characteristics of learners. A number of studies support the view that matching learning styles with appropriate instructional strategies lead to academic achievement. Studies conducted by Ault (1986), Dunn and Dunn (1993), and Andrews (1981) maintained that learning improves, and students' attitudes and performance increased when teaching takes into consideration the aspect of learning style.

A study carried out by Ault (1986), using a simplified version of McCarthy's 4 mat system led to conclusion which support the effectiveness of teaching to learning styles at the college level in terms of improved students attitudes and performance and increased teacher satisfaction and effectiveness in the classroom. Recommendations from this study include institution-wide training methods, which accommodate differing learning styles of students; McCarthy's 4 Mat System differentiates learners into four distinct types. Type one learners perceive through concrete experience with senses and feelings. They learn better through discussions, listening and interacting; type two learners perceive through abstract concepts by thinking. They learn best through lectures and examination of data; type three learners process information through active experimentation and learn best through hands-on activities; type four learners perceive through concrete experience and

process information through active experimentation by doing. McCarthy advises teachers to teach to all four types of learners with all four methods.

Dunn and Dunn (1993) have performed extensive research in the area relating to individualizing instruction. These investigators view learning style as the manner in which at least eighteen different elements of four stimulant categories affect a person's ability to absorb and to retain information, values, facts, or concepts. The four areas of stimuli include the immediate environment with elements such as noise, lighting, temperature, and décor; emotional make-up, involving factors such as motivation, persistence and responsibility; sociological reaction to people such as peers, self, teams or adults; and physical being which entails perception, intake, time and mobility. These researchers support the premise that learning style is variable among individuals, is identifiable and requires complimentary instructional methodology and/or teaching styles. They found that when students were permitted to study according to their identified learning styles, academic achievement and retention improved.

Andrews (1981) investigated how teaching methods and student learning style affect learning outcome. He hypothesized that students will be able to learn more in settings, which allow them to interact more effectively with their instructor. When students are comfortable in the relationship with the instructor, they are then able to focus their energy on academic learning. He explored two instructor strategies (Instructor Centered versus Peer Centered) in chemistry classes, which were led by teaching assistants. The students' learning style was assessed on the Grasha-Reichmann Student Learning Style Scale and measured along Collaborative/Competitive

dimensions. The results indicated that the peer-centered approach was most beneficial for collaboratively oriented students, whereas competitive students learned best in an instructor-centered approach. This study suggested that course instructors should capitalize on the fact that students, consciously or unconsciously, select learning resources to match their learning style.

Andrews (1981) recommended that instructors should provide students with information about their learning style to help them become more effective learners.

Self-Directed Learning

'The concept "self-directed learning" is central to what adult education is all about, and it has been one of the field's high interest topics. The information explosion and the continual changes in the means of accessing information have reinforced the importance of preparing graduates to direct their own learning and to continue so throughout their career. Increasingly, professional schools, medical and nursing are turning to curricula to develop in the graduates the capacity to "self-direct" learning and to prepare them for life-long learning. Brockett and Hiemstra (1991) claimed that one effective approach to life-long learning is to become a self-directed learner by taking control of both, methods (means) and content (objectives) of one's own learning.

Researchers, theorists, and practitioners have all asked the question: what is self-directed learning and what are the proper roles for educators wanting to provide it. There is some debate over the concept of self-directed learning and what exactly it entails. What is self-direction in learning? Many questions about the concept of self-direction in learning are posed. Is it a

characteristic of all adult learners? Is it a goal toward which adult learners should be moved? Is it an instructional method naturally employed by adults? Or is it an orientation toward a trait or learning style that individuals possess in varying degrees?

Conceptualizations about Self-Directed Learning

Self-directed learning is based on the concepts from lifelong learning (Dave, 1976), humanism (Rogers, 1969), principles of adult education (Knowles, 1975), and Grow (1991) staged self-directed learning model. ¹

Concepts identified by Dave (1976) as a foundation of lifelong learning include an emphasis on self-directed learning, flexibility and diversity of learning tools, teaching techniques, and content. Lifelong learning seeks continuity and articulation among the educational levels, organizing each level in discrete, but not mutually exclusive, stages of cognitive, social, and affective development so there can be a smooth transition of role changes during a person's life span.

Humanism, the philosophic basis for lifelong learning advocates the value of human existence and the ability of persons to continue to grow and develop during a life- time. Rogers (1969) believed that people learn what they perceive will be helpful to their sense of well being. Learning is equated with change. The teacher as a facilitator provides a non-threatening environment to assist the learner who may initially perceive the need to change as a threat. ¹ Learning occurs when the learner actively participates in and is responsible for the learning process. ² Rogers (1969) further believed that educators need to start thinking of themselves as facilitators and consultants rather than experts. The shift of the educator role means letting

go of control. The facilitator/learner relationship is one of mutual respect and collaboration. Educator responsibilities are to create learning environment and to motivate, support, and provide feed back to the learner. The educator should identify potential learning resources and serve as a role model, whereas the learner is responsible for initiating, directing, and controlling the learning process.

Knowles (1975, p. 18), the author of the term "andragogy" associated adult education with a process model rather than with a content model. He defined self-directed learning as "a process in which individuals take the initiative, with or without the help of others, to diagnose their learning needs, formulate learning goals, identify resources for learning outcomes". His 1975 publication, self-directed learning, provided foundational definitions and assumptions that guided much subsequent research: (a) self-directed learning assumes that humans grow in capacity and need to be self-directed: (b) learners' experiences are rich resources for learning: (c) individuals learn what is required to perform their evolving life tasks; (d) an adult's natural orientation is task or problem-centered learning; (e) self-directed learners are motivated by various internal incentives, such as need for self-esteem, curiosity, desire to achieve, and satisfaction for accomplishment.

According to Knowles (1975) self-directed learning is an outcome as well as a process. The learner gains the skill of engaging in self-directed learning, which involves changes in attitude and behavior. It involves a significant change in roles, beliefs, values, and assumptions by the educator and the learner. The power and control normally associated with the educator is transferred to the learner who decides what and how they will learn, and

then evaluates the worth of their work. The educator becomes more of a facilitator of learning, helping learners along, rather than being the director of learning. Like Grow's staged self-directed learning model (1991), Knowles believes that learners need to be introduced gradually to self-directed learning, and "learn" how to be more "self -directed".

Another important component of self-directed learning is self-evaluation, which according to Knowles (1975) is a skill required in professional life and for life long learning. This requires individuals to set their own objectives, design strategies to achieve them, and methods to evaluate the accomplishment of objectives, these in turn involves reflection on past experiences and on the learning process. Knowles (1975) gives the example of a learning contract as an effective tool for self-evaluation because it helps the learner to set personal goals and objectives, and make explicit the responsibilities of the student/learner and the educator.

Grow's (1991) stages of self-directed Learning Model proposes that learners advance through stages of increasing self- direction and that teachers can help or hinder that development. Good teaching match the learner's stage of self-direction and helps the learner advance toward great self-direction. Specific methods are proposed for teaching students at each stage, several pedagogical difficulties are explained as mismatches between teacher style and learner stage, especially the mismatch between a student needing direction and a non-directive teacher. Good teaching, according to Grow, does two things. It matches the student's stage of self-direction and it empowers the student to progress towards greater self-direction. Good

teaching is situational, yet it promotes the long-term development of the student.

Models and Research on Self-Directed Learning

This section of the review of literature includes research on many self-directed learning models that were designed and were mainly prompted by the writings of Knowles (1975) and the research conducted by Tough (1978). Tough's studies showed that nearly all-adult learners are involved in some form of self-directed learning. Many self-directed learning models have been designed and used in orientation programs, staff development, determining cost-effectiveness, continuing education, and nursing education programs.

Some theorists argued that the environment and how it organizes learning events for the self-directed learners, plays a major role in the course of action selected by learners (Mocker & Spear, 1982). Other theorists argue from a philosophical perspective that assumes greater control by the learner, but the role of the learning environment remains significant (Brockette & Hiemstra, 1991).

Mocker and Spear (1982) included self-directed learning in a descriptive model for lifelong learning based entirely on the locus of control for decision making about the objectives and means of learning. The model is a two-by-two matrix of learner and institution. The self-directed learning situation occurs when learners, not institutions, control both the learning objects and means of learning. Thus whether or not learning is self-directed depends not on the subject matter to be learned or on the instructional method used. Instead, self-directness depends on who is in charge, which

decides what should be learned, who should learn it, what methods and resources should be used and how the success of the effort should be measured. To the extent the learner makes those decisions, the learning is generally considered to be self-directed.

Brockette and Hiemstra (1991) synthesized many aspects of knowledge about self-direction and conceptualized the PRO (Personal Responsibility Orientation) model. This model recognizes both the differences and similarities between self-direction as an instructional method and learner self-direction are a set of personality characteristics. Personal responsibility refers to individuals assuming ownership for their own thoughts and actions. In terms of learning, it is the ability or willingness of individuals to take control that determines any potential for self-direction. This means that the learners have choices about the direction they pursue. Along with this goes responsibility for accepting consequences of one's thoughts and actions as a learner. Brockette and Hiemstra (1991) view the term self-directed learning as an instructional process centering on activities as assessing needs, securing learning resources, implementing learning activities, and evaluating learning.

One of the studies conducted that support the above models developed by Brockette and Hiemstra (1991) and Mocker and Spear (1982) was the study by Mifflin et al (2000). The authors conducted a study to develop a conceptual framework to guide the development of self-directed, lifelong learning in problem based medical curricula. They found inconsistencies in the interpretation of self-directed learning among staff and students during the implementation of a problem based curriculum in The Graduate School of

Medicine in Australia. As a result students were frustrated, many became dependent on faculty guidance, and some withdrew from the tutorial process reverting to “rote learning” to cope. The results of this study showed that these differences in opinion among staff and students was due to unarticulated, not very well understood, and in many cases conflicting beliefs about the way to approach the goal of self-directed, lifelong learning. Mifflin et al (2000) found that dissonance about the concept caused difficulties in the implementation of the program, and guidance was not sufficient to deal with the underlying dissonance.

Hence, Mifflin's et al (2000) major premise was that in order for the problem-based learning model to foster the development of self-directed, lifelong learning, students need support and guidance. They maintained that self-direction is an outcome that results from progressive development of student responsibility for learning and gradual reduction of the direction provided by the faculty. The framework they developed guides teachers and learners so that there is an agreed mixture of support for learning and encouragement of student responsibility. The ultimate goal, according to Mifflin et al (2000), is that when support is no longer available, experience in clinical practice will continue to motivate graduates, throughout their professional careers, to use their developed skills to evaluate their performance, identify personal learning needs, and select and evaluate appropriate resources to achieve their goals.

Similar to Brockett and Hiemstra (1991), research by Guglielmino & Guglielmino (1988) suggests that self-direction is a personal quality and should stem from the individual. According to Guglielmino & Guglielmino

(1988), self-directed learners are similar in that they show initiative, independence and persistence in learning. They assume responsibility for their learning and see problems as challenges rather than obstacles. They have a high degree of curiosity, and a strong desire to learn and the capacity for self-discipline. They can set goals, make plans, organize their time and set an appropriate pace for learning. Guglielmino & Guglielmino (1988) also sees a significant link between self-directed learning and the kind of behaviors that characterize good problem solvers: questioning assumptions, setting objectives, thinking holistically and assessing alternatives on merit.

‡ Self-directed learning in nursing has been proposed as an option to provide flexible educational strategies to meet learning needs because nursing encompasses too many areas of practice, involves vast number of persons, and engages in practice that is constantly changing. Swendson (1981) noted that educators face the increasing challenge of an expanding body of knowledge, diverse learner populations, limited budgets, and consumer demands for a better nursing care. He/she further noted that self-directed learning might be one teaching strategy that will increase the ability of educators to meet those challenges.

In 1977, “The American Nurses” Association ad Hoc Committee on nontraditional learning developed a definition of self-directed learning. Components of self-directed learning which were identified would facilitate the acceptance of a variety of self-directed approaches to learning for nurses in an industry which required continuing education units (CEU’s) for licensure. The committee defined self-directed learning as “an Activity for which the learner takes the initiative and responsibility for the learning process”.

Depending on the design of this activity, the learner may have a choice or have control over one or more of the following learning variables: (a) assessment of learning needs (b) objectives or learning outcomes (c) environment (d) time (e) pace and sequence (f) appropriate experiences (g) human and non-human resources (h) methods of evaluation and (i) methods of documenting that objectives are met.

Based on the above, self-directed learning models have been implemented in many courses and have been adopted in several education programs. Researches that incorporate self-directed learning techniques within their framework have been conducted to look at the outcome of these new methods. Nixon et al (1996) conducted a comparative study to compare clinical skill acquisition (cognitive and psychomotor) of undergraduate nursing students participating in two different teaching-learning modalities: teacher-directed and self-directed learning. The study included sixty randomly selected second year students enrolled in the acute care subject in an undergraduate nursing course. Thirty students were assigned to the teacher directed (control) group and thirty to the self-directed (treatment group). Both groups were largely similar, except for variations in age, prior nursing experience, past educational experience and cultural background. However, these factors proved to be not significant. The instrument used comprised a four point criterion-referenced scale developed to assess students' cognitive and psychomotor competency when taking the problem solving scenarios.

Results indicated that the teaching-learning method proved to be a major indicator with respect to differences in performance. Students who took part in self-directed learning demonstrated a higher level of competency in

performing both the cognitive and the psychomotor components of nursing skills in comparison to those in the control group. The authors attributed these results to the fact that the andragogical approach enhances students' engagement with content, autonomy and clinical reasoning.

CASE - BASED TEACHING

Case-based teaching is becoming increasingly popular as an important pedagogical tool in many fields of study. Case-based education is well known in business and law schools. Implementation of a case-based learning at the center of undergraduate student education has a wide spread appeal among professional education. There is an increased need for today's nurse to be an autonomous, an independent, and a self-directed professional (Heliker, 1994; Rideout 1994). According to them educational programs should produce graduates who are capable of exploring options, who are articulate and have the capacity for developing appropriate strategies based on reflective decision making.

Nurses must begin to value their lifelong ability to expand their knowledge base (Heliker, 1994). It has also been asserted that the nursing curriculum must be radically changed in order to develop skills that make up "good nursing". Laurence (1999) noted that in many professional domains, mastering essential knowledge is regarded as no more important than, or even subordinate to, acculturation in the values, norms, and attitudes held to be appropriate for practice. Especially in the field of human service, respect for persons, optimism and a general regard for the complexity of causality are among the values and attitudes believed to be indispensable to professional issues.

Bevis and Watson (1989) believe that proficient nursing is comprised of excellence in three components: (a) the technical, which consists of the clinical skills that are necessary in practice; (b) the rational, which describes the thought processes of the nurse and her ability to communicate them effortlessly; and (c) the emotive, which encompasses the interpersonal and intuitive aspects of nursing.

Rideout (1994) argues that changing the nursing curriculum will facilitate the creation of such nurses. Advocating student-centered pedagogical approaches, including CBL and PBL, Rideout (1994) believes that only then can nurses become the autonomous, independent decision-makers now so sought in the nursing profession. That is, students' participation in their own learning develops the required excellence in these skills and qualities.

Many authors asserted that a student centered critical pedagogy becomes an emancipatory experience for its recipients. Students are encouraged to develop autonomy and responsibility as opposed to a surface imitation of the model nurse. Giroux (1988) calls for a post-modernist critical pedagogy that fosters autonomous, political, decision making individuals. Education can be emancipatory; it may be the means of creating a true democracy by empowering all, giving each individual a voice and the capacity to innovate and change. Some authors went further to assert that the use of case based teaching method is a way to promote democratic teaching and learning (McNergney et al, 1999). They believe that case-based teaching and learning help people look to the future with some reasonable sense of optimism and power over their own lives. According to them, democratic teaching and learning lead not only to a collective gaining of knowledge, but to

a perpetual dissemination, exchange, and refinement of knowledge among people, and the case method can be organized and carried out to encourage this kind of practice. McAninch (1993) noted that case methods attempt to bridge the gap between theory and practice in teacher education through democratic teaching and learning activities.

This view of democracy is derived from the educational theory of Dewey. Teaching for democracy is a major element in Dewey's model. It advocates the joining of education to real life. This relationship between learning and involvement help students to become effective citizens or community members. Dewey (1939/1993) asserts that " democracy is a personal way of individual life; that it signifies the possession and the continual use of certain attitudes, forming personal character and determining desire and purpose in all the relations of life"(p.241). He suggests that it can be characterized by a "working faith" in three principals.

The first one is that citizens of a democracy are moral equals. Dewey (1939/1993) wrote: "The democratic faith in human equality is belief that every human being, independent of the quantity or range of his personal endowment, has the right to equal opportunity with every other person for whatever he has and to lead his own life free from coercion and imposition by others," (p. 242).

The second tenet of democracy, according to Dewey, is that human beings are capable of intelligent judgement and action " if proper conditions are furnished" (p.242). He asserts that reflection, the method of intelligence, is central to a democracy where good citizens participate in the reconstruction of values and decide for themselves what to believe. Where inquiry is closed off

or where indoctrination takes place democracy is eroded. Democracy implies social sensitivity, a faith in the intelligence of individuals to thoughtfully foresee the consequences of alternatives for themselves and others.

Finally Dewey (1939/1993) describes the third principal of democratic faith: the ability of individuals to work together on a day-to-day basis to settle conflicts and solve problems. Dewey observes ", Democracy is the belief that even when needs and ends or consequences are different for each individual, the habit of amicable cooperation.....Is itself a priceless addition to life," (p.243). Citizens governed by a democratic attitude do not fear disagreement and conflict, but rather see in conflict the possibility for cooperation and enrichment of experience.

CBL conforms the definition of student centered education where learning goals and the means to achieve them are determined through collaboration and discussion between students and faculty (Bevis and Watson, 1989). Case based learning is a method and philosophy of education that aims to develop analytical and critical thought, cooperative and self-directed learning and the integration of knowledge and skills within the context of practice and self-motivation. Therefore, the structure of a CBL program encourages students to take responsibility for initiation, planning and coordination of learning.

The adoption of case based learning requires change in the traditional roles and responsibilities of students and faculty (Barrows and Tamblyn, 1980). Case-based learning encourages student involvement. Rather than just being recipients of distinct subject lectures, those students who take part in a CBL educational programs are involved in the assessment and

exploration of a series of a theoretical clinical cases and problems with the help of facilitators and diverse expert resources. The teachers' role is no longer to impart knowledge, rather they become facilitators present only to guide and monitor the learning process. Instead of being taught didactically, students are encouraged to become skilled at problem solving by identifying and valuing their own existing knowledge and to correct any knowledge deficits themselves, using formal and informal resources. The outcome is the sorting and synthesis of relevant and contextual information and its assimilation into their knowledge base (Barrows and Tamblyn, 1980)

McAninch (1993) noted that teaching with cases requires that teacher educators plan for instruction and learning in ways that differ from traditional classroom experiences. In traditional instruction, the teacher educator acts as the instructional leader and content expert, selecting a specific body of material for students to learn. The primary pedagogical format is usually lecture, coupled with assessment that relies on objective measures including multiple choice, matching, and sentence completion test items. There is usually only one correct answer to a given question. Students must master much of the information by memorizing and comprehending it, but not necessarily by applying and synthesizing it. Teacher educators often have few clues about student misconceptions or gaps in content and comprehension other than incorrect test answers. The traditional approach to instruction does little to foster students' abilities to reason democratically or to make fair and considered choices.

Case-based teaching, on the other hand, as Sudzina (cited in McNergney et al, 1999) noted is a constructivist approach to instruction. The

teacher acts as a facilitator and mentor, helping the student to examine a wide range of perspectives in an unfamiliar situation. Both the teacher and the student create meaning from the case information. Prior experiences, history, and knowledge affect how students grasp the issues and formulate actions in specific case issue. Although some responses are better than others are, there is typically no one correct answer to a given situation. The appropriateness of the response, the context of the situation, and the personalities of the case participants all play an important part in "what works".

Cusimano (1995) claimed that in case-based participatory teaching several things happen: Students must digest the material, engage it, think for themselves and generate the classroom learning. The faculty member is not "knowledge on tap", instead the faculty member facilitates discussion, poses challenging, open ended questions which invite students to explore and interpret the material for themselves. Cusimano (1995) added that case-method teachers could use a variety of teaching methods to include discussions, group exercises and role-plays and varying the type of discussion questions from descriptive to analytic and prescriptive. This not only allows addressing teaching goals beyond context goals, but also allows reaching different students with varied learning styles. This offers students practice in developing thinking and speaking skills they need in the real world, a useful outcome if teaching goals are for students to encourage analytic and communicative skills as well as mastery of certain context.

The teacher/facilitator's duty in the case method is to accept responsibility for awakening students' interest, stimulating their active

engagement and encouraging their contribution. The students' duty in the case method, is to accept responsibility for their own learning, to prepare for and contribute to discussion, to take chances in expressing and testing ideas and to respect the learning process of other students. The case method gives students the opportunity to make every effort to perform at their highest level of skill and awareness (Laurence & Lynn, 1999, p. 44-45).

Case-based teaching may appear to be more loosely organized and less demanding than traditional instruction. The students are more actively involved in the material than they are in traditional classes, and the teacher facilitates and shapes class discussion as needed, rather than lecturing for the entire class period (Sudzina as cited in McNergney et al, 1999).

Advantages of Case-Based Learning

Cusimano (1995) defined case and participatory teaching techniques as ways to make sure that students do the growing in the classroom. Case-based techniques help students to (a) grow in the social environment of the group; (b) be able to find, create, and critique the knowledge they encounter in the material; (c) be able to express their view, to listen to others and incorporate their contributions and apply what is learned to practical situations. The author further noted that there is evidence that teaching with discussion cases carried advantages in the transfer and learning of context. Students typically remember better and for a longer period of time information, which is proved in psychological testing which tells that people remember information better and for a longer period when that information is encoded on several sensory dimensions. Case teaching allows students to develop and practice crucial skills they need in the real world beyond class room such as:

(a) Critical thinking skills: the abilities to identify, order and “cut through” evidence for themselves; (b) The ability to think on one’s feet; (c) The ability to create alternative interpretations, as well as to ‘see other sides of the argument”; (d) Public speaking skills: especially the capacities to construct logical arguments, and to persuade an audience of various points and, (e) Group dynamic skill: the ability to read and interpret group signals and moods.

By using the case study as a teaching-learning strategy, students are able to exercise all the domains of learning. The domains of learning have been categorized cognitive, affective and psychomotor (Bloom, 1984). The cognitive domain includes behaviors that can be attributed to knowledge, comprehension, application, analysis, synthesis and evaluation. Knowledge represents the lowest and evaluation is the highest level in the hierarchy. Categories in the affective domain include receiving, responding, valuing, organization and characterization by a value or value complex. Receiving represents the lowest category and the internalization represents the highest. Attitudes, opinions, beliefs, emotions, feelings and appreciation are constructs found in the affective domain. The psychomotor domain concerns motor skills, which may include cognitive, affective elements. But coordinated gross or fine movement is the dominant aspect of this domain.

Nurse educators need to realize that there are many advantages to employing case-based approach to ethics teaching. Korenman and Shipp (1994), in an AAMC handbook for instructors teaching the responsible conduct of research through case-study method, outline the following advantages. Discussing cases permits participants to: (a) become sensitized to their personal values systems; (b) express opinions based upon those

values, and to compare their values with those of others; and (c) test ethics policies and guidelines, which have been developed for validity and comprehensiveness. Furthermore, case discussions serve as reference points for individuals when they experience an analogous problem in their work as well as allow (a) trainees, faculty and staff to enter into discussion using a common frame of reference, (b) cases dealing with a given issue to be presented from a variety of points of view; and (c) individual problems to be analyzed without the prior need to absorb a vast field of knowledge, particularly when participants are alerted to appropriate resources than can enlighten them on technical and other unfamiliar considerations.

Many of the studies used in this literature review referred to studies conducted in the field of education to the measure the outcomes of using problem-based learning approach. Case-based learning is designed to achieve goals similar to PBL. In both, CBL and PBL, students are to attain an essential body of knowledge that is nested in the ability to use that knowledge effectively (Barrows and Tamblyn, 1980). At the same time students are to become self-directed learners who have the desire and ability to learn independently throughout their careers. CBL and PBL are patient centered (students learn that the person is primary, not the disease). The student is encouraged to view the patient as a whole, not just a collection of symptoms, and student centered (faculty serve to guide discussion and encourage independent training).

In conclusion, the case-base method seem suitable for teaching nursing students for many other reasons than those cited previously. Students pursuing nursing as a profession are required to think critically and

solve numerous problems. Their instrument for critical thinking and problem solving is the nursing process which requires use of the sequence of assessment, analysis, planning implementation and evaluation in the administration of quality care to clients in a variety of health care settings. More specifically, the nurse gathers information from a variety of sources about the client, identifies needs, formulates nursing diagnoses, sets priorities develops a plan of care based upon this information and implements or carry out the plan of care and then evaluate what has been done. The opportunities that are afforded by the presentation of the case-based method demonstrates that it is an excellent teaching strategy that can assist the students to practice decision making, problem solving and to develop human interaction abilities.

Summary of Literature Review

This literature review examined research concerned with determining learning styles among nursing students. Learning style was assessed using a variety of instruments. Kolb's Learning Style Inventory was used most frequently to assess learning style of nursing students. Nursing students were scattered among all four learning style categories, a finding which somewhat undermines Kolb's contention who postulates that individuals with certain learning style gravitate toward certain careers. Little agreement occurred as to whether divergers, accommodators, or assimilators were the most common learning styles of nursing students. Convergers among nursing students were rare. Also little agreement occurred to which type of learning styles performed better depending on the field of study, means of assessment, and others.

The review of literature also included investigations relative to the relationship between learning style, teaching method, and academic

achievement. Most of the studies showed that the most important information that learning style research provide is that individuals differ in their approach to learning and that no single teaching strategy will produce optimum learning for all students. Most of the innovations in teaching students produced an increase in learning. Generally, students were more motivated and expressed satisfaction with various teaching methods.

Self-directed learning stated is an empowering term for the learner rather than the teacher being in charge for or most of the learning process. Self-directed learning occur any time an individual takes the responsibility for his or her own learning. This can include every thing from identifying the learning need, to locating the appropriate resources, to self-evaluating one's progress. It is a process that prepares students to acquire the skill of learning how to learn that is important for life long learning. However, it is revealed in the literature that self-direction seems to be an outcome of the cumulative effects of learning over a period, resulting from progressive development of student responsibility for learning and gradual reduction of the direction provided by faculty.

The use of andragogical approaches such as PBL and CBL which incorporate self-directed techniques within their frameworks encourage students to acquire the skill of learning how to learn, which is critical in health education so that they are prepared for the future and a world that is constantly changing.

The implications which can be inferred from this review of literature are that: it is possible to determine how individuals learn, that a variety of methods and resources should be available for acquiring knowledge in an educational

setting; and that the teacher as a facilitator must make learning attractive by using innovative novel methods so as to motivate students to take initiative for their own learning. It is desirable to embrace the concept of "life long learning" through the recognition of diversity and creating an atmosphere, which support the goals of the individual student.

Literature is rich in studies that address individual differences in terms of learning style, in research that proved that the interaction between learning style and instructional design leads to gains in achievement. Literature was also conducted to look at learning style and academic achievement in traditional and progressive methods of teaching. But little attempts have been made to acquire a better understanding of individuals' self-directed learning preferences and problem solving orientations. This research looks further to determine the relationship between learning style and stage of self-direction and compare it with the level of academic performance in courses taught by the case-based method.

THEORETICAL FRAMEWORK

This study was guided by two theoretical orientations to learning. Kolb's (1984) learning styles model was used to guide questions related to orientation to learning as an "individual attribute". The learning styles theoretical framework for this study is based on the cognitive view. The cognitive view of learning encompasses the main idea that learning deals with the internal structuring and processing of information. Cognitive theorists believe that learning is an internal process, not necessarily observable, in which information is integrated and internalized into one's cognitive intellectual structure.

Secondly, Grow's model on the stages of learning was used to frame questions related to learning as "development". Grow's model was chosen because of its acknowledgment of the ability of learners to move from total dependency on teachers, to becoming self-directed learners, given a teaching approach conducive to such development.

Kolb's (1984) Experiential Learning Theory

Kolb's theory of experiential learning (Kolb, 1984) draws its intellectual sustenance from various theorists who influenced progressive educational thinking. Linking elements from the work of Dewey, Lewin, Piaget and Vygotsky, Kolb formulated a complex theory of learning that rested on the critical force of experience and assumed, as did Vygotsky, that "learning from experience is the process whereby human development occurs" (p. xi). His goal was to make meaningful connections between theory and practice by focusing research on understanding how the influence of social experience,

especially that of social interaction and social norms, affect cognitive processes. The thrust of Kolb's argument is that learning should be seen as an adaptive state, transactional process that both influences and is influenced by the learner. Drawing from Lewin's work on the power of subjective experience, Kolb concluded "feelings as well as thoughts are facts in a learning process." His research showed that learning tasks such as structured exercises, simulations, cases, games, and observations had proven to be powerful learning tools because they created "personal experiences for learners that serve to initiate their own process of inquiry and understanding"(Kolb, 1984, p.11).

Kolb also pulled from the work of Piaget, focusing on Piaget's explication of how intelligence "grows" out of interactions between individuals and their environment. However, whereas Piaget saw the individual progressing from phenomenalism and egocentrism to a higher state that involves constructivism and reflection, Kolb postulated that all four states are equipotent poles of two dimensions or "modes of knowing." These modes are involved in learning through out life span and thus, are continually involved in a dialectic that produces learning. According to Kolb, learning always involves a cycle that begins with concrete experience, and moves through abstract conceptualization and experimentation to assimilation. This end point was conceived by Kolb to be a form of ownership similar to the state of mastery Vygotsky envisioned when he outlined how individuals moves from a zone of proximal development to a state of competency.

Kolb's (1984) experiential learning focus is on how individuals perceive and process information. Perceptions and information processing influence

learning style that is indicative of one's learning preference and can vary from situation to situation. Emphasis is on the role of experience in learning. Figure 1 depicts the four types of learning styles as conceptualized by Kolb within his experiential learning cycle.

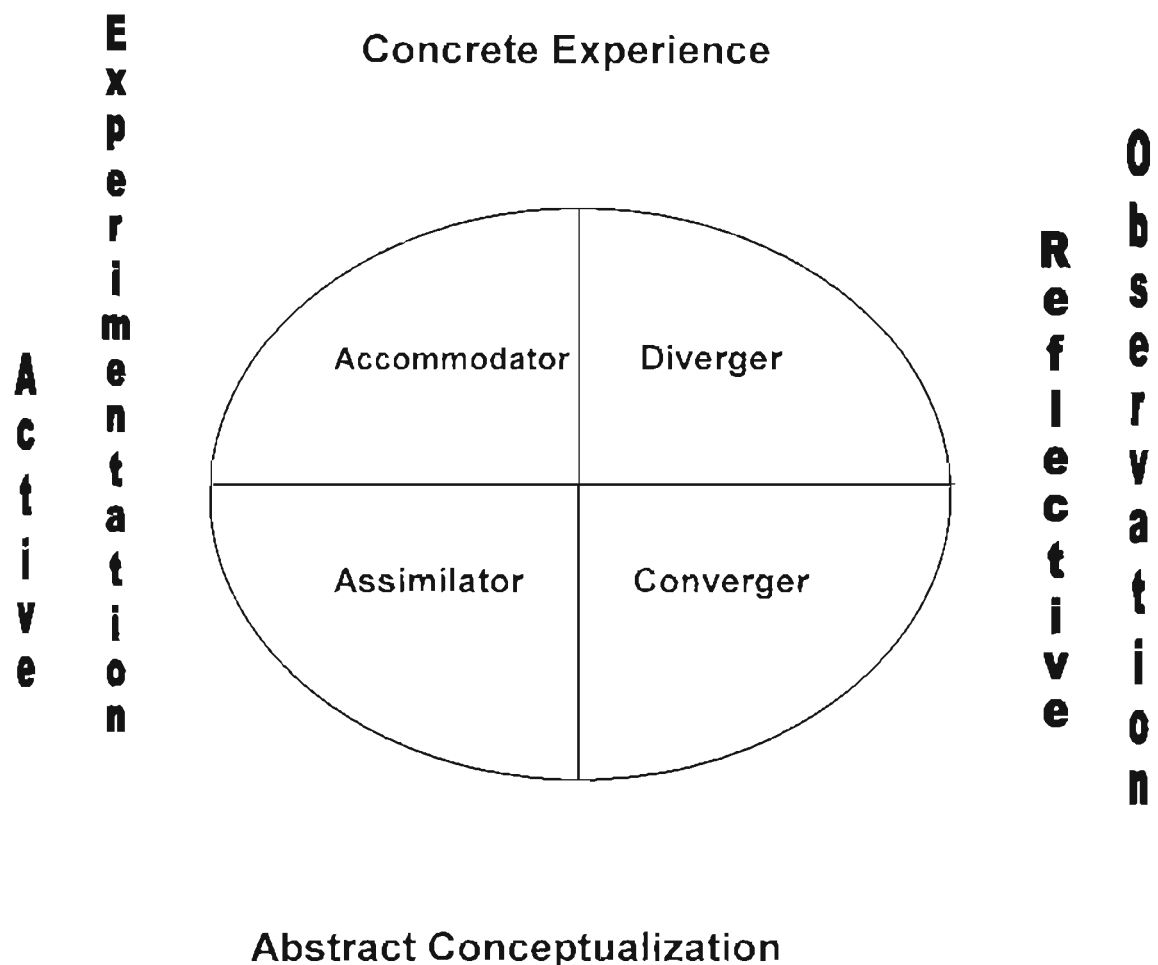


Figure 1: Kolb's Types of Learning Styles

The process of experiential learning involves a four-stage cycle (Kolb, 1984). In the first stage of the learning cycle, a person relies on his or her concrete experience (CE) abilities. CE abilities emphasize personal involvement with individual in "everyday" situations. Learning occurs from

feeling in this stage (CE) of the cycle. Learning by watching and listening occurs in the second stage, reflective observation (RO). In the RO stage, the learner relies on patience, objectivity and careful judgment before taking action. The third stage of the cycle, abstract conceptualization (AC) involves using logical analysis of ideas, and systematic planning to understand problems or situations. In the AC stage, the learner learns by thinking. In the final stage of the learning cycle, active experimentation (AE), learning takes an active form, and the learner learns by doing.

These four sets of learning abilities are referred to as learning modes (Kolb 1984). To be an effective learner, an individual is able to apply 'skills' from each of the learning modes in whatever combination the learning situation requires. Frequently, the learner will have to continue through the cycle several times in order to achieve a high degree of success in the learning situation. Individuals vary in their reliance on a particular mode of learning, and this results in a certain style of learning. Kolb (1984) described four basic learning styles; convergent, divergent, assimilative and accommodative. These styles are explained later.

Kolb (1984) stated there are five forces that shape an individual's learning style: (a) personality type, (b) educational specialization, (c) professional career choice, (d) current job role and (e) the current task and/or problem. Individuals grow and develop in four main dimensions: effectively, symbolically, behaviorally and perceptually. Kolb (1984) found that individuals with different learning styles will prefer different types of learning environment, and each learning environment requires the learner to use specific skills from the four learning modes. Learning environments are labeled, affective,

perceptual, symbolic and behavioral. In an effectively complex learning environment, the student experiences what it is actually like to be a professional in the field under study. The teacher in this environment acts as a role model, and provides the student with individualized feedback.

The goals of a perceptually complex learning environment are to understand something, to be able to identify relationships between concepts, to define problems for investigation, to collect relevant information, and to be able to research a question. Performance is not measured against specific criteria, and the learner is free to explore others' ideas and opinions in order to develop their own perspective. The teacher is non-evaluative, and serves as a process facilitator (Kolb 1984).

Kolb (1984) stated that learning environments that are dissimilar to an individual's preferred style of learning may be rejected and/or resisted by that person. People who score high CE as a mode of learning usually prefer an affective environment, while perceptually related learning environments are helpful for learners scoring highest in the RO mode of learning. Learners who score highest in the AC mode learning usually prefer a symbolically orientated environment and those scoring highest on the AE mode of learning usually prefer a behaviorally orientated learning environment. The task of the educator is to individualize instruction and/or modify his or her teaching style to accommodate the differences in learning style preference.

Kolb (1984) acknowledges that to learn one has to move from involved actor to outside observer and then from abstract thinker (or detached analyst) to newly involved participant. Therefore Kolb suggests that there are "polar opposites" involved in the process. He defines these opposites as concrete

experience and abstract conceptualization, and active experimentation and reflecting observation. By combining the two opposite dimensions, four quadrants of learning behavior or four types of learners are determined:

1. **The Converger** (abstract conceptualization- active experimentation):

the learner's biggest strength is the practical application of ideas, solving problems and finding practical solutions and uses for learning.

Hypothetico-deductive reasoning is the main reasoning mode for this learner (Kolb, 1984, p.77). According to Kolb research has shown that convergers are less people oriented but are good at applying theory to practical situations- a learning environment provided by case-based teaching and learning. Case-based teaching and learning simulates the real world of nursing practice in that it contextualises health problems. Furthermore, the significance of independent learning in a case-based curriculum places these types of learners at an advantage in such a program, although they may not be impressed by the amount of collaborative learning required.

2. **The Diverger** (concrete experience–reflective observation): these

learners have imaginative abilities that enable them to view concrete situations from many different angles. Learners like to look at things from many points of view. They would rather watch than take action. They like to gather information and create many categories for things. This kind of learner is described as being people-oriented and is often found in human service professions (Kolb, 1984, p. 77-78).

3. **The Assimilator** (reflective observation – abstract conceptualization):

learners are good at inductive reasoning, assimilating different

observations into a rational explanation. They are concise and logical. Abstract ideas and concepts are more important than people issues. For this reason, the need to work with others presented by a case-based learning environment might be less conducive to learning for learners with assimilative learning style who would rather sit quietly and contemplate issues rather than discuss them. Assimilators are said to be good in situations which require independent work and theory generation (Kolb, 1984, p.78).

4. **The Accommodator** (concrete experience-active experimentation): learner's strength lies in doing things, carrying out plans, taking risks, experimenting. Learners rely on other peoples analysis rather than their own. They enjoy applying learning in real life situations. "Tends to solve problems in an intuitive trial and error manner, relying heavily on other people for information rather than one's own analytical skills" (Kolb, 1984, p. 78).

The starting point is "concrete experience". This forms the basis for people to observe and reflect on their practical experience of doing things. Such observations and reflections enable people to form abstract concepts and generalizations (or theories). These in turn allow or even prompt the testing of newly developed "theory" in practice. This leads to new concrete experience that starts the cycle all over again. Kolb (1984) argues that learning expands as this cycle is completed and repeated, over and over. Ideally to be effective, a learner needs four types of ability. These are the ability to: (a) become completely and openly involved, without bias, a new concrete experience, (b) use different perspectives to observe and reflect on

those experiences, (c) integrate those observations to create abstract concepts that form logical theories, and (d) apply those theories in decision - making and problem solving situations.

Rationale for Kolb's Model to the Present Study

Laschinger (1984) noted that the assumptions underlying experiential learning theory are congruent with those of nursing and nursing education. He /she further asserted that Kolb emphasizes the holistic view and the importance of the individual. The nursing profession values holistic individualized nursing care. Nurse educators reinforce these principles in teaching learning situations with their students. The importance of experience in the learning process is emphasized in experiential learning theory. A major component of nursing education has always been the clinical experience in clinical settings in which students derive knowledge about nursing. In view of the congruence between experiential learning theory and the nature of the nursing education, it is useful to examine the learning styles of nursing students in the Institute within this theoretical framework. Besides, being an important aspect of case- based education; the level of self-direction of the students is assessed and compared with the level of achievement.

The implication of this model to the learning process stress that all aspects of learning styles are essential for optional learning. No one mode or style can be seen as good or bad. For instance, to operate in the abstract can appear to remove one self from the real world, but to engage in concrete experience alone may mean to repeat same successes or mistakes without learning

Grow's Stages of Self-directed Learning (SSDL)

The fundamental movement implicit in Grow's Staged Self-Directed model is the movement from dependent to self-directed learning. Teaching is matched to learners with the explicit purpose of helping them attain the knowledge, skills, motivation, and goal of becoming more autonomous in learning and in life. As students gain the skills needed for self-direction, the teacher's role change from a directive role to one of facilitating and motivating. According to Grow (1991), teachers can help or hinder the progression of students through the stages of increased self-direction. He noted that good teaching matches the learner's stage of self-direction and helps the learner advance. Specific methods are proposed for teaching students at each stage although different teaching styles are good when appropriately applied. Problems occur when dependent learners are mismatched with nondirective teachers or when self-directed learners are mismatched with highly directive teachers.

However, Grow (1991) added that there is no one way to teach well. He suggested that what is "good teaching" for one student in one stage of development may not be "good teaching" for another student or even for the same student at a different stage of development. Good teaching according to Grow does two things. It matches the student's stage of self-direction and it empowers the student to progress toward greater self-direction. Good teaching is situational, yet it promotes the long-term development of the student. Hence, the Staged Self-Directed learning provides a way to honor the strengths of a broad range of teaching styles, and suggest how teachers can

actively equip students to become more self-directed in their learning taking into consideration the major concepts around which Grow organized his understanding of teaching: (a) different students have different abilities to be self-directed, (b) teachers must adapt their methods in response, (c) self-direction can be taught.

Stage 1: learners of low self-direction. Learners are dependent and need an authority figure to give them explicit directions on what to do, how to do it, and when. For these students, learning is teacher centered. They either treat teachers as experts who know what the students need to do, or they passively slide through the educational system, responding mainly to teachers who "make" them learn.

Dependent learners respond best to clearly organized, rigorous approach to the subject, with prescribed clear-cut objectives and straightforward techniques for achieving them. Learners at this stage depend on the teacher to make decisions they themselves will later learn to make.

Teachers use the coaching approach in teaching the dependent learners. The teacher in this stage is an expert and must establish credibility and authority, which are the key in dealing with dependent learners. Usually discipline and direction is provided. Many of the characteristics of stage one teachers oppose the characteristics of student-centered styles of teaching. It is referred to as the transfer theory of teaching where teachers pour knowledge into students that Freire calls the 'banking' approach. (Grow, 1991).

Stage 2: learners of moderate self-direction. Stage 2 learners are 'available'. They are interested or 'interestable'. They respond to motivational

techniques. They are willing to do assignments they can see the purpose of. They are confident but may be largely ignorant of the subject of instruction. Learners at this stage go along if they understand why and the instructor provides direction and help.

To teach at this stage, clear explanations of why the skills are important and how the assignments help attain them. Because part of the function of a Stage 2 teacher is to prepare students to become more self-directing, students are trained in such basic skills as goal setting. Students are helped to begin recognize their different personality types, life-goals and styles of learning. Teaching is still quite directive. In this stage the teacher 'views students or at least student brains, as raw material (metal, wood, or clay) to be shaped, or molded, or turned to a predetermined and often detailed specification (Grow, 1991).

Stage 3: learners of intermediate self-direction. At this stage, learners have skill and knowledge, and they see themselves as participants in their own education. As part of the process of weaning from other-direction, students in Stage 3 may examine themselves, their culture, and their milieu in order to understand how to separate what they feel from what they should feel, what they value from what they should value, what they want from what they should want. They may learn to identify and value their own experiences in life. They may learn to value the personal experiences of others.

Successful Stage 3 learners develop critical thinking, individual initiative, and a sense of themselves as co-creators of the culture that shapes them. They see themselves as future equals of the teacher, as professionals or worthwhile adults.

The teacher comes closest at this stage to being a participant in the learning experience. Teacher and students share in decision making, with students taking an increased role. The instructor concentrates on facilitation and communication and supports students in using the skills they have. As students mature toward greater self-direction, the Stage 3 teacher will help them structure the transition towards independence. The 'facilitator' might begin by negotiating interim goals and interim evaluation, then give learners more rope. The teacher's goal is to continue making certain that students both learn the necessary subject matter and learn how to learn (Grow, 1991).

Stage 4: learners of high self-direction. Self-directed learners set their own goals and standards, with or without help from experts. They use experts, institutions, and other resources to pursue these goals. Learners at this stage are both able and willing to take responsibility for their learning, direction and productivity. They exercise skills in time management, project management, goal setting, self-evaluation, peer critique, information gathering and use of educational resources. Stage 4 learners do not completely do away with teachers. They can learn from any kind of teacher, but most of them thrive in an atmosphere of autonomy.

The Stage 4 teacher's role is to delegate, to inspire and mentor, challenge and provoke, and direct and evaluate. The teacher's role is not to teach subject matter but to cultivate the students' ability to learn. The ultimate subject of Stage 4 is the learner's own personal empowerment as a mature creator and evaluator of knowledge, or as a high-level practitioner of a skill. But, the ultimate task of a Stage 4 teacher is to become unnecessary (Grow, 1991).

Rationale for Grow's Model to the Present Study

The literature on self-directed learning suggest that “learning on your own” requires a complex collection of self skills and learning skills which not all learners spontaneously acquire. Though adult educators recognize that adult learners are not necessarily self-directed learners, it is widely assumed that adults will become self-directed after a few sessions.

Grow's model is chosen because it provides explicitly pedagogical methods for helping students move from dependency to self-direction. The Staged Self-Directed learning model describes the concept of "good teaching" which advocates the concept of individual differences and suggests teaching styles for each one. The Staged Self-Directed Learning model provides a way to honor a wide range of differences and suggest a broad range of teaching styles. Grow's model advocates the idea of a multi-mode teaching, where any teacher can teach in more than one style according to the stage in which the learner is in. Such convergence underscores the difficulty in drawing clear lines between self-direction, other direction, and teaching style. Such a model is flexible to cater for differences that exist among individuals, which is a main aim for this research. The table below explains this process of matching teaching to the stage of self-direction and the different teaching styles used.

S 4 : Self-directed Learner	Independent projects. Student-directed discussions Discovery learning, instructor as an expert, consultant and monitor			
S3: Involved Learner	<u>Application of material</u> Facilitated discussion Teams working closely with instructor on real problems. Critical thinking. Learning strategies.			
S2 : Interested Learner	<u>Intermediate material</u> Lecture discussion. Applying the basics in a stimulating way. Instructor as motivator			
S1 : Dependent learner	Introductory material Lecture Drill. Immediate correction			
	T1: Authority Expert	T2 : Salesperson Motivator	T3: Facilitator	T4: Delegator

Figure 2: Matching teaching style to the stage of self-direction in learning

CHAPTER 3

Methodology

Introduction

The third chapter presents a description of the methods and procedures used in conducting this study. The study design and a description of the instruments used to collect the data, as well as statistical treatment is also included.

Study Design

The design of this study was a descriptive correlational survey involving nursing students enrolled in a three-year diploma nursing program in the U.A.E. The aim was to measure the “relationship” between learning styles, stages of self-direction in learning and academic performance.

Selection of Participants

One hundred and eighty six diploma nursing students enrolled at the Institute of Nursing, Abu Dhabi, were invited to participate in the study. Of these 186 students who participated in the study 78 were in the first year (DI), 59 in the second year (DII) and 49 were in the third year (DIII). This constituted the whole population of the Abu Dhabi campus. The students were full time students, all females and ranged from 18 to 25 years of age. Females constituted the representative sample, as males were not allowed to enroll in this diploma program. Arabic was their primary language and English was secondary. English is the language of instruction at the Institute. For all the three classes (DI, DII, DIII) nursing courses were taught by the case-based method. These courses were (a) preventive and promotive nursing I, (b)

nursing care of adults I, and maternal child health nursing I and, (c) nursing care of adults II for DI, DII, and DIII respectively.

Instruments

Kolb's Learning Style Inventory (LSI2) was used for this study. The LSI consists of 12 simple sentence completion items, which require the respondents to rank order, their preferences. Kolb's LSI classifies an individual's learning style according to four different kinds of abilities. The inventory measures an individual's relative emphasis on four learning modes or scales: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). In addition, two composite scores indicate the extent of emphasizing abstractness over concreteness (AC-CE) and action over reflection (AE-RO). The composite scores create a learning style type: the diverger who emphasizes CE and RO; the assimilator, who emphasizes RO and AC; the converger, who emphasizes AC and AE; and the accommodator, who emphasizes AE and CE. The LSI is a commercial instrument and therefore, cannot be included as an appendix in this report in its entirety. Nevertheless, a sample of a few items from the LSI appears in Appendix 1.

To measure the stage of self-direction in learning, a tool based on Grow's stages of self-direction was designed by the researcher. The tool took into consideration basic characteristics that distinguish the meaning of the term 'self-directed learning' such as autonomy, motivation, initiative, independence, persistence in learning, assuming responsibility for learning, having a high degree of curiosity and a strong desire to learn, and capacity for

self-discipline, setting goals, making plans, organizing time and setting appropriate pace for learning.

The self-directed learning tool is a 16 item four-point Likert scale listing a number of self-directed learning skills. The students were required to rate themselves in terms of the degree to which they believed the statement in the scale described their approach to learning. It is worthwhile mentioning here that the stages, as developed by the researcher, were compared to Grow's stages as follows: none, for those who were not self-directed and the range of scores is less than 16; low, for low self-directed with a range of scores between 17 and 32; moderate, for moderate self-directed with a range of scores between 33 and 48; and high for intermediate self-directed with a range of scores between 49 and 64.

Both instruments were translated into Arabic to cater for linguistic differences and to ensure that the concepts were well understood. Academic performance was measured using students' final grades for the courses taught by the case method. Refer to Appendix 2.

Validity and Reliability of the Instruments

The content validity of the translated tools was verified by review by three persons in the field of education and teacher agreement in terms of the translated LSI and the concepts that characterize self-direction in learning. Reliability of the instruments was confirmed by using the test-retest method. The instruments were given to 20% of DI, DII, and DIII students from the Sharjah Campus, to avoid over-researching of the students at the Abu Dhabi campus. The correlation coefficients were 0.84 for LSI and 0.74 for self-directed learning.

Data Collection

The researcher personally met with Diploma I and II separately to discuss the purpose and the mechanism of conducting the study. The head tutor of Diploma III helped the researcher in collecting the data from DIII students as the schedule of the researcher was in conflict with that of Diploma III. The researcher also discussed the mechanism for conducting the study with each class head tutor so as to have minimum disruption of classroom instruction.

Students were allowed as much time as they needed to complete the questionnaires. The average time for each instrument was 35minutes. Students were advised that there was no wrong or right answers, and were directed to think carefully about their answers and to report what they really believed. The two instruments, Kolb's LSI and the self-directed learning questionnaire, were administered on separate days in order not to overwhelm the students.

Ethical Consideration

It was explained that participation was voluntary, and an informed consent was attached to the questionnaire that explained the procedure.

Caution was also taken to protect the participants from emotional and spiritual risks. The study took every precaution to protect the privacy of the students. The names were not used directly on any material or in the reporting of the results. Reports were discussed in the findings as they relate to all participants in a general way. Refer to Appendix 3.

Limitations

1. One semester of academic work is clearly not an adequate indicator of success and failure at the Institutes. To truly analyze the relationship

between learning styles, learning stages and academic achievement in any kind of program it would be necessary to follow the students through their first, second and third year.

2. The number of students selected for this study was small. Any generalization would require an extensive subject sample. This study was limited in the conclusions that it could draw by the small size of the available study population. Nevertheless, the whole population of the students at the Abu Dhabi Institute of Nursing participated in the study.
3. The LSI is a commercial tool, which was originally designed and used for American students who differ from UAE students (in terms of context).
4. No control over other variables such as family and personal stresses are taken into consideration that may influence achievement. Learning style as the only considered students' characteristics and one time achievement variable. Other variables have to be considered which can play a major role in achievement.
5. Instrument validity and reliability. The researcher designed the self-directed learning tool; thus its "true" validity and reliability still need to be established.
6. Type of nursing education program. A single nursing program was used for the study; thus the results are not generalizable to students following other nursing programs.

Analysis of Data

The SPSS software program was used to analyze data. The data was analyzed using descriptive measures of central tendency including means and

standard deviations to determine the range and differences between the scores. The Pearson Product Moment Correlation provided information on the relationship among learning style, learning stage, and academic performance. ANOVA and LSD tests were computed to determine variations in academic performance between groups by learning style. Chi Square and T-tests were employed to determine variations in academic performance between groups by learning stage.

CHAPTER 4

Results

Introduction

The purposes of the study were to (a) identify the learning styles and stage of self-direction in a group of students enrolled in the Institutes of Nursing, Abu Dhabi, (b) to examine the relationship of learning style and academic performance and (c) the relationship between stage of self-direction and academic performance in subjects taught by the case-based learning method.

Descriptive data is presented on the learning style of the participants as depicted by Kolb's Learning Style Inventory as well as the stage of self-direction in learning as depicted by Grow's concept of stages of learning. Next, the mean academic performance scores obtained from the courses taught using case-based method are presented by each level of study, as well as for the overall sample.

The Pearson Product Moment correlation, analysis of variance (ANOVA) and LSD tests were performed to answer the research questions raised concerning the relationship between learning style and academic performance. Chi-square and T-tests were employed to determine variations in academic performance based on the stage of self-direction in learning. A probability of 0.05 was used to declare statistical significance.

Distribution of Learning Styles among the Participants

Table 1 depicts data on the participants' learning styles for all the three levels of study (DI, DII, and DIII). Even though all learning styles were represented in the sample, the predominant learning style was assimilator (n=66, 35.5%) followed by convergers (n=55, 29.6%) then accommodators and divergers being equally distributed (n=32, 17.2% and n=34, 17.7%) respectively. DI had the highest percentage of assimilators (46.2%) followed by DII (35%) and DIII (18.4%).

Table 1: Participant's distribution among Learning Styles

Diploma	Ass.	%	Acc.	%	Conv.	%	Div.	%	Total	%
DI	36	46.2	10	12.8	13	16.7	19	24.4	78	100
DII	21	35.6	11	18.6	20	33.9	7	11.9	59	100
DIII	9	18.4	11	22.4	22	44.9	7	14.3	49	100
Total	66	35.5	32	17.2	55	29.6	33	17.7	186	100

Distribution of Stages of Self-Direction among the Participants

The highest percentage of students were in the moderate stage of self-direction (n=125) and represented 67.2% of the total sample. The second highest percentage was that of high self-direction (n=38, 20.4%). The other two stages of self-direction were minimally represented in the sample being 0.5% for non self-direction and 11.8% for low self-direction.

Those students who were rated as moderate self-directed represented 64% of DI (n=50) and nearly the total sample from DII 91.5% (n=54)) while DIII had 42.9% (n=21). Those students who were rated as high self-directed learners represented more than half the sample from the DIII class (57%)

while DII and DI had approximately the same percentage, 8.5% and 6.4% respectively.

Table 2: Participants' distribution among Stages of Self-Direction.

Diploma	No SDL	%	Lo SDL	%	Mo SDL	%	Hi SDL	%	Total	%
One	1	1.3	22	28.2	50	64.1	5	6.4	78	100
Two	-	-	-	-	54	91.5	5	8.5	59	100
Three	-	-	-	-	21	42.9	28	57.1	49	100
Total	1	5.3	22	11.8	125	67.2	38	20.5	186	100

Academic Performance

Mean academic scores for courses taught by the case- method revealed that DIII had the highest mean scores (68.52) compared to DII (65.04) and DI (62.20). However, the three levels' mean scores suggest that students performed very well. The mean academic scores are presented in table 3.

Table 3: Mean Academic Scores for Courses Taught by Case Method

Diploma	N	Minimum	Maximum	Mean	Std. Deviation
One	78	20.60	91.50	62.20	15.97
Two	59	41.50	89.40	65.04	12.00
Three	49	49.00	92.10	68.52	8.64
Total	186	20.60	92.10	64.76	13.31

Academic Performance and Learning Style by Level of Study

The mean performance scores of the participants by learning style and grade average are presented in Table 5. The mean scores of convergers and divergers were consistently higher than the mean scores of assimilators and

accommodators across the three levels of study (DI, DII and DIII). Besides, the range of scores differed between the four types of learning styles across the three levels.

The minimum academic performance scores for convergers and divergers were higher compared to assimilators and accommodators for DII and DIII with the minimum scores achieved being higher in DIII than DII and DI. The convergers and divergers also had the maximum scores above 85 compared to assimilators and accommodators where the maximum grade obtained was in the range of 70-73.

Table 4: Mean Performance Scores of Learning Style and Level of Study

Learning Style	DI				DII				DIII			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Ass.	59.56	17.97	22	86	58.97	8.83	43	72	66.07	4.74	61	73
Acc.	66.26	16.16	37	83	55.90	9.96	43	72	59.46	7.79	49	70
Conv.	61.50	14.39	36	86	72.67	9.01	55	89	72.30	7.56	60	87
Div.	65.53	12.63	40	88	75.80	9.99	61	89	74.02	4.42	66	79

Analysis of these data by using the Pearson Product-Moment Correlation showed that for all three groups of students that participated in this study, a positive correlation between learning style and academic performance was found. Pearson product-moment ratios were, however, low for the DI group ($r = .12$) and moderately high for the DII and DIII groups ($r = .58$ and $.46$) respectively. Except for the DI group the correlation between LS and academic performance was significant. The correlation between LS and academic performance for the total population of participants was also low ($r = .32$) although significant ($p = .000$). The data appears in Table 5.

Table 5: Correlation between LS and Academic Performance

Level of Study	Correlation Between Academic Performance And Learning Style	
	Correlation (r)	Level of Significance (P)
DI (n=78)	.12	.31
DII (n=59)	.58	.000
DIII (n=49)	.46	.001
Overall Group (N=186)	.32	.000

*p< .05

The ANOVA was computed to test for differences in academic performance by LS for each level of study. As for the correlation results, no significant differences were found between groups for the DI students ($df = 3$, $F = .820$, $p = .49$). Significant differences in academic performance by LS were found, however, for both the DII ($df = 3$, $F=14.3$, $p= .000$) and DIII ($df =3$, $F=10.6$, $p= .000$) groups.

Academic performance and Learning Style for the Overall Group

The ANOVA was computed to test for differences in academic performance by LS for the whole group. The test revealed significant results ($p= .000$).

Table 6: ANOVA on Differences in Academic Performance for the Whole Group

Source of variance	Sum Sqrs	df	Mean Sqrs	F	P
Between Groups	4143.508	3	1381.169	8.768	.000
Within Groups	28669.611	182	157.525		
Total	32813.119	185			

*p<.05

The first hypothesis stated that learners with divergent and convergent learning styles would perform better academically compared to those with assimilator and accommodator learning styles. Further analysis of data by

LSD revealed that divergers and convergers performed significantly higher than both assimilators and accommodators. These results support the hypothesis that convergers and divergers would outperform assimilators and accommodators in courses taught by the case-based method. No significant differences in academic performance were found however, between the assimilators and the accommodators, as well as between the divergers and the convergers.

Stage of Self-Direction in Learning

Crosstabulation analysis was performed to examine the relationship between stages of self-direction in learning and level of study. The counts in table 7 show that DIII had the highest percent of students in high stages of self-direction in learning (57.1%) compared to DI (6.4%) DII (8.5%). DII had the highest percent of students in the moderate stages of self-direction in learning (91.5%) compared to DI (64.1%) and DIII (42.9%). Students in none/low stages of self-direction in learning were only found in DI, but not in DII and DIII, and represented 29.5% of DI class. Chi-square results ($df = 4$, $p = .000$) indicate that there is a significant relationship between stage of self-direction in learning and level of study. These results support hypothesis No. 2 that stated that students in DIII would be in higher stages of self-direction in learning compared to DI and DII. The data is presented in table 7.

Table 7: The 3x3 Crosstabulation of SDL and Level of Study

Level of study	NTILES OF SDL			Total
	No/Lo	Mo	Hi	
One	23	50	5	78
Two		54	5	59
Three		21	28	49
Total	23	125	38	186

Academic Performance and Stage of Self-Direction in Learning by Level of Study

A positive correlation between stage of self-direction in learning and academic performance was found. The Pearson Product- Moment correlation was higher for DI ($r = .73$) and relatively low for DII ($r = .23$) and DIII ($r = .27$). Pearson Product- Moment correlation for the total sample was moderately high ($r = .56$, $p = .000$). The data is presented in table 8.

Table 8: Correlation between Stage of Self-Direction in Learning and Academic Performance

Level of Study	Correlation Between Stage of Self-Direction and Academic Performance	
	Correlation ®	Level of Significant (P)
DI (n=78)	.73	.000
DII (n=59)	.23	.035
DIII (n=49)	.27	.070
Overall Group (N=186)	.56	.000

* $p < .05$

The mean performance scores of the participants by stage of self-direction in learning are presented in table 9. The mean scores of those that are in moderate and high stages of self-direction are higher than those in the low stage of self-direction.

Table 9: Mean Performance Scores by Stage of Self-direction in Learning by Level of Study

Variable	DI				DII				DIII			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
NO SDL	29.00	-	29	-	-	-	-	-	-	-	-	-
LO SDL	45.21	9.70	23	56	-	-	-	-	-	-	-	-
MO SDL	68.57	11.53	35	88	64.04	11.8	44	89	65.94	7.35	52	79
HI SDL	79.82	5.57	78	88	75.80	8.52	69	80	68.52	8.64	49	92

To test for differences in academic performance by stage of self-direction in learning, ANOVA test was performed for DI. Significant difference in academic performance were found between groups for DI ($df=2$, $F=45.55$, $p= .000$). It is worthwhile mentioning here that the stages of self-direction in learning were collapsed into three stages as follows: (1) none-low, (2) moderate, and (c) high as the none self-directed learners were minimally represented in the sample ($n=1$).

Table 10: ANOVA of Academic Performance and Stage of Self-Direction

	Sum of Sqrs	df	Mean Sqrs	F	Sig.
Between groups	10778.78	2	5389.39	45.55	.000
Within Groups	8874.51	75	118.33		
Total	19653.29	77			

* $p < .05$

The t-test for independent groups was performed for both DII and DIII to distinguish between groups by stage of self-direction in learning in terms of academic performance as they had only two groups identified, moderate and high self-directed learners. The analysis yielded a t -value of -2.16, $df = 57$ and $p = .035$ for DII and a t -value of -1.86, $df = 47$ and $p = .070$ for DIII. The results proved to be slightly significant for DII and insignificant for DIII as p values were $> .05$. The results are presented in table 11.

Table 11: T-test for DII and DIII Performance by SDL Stage

Diploma	t-value	df	Sig.
DII	2.159-	57	.035
DIII	-1.854	47	.070

* $p < .05$

Academic Performance and Stages of Self-Direction in Learning

for the Overall Group

Mean academic scores of the total population showed that students in high stages of self-direction scored better than those that fall in the lower stages of self-direction. The data is presented in table 12.

Table 12: Mean Academic Scores for the Total Population by Stage of Self-Direction

SDL	N	M	SD
NO-LO	23	44.51	10.07
MO	125	66.18	11.20
HI	38	72.34	9.18
Total	186	64.78	13.31

Again ANOVA was computed to measure differences in academic performance by stage of self-direction in between groups. A significant difference was found between groups ($df=2$, $F=52.03$, $p = .000$).

Table 13: ANOVA of Academic Performance by Stage of Self-Direction for the Total Population

	Sum of Sqrs	df	Mean Sqr.	F	Sig.
Between Groups	11894.78	2	5947.39	52.03	.000
Within Groups	20918.34	183	114.30		
Total	32813.12	185			

* $p < .05$

Further analysis by LSD confirmed that those students in the high stages of self-direction had higher mean scores in the courses taught by the

case-based method than those students in the none/low and moderate stages of self-direction in learning. Furthermore, mean academic scores for the students in moderate stages of self-direction were significantly higher than those of the students in the none/low stages group. Hence, the results support hypothesis No. 3 that stated that students in high stages of self-direction perform better than students in lower stages of self-direction.

Relationship between Learning Style and Stage of Self-direction in Learning

Crosstabulation analysis was performed to examine the relationship between learning styles and stages of self-direction in learning. The counts in table 14 show that there were more divergers and convergers (66%) in the higher stages of self-direction compared to accommodators and assimilators (34%). Whereas in the lower stages of self-direction, there were less convergers and divergers (35%) compared to assimilators and accommodators (65%). Similarly, more assimilators and accommodators were found in moderate stages of self-direction group (56%) compared to convergers and divergers (44%). Chi-square results ($df=6$, $p=.22$) indicate that there is a significant relationship between learning style and stage of self-direction in learning. The results obtained support hypothesis No. 4 that stated that students with divergent and convergent learning styles would demonstrate higher stages of self-direction compared to assimilators and accommodators.

Table 14: The 3x4 Crosstabulation of SDL and LS

SSDL	LS				Total
	ASS.	ACC.	CONV.	DIV.	
NO-LO	12	3	3	5	23
MO	48	22	33	22	125
HI	6	7	19	6	38
Total	66	32	55	33	186

CHAPTER 5

Discussion, Conclusion and Recommendations

Introduction

This study sought to investigate the learning style and the stages of self-direction in learning of students in the Institute of Nursing, Abu Dhabi and to determine whether there was a relationship between the learning style and the stage of self-direction for courses taught by case-based method. The discussion of the results, conclusions and recommendations are presented in this chapter.

Discussion

Distribution of learning styles among the participants. Even though all learning styles were represented in the sample, the highest number of learners had the assimilator style (35.5%) which combines learning modes of Abstract Conceptualization (AC) and Reflective Observation (RO). Students with this learning style are best at understanding a wide range of information and putting it into concise logical form. They are less focused on people and are more interested in abstract ideas and concepts. Generally, people with this learning style find it more important that a theory have logical soundness than practical value (Kolb, 1984). (Refer to table 1)

The finding related to the assimilator style more represented in this study is consistent with the studies conducted by Joyce-Nagata (1996) and Highfield (1988), which identified nursing students to have a predominant assimilative learning style. However, according to the finding of other researchers, nursing students tend to have either an accommodator or diverger learning styles as revealed in the studies done by Hunch (1981),

King (1984) and Hodges (1988). The results of this study are inconsistent with the above results. Accommodators and divergers were the least represented in the sample with a 17% for each. Divergers also represented 17% of the sample combine learning modes of Concrete Experience (CE) and Reflective Observation (RO). Students with this learning style are best at viewing concrete situations from many different points of view. Their approach to situations is to observe which is strength that calls for generating a wide range of ideas as is brainstorming. They have broad cultural interests and like to gather information. Divergers are also people oriented. One would have expected a higher percentage of divergers than assimilators in nursing, especially in a case-based learning program.

The converger was the second predominant style (29.6%) (see table 1). The converger combines learning mode of Abstract conceptualization (AC) and Active Experimentation (AE). People with this learning style are best at finding practical uses for ideas and theories. They have the ability to solve problems and make decisions based on finding solutions to questions or problems.

The highest percentage of assimilators were found to represent approximately half of the students of Diploma I (46.2%) and this number decreased significantly for DII and DIII. This contradicts with findings with the converger style where the number increased from 16.7% in DI to 33.3% in DII and 44.9% for DIII. The percentage of accommodators remained relatively stable across the three levels, and the number of divergers decreased (refer to table 1).

Kolb (1984) explained this notion about styles. He stated that styles are not “fixed traits” but “stable states”. The stability and endurance of these states in individuals comes solely not from fixed genetic qualities or characteristics of human beings, nor does it come from the stable fixed demands of environmental circumstances. Rather, these stable and enduring patterns arise from consistent patterns of transactions between the individual and his or her environment.

Learning styles, therefore, are conceived not as fixed personality traits but as possibility processing structures resulting from unique individual programming of the basis but flexible structure of human learning. These possibility – processing structures are best thought as adaptive stages or orientations that achieve stability through consistent patterns of transactions with the world (Kolb, 1984). It can be inferred from the findings of this study that although nursing seems to attract more assimilators than any other individuals with the other learning styles, exposure to a teaching/learning environment that places emphasis on interactive learning, hypothesis formulation and problem solving is likely to facilitate change from assimilative to convergent and/or accommodator learning styles at least for some (see table 1).

Stage of self-direction in learning. Most students across the three levels rated themselves as being in moderate stages of self- direction, however DIII has higher frequency of students falling in the high self- directed (28) compared to DI (5) and DII (5). Chi-square analysis revealed significant results in the DIII group also. However, each level had students in the different stages of self-direction with DI having 23 students in the none/low

stage of self-direction. DII and DIII did not have students represented in this stage (refer to table 2).

According to Grow (1991), learners with moderate stages of self-direction are categorized as stage 2 Learners. Students in this stage are interested and respond to motivational techniques. They are willing to do assignments. They are confident but may be largely ignorant of the subject of instruction. The Instructor at this stage provides direction and help.

On the other hand, more than 50% of DIII three rated themselves as high-self directed learners, which coincides with stage 3 in Grow's model. Students in this stage have skill and knowledge, and they see themselves as participants in their own education. They are ready to explore a subject with good guide. But still they may need to develop a deeper self-concept, more confidence, more sense of direction, and a greater ability to work with others. The teacher comes closest at this stage to being a participant in the learning experience. The instructor concentrates on facilitation and communication and supports students in using the skills they have. Hence, applying the non-traditional education techniques, case based curriculum supported this self-directness and preference to control learning.

Students' ratings of their ability to regulate their learning differed greatly from dependent for the DI and DII to more self-directed for the DIII group. Hence the hypothesis that states that DIII are expected to be in higher stages of self-direction is supported.

Grow's (1991) stages of self-direction model describes a progression of stages, but this progression of students or a class will rarely be linear, and classes will contain students at different stages of self-direction. It does

seem, however, that for this particular group of students, that CBL approach might have facilitated students' progression toward more independence in learning.

Learning style and academic performance. The results obtained from this study showed that students with the converger and diverger styles scored higher than assimilators and accommodators across the three levels of DI, DII and DIII, though students' performance scores demonstrated that all of them learned significantly irrespective of the learning style. The mean scores of each style by each level of study are shown in table 4.

A number of factors might explain why students with the convergent and divergent styles performed better than those in the other two categories of learning styles did.

Firstly, learners with convergent style are best at using Abstract Conceptualization (AC) and Active Experimentation (AE). They have the ability to find practical application for ideas, concepts, and theories. Their strengths lie in solving problems, testing theories in sensible ways, and questioning every thing. Such learners get motivated by problems and learn by testing theories, questioning and hands on experience. These strengths are important skills for functioning in learning by case-based method. This is explained clearly by the convergers having higher mean scores with the divergers compared to other types. On the other hand, convergers have disadvantages, as they prefer to deal with technical issues rather than people issues. Being in a case-based learning program might actually help them gain the skills necessary for working with others. A major theme in a CBL program

is to make sure that students grow in the social group environment of the classroom, and to make them express their views as well as listen to others.

Secondly, students with the divergent style are best at using Concrete Experience (CE) and Reflective Observations (RO). Students with this type enjoy brainstorming and small group discussion. They like to gather information and have broad interests. They are imaginative, empathetic and like personal involvement. They usually learn by listening, absorbing and discussing (Kolb, 1984). Because case studies present the information to be learned in as much an authentic situation as possible, as well as the fact that a lot of time is spent on discussion in such classrooms, the divergers, therefore, would be in favorable situation in a case-based nursing program. This might explain why the mean scores of divergers, though least represented, are among the highest scores compared to performance in the other learning styles.

Students with assimilator and accommodate styles had lower mean scores. This might be attributable to the fact that according to Kolb (1984) individuals with assimilator and accommodate learning styles possess and lack certain characteristics that put them at risk in a case-based learning program. He maintained that students with the assimilator learning style are best at using reflective observations (RO) and abstract conceptualizations (AC). He further asserted that students with this style have a talent for creating theoretical models, enjoy inductive reasoning and distilling varied observations into logical explanations, however, may be overly cautious about experimenting and miss opportunities for learning. They prefer concepts to

people and seek facts and expert opinions, like expert teachers. Therefore, they learn by thinking through ideas forgetting about practical applications.

All these characteristics put students with assimilative learning style at risk in a case-based curriculum that stresses active involvement in the learning process, and where the teacher acts as a facilitator in the process. Being taught using the case-based method would help students get involved in more interpersonal activities like role-play and discussion techniques that are basic to learning in case-based method. Besides, it helps students to try ideas, skills or concepts, than watching what happens which strengthen their active experimentation and concrete experience skills, both of which are important in nursing.

Compared to assimilators, the accommodators learn primarily from hands on experience. They are likely to be involved in planning and participating in new and challenging experiences. They tend to act on intuition rather than careful analysis. Their major weakness is their inability to engage in reflective observation, which puts them at risk in a case-based learning situation where it is important to collect, analyze and organize information. However, a major asset that accommodators possess is that they are people oriented (Kolb, 1984), which is an advantage in human oriented disciplines such as nursing.

The findings from the above results support the hypothesis proposed that those students with the converger and diverger learning styles will score better in courses taught by the case-based method. This is shown by the results of the correlational testing which revealed significant results and proved that there is correlation between learning style and academic

performance in courses taught by the case-based method (see table 5). In terms of Kolb's (1984) experiential learning theory, students with these learning styles possess characteristics that put them in favor in learning by this teaching method.

Research showed that educators have adopted the learning style to describe the variety of typical differences in individuals. Proponents of the learning style construct argue that interaction between learning style and instructional variables were thought to have a significant influence on student motivation, task engagement, cognitive processing, and achievement (Andrews 1981; Ault 1986; Cook, 1997; Domino 1971; Dunn and Dunn 1993; & Lynch et al 1998). Except for the studies by Decoux (1987/1988) and Joyce-Nagata (1996), research showed that there is an interaction between student's achievement and the teaching style he or she is exposed to. Students taught in a manner consonant with their learning style obtained significantly higher means than students taught in a dissonant manner. As a consequence, theorists claim that an understanding of learning style is essential for designing instruction that addresses the learning needs of each individual.

Although research does indicate that instructional design based on learning style theory can result in student achievement gains (Dunn & Dunn 1993, Nunn 1995), there remains much debate over the effectiveness of matching instruction to preferred learning style. Kolb (1984) noted that if the aim is to make the students self-renewing and self-directed, to focus on integrative development where the person is highly developed in each of the learning modes; active, reflective, abstract, and concrete, students then

should be taught to experience the tension and conflict among these orientations, for it is from these tensions that creativity springs. Perhaps more important than the question whether to seek a match or a mismatch, is whether it is appropriate to redesign instructional strategies according to learning style, especially that, as results revealed from this study and, as Kolb (1984) claimed that learning styles are adaptive states rather than fixed traits. Learning styles develop over time through interaction with a variety of educational settings and will vary in response to environmental conditions.

Consequently, educators should be cautioned against narrow placement decisions and must advocate the use of multiple teaching methods with innovative teaching methods, as the case-based method can furnish.

Learning style research should be advocated to find new ways to deal or work with the differences that exist among individuals. McCarthy (1987) used the 4MAT system, which is a teaching model that translates concepts from learning style into instructional strategies. The model is based on Kolb's (1984) theory of experiential learning and on the findings of brain hemisphericity research. This research supported the power of organizing a variety of instructional strategies around the framework of learning style ideas. 4MAT focused no attention on calculating how much time instruction is matched or mismatched to student styles but rather contended to enlarge teachers' skills by equipping them with multiple methods of instruction that produced gains in achievement.

Stage of self-direction in learning and academic performance. The research hypothesis that students in high stages of self-direction perform better than students in low or moderate stages of self-direction was supported.

Results obtained from correlational testing revealed that there is a significant relationship between stage of self-direction and academic performance (see table 8). Moreover, results also revealed that the mean performance scores of the students in high stages of self-direction were higher than those of the students in low or moderate stages of self-direction in learning these results are presented in table 9.

Thus the results of this study support the argument made by Mocker and Spear (1982) and Brockett and Hiemstra (1991) that noted that the learning environment and how it organizes learning events play a major role in increasing students' self directed beliefs. The case-based method seemed to have furnished this for the nursing students who participated in this study, as scores revealed.

CBL might have helped students to be confident in their thought processes and decision-making, and made them capable of functioning independently. The students' participation in their education with the CBL method must have perpetuated their responsibility and instilled within them a confidence in their ability to learn as they made the transition from DI to DIII.

Therefore, the teaching/learning method might a major indicator with respect to differences in performance. The CBL learning approach might have fostered the development of self-directed learning. It was apparent from the results that students who took more time to participate in and were more exposed to self-directed learning (DIII), demonstrated a higher level of performance compared to those in DI and DII. DIII students might have become better self-directed as a result of being in the case-based curriculum for a longer time and hence became more experienced and more confident

with the tutorial process. Some of the DIII students, however, had not reached the high stage of self-direction in learning. This would mean that some of the students, even at third year, still need guidance throughout their study in CBL courses.

The above analysis does not deny the fact that DI students are mature and are capable of self-direction. A major reason that could have attributed to these results is that DI students are new to the case-based educational program used in nursing courses and, hence, are faced with new experiences in learning strategies. Other reasons that could have attributed to these results might be that DI students are still being taught in traditional or didactic sense in courses such as anatomy and physiology, which would have interfered or diminished the achievement of self-direction. Therefore, students need support and guidance to foster the development of self-directed, lifelong learning. Providing guidance and support at this stage fosters rather than undermines increasing self-direction. These results support the results of the studies done by Mifflin et al (2000), Grow (1991), and Knowles (1975) that claimed that guidance and assistance are necessary to assist students over time to develop capacities and confidence to take greater responsibility to direct their own learning.

Conclusion

This diversity in learning styles and stages of self-direction in learning is an important variable in the educational process. Learning style theories generally assert that different styles are of equal worth; there are no inherently inferior styles. Different learning outcomes, however, demand different approaches to teaching. As noted earlier, learning styles are not fixed traits

and are amenable to change depending on the nature of the teaching/learning process.

It is concluded therefore, that knowledge of students' learning styles and stages is important, if only to help case-based learning teachers identify those learners who might need more help than others in adapting to a learning environment that places emphasis on interaction, self-directed learning, and problem solving. Besides, heterogeneity exposes all students to valuable insights that otherwise would not be realized in a homogeneous environment.

Information supplied by determining learning styles is invaluable in the educational field and a greater service for both teacher and student achievement. Knowing that there are different types of learners, that we don't all learn or think the same, and using this information to move forward and allow each student to improve and gain success, results in a positive learning experience for all involved and provides industry and academia with well balanced individuals who can face challenges head-on, and can work in teams to solve problems that might slow or stop others.

Recommendations

Teaching/ learning in nursing. This research carries a clear message that it is important for teachers to become "... more aware of each student as an individual learner" (Cranston & McCort, 1985). If teachers were more aware of student learning style and stage of self-direction in learning, then it would be possible for them to vary their teaching strategies so as to ensure that all students have a chance to learn in the ways that that are the best for them to learn.

It is recommended that nursing education institutions that place value on active student learning should consider using the case-based method, because this method emphasizes using information rather than simply acquiring information. Students who are actively involved in their learning become better prepared at developing and expressing their own positions about issues and debating. They become more responsible for their learning, student-directed inquiry is perhaps the most important part.

Faculty must be willing to commit to utilizing the concept of learning style and stage of self-direction in learning. Once an educational setting decides to apply these concepts, the following percepts must be accepted: (a) individuals prefer to learn differently, (b) it is possible to determine how individuals prefer to learn, (c) it is the responsibility of institutions and/or individuals who provide learning environments to consider the learning style of the learner, (d) it is the student's responsibility to use provided learning style information to structure his or her learning environment. By knowing the learning styles of students, both the student and the teacher can identify the style and type of learning situations that are best for every one involved.

A student's undergraduate education plays a great role in deciding which style and in what stage of learning that student is. The challenge facing the teacher is to discover these styles and stages of each student, then make sure that a good mix of students of different styles and stages are teamed together to provide the most productive learning environment for all involved.

Although each student's style and stage was kept confidential, just knowing where each student is in relation to learning stage and style gives the student information that is invaluable for that student's academic career.

Knowledge of the strengths and weaknesses of the various learning styles may give students insight into their own conceptual patterns and thus allow them to modify non-productive habits to strengthen beneficial ones.

Curriculum. Learning stage and style research should be adapted to Institute's renewal efforts as an integral part of educational needs assessment. The learning stage and style research should be incorporated into staff development activities that will engage teachers in curriculum planning and development as well as increase their awareness and understanding.

Further research. The limitations of this study, namely small size, inclusion of students from one institution, in one subject, and in one semester of academic work, inability to control other factors without measuring clinical skills, suggest that a replication of the study is needed at a larger scale or in a number of settings in order to validate the findings.

There is a need for further research into learning styles of students to establish whether they are temporally stable. Longitudinal studies of groups of students during their three years degree studies would help to identify how learning styles may change.

Another important need has to be fulfilled as performing studies to uncover the CBL graduates' own perceptions of themselves as nurses and compare them with those of nurses from traditional programs. Or to compare the cognitive and psychomotor skills acquisition by graduate nurses who participated in learning in two different modalities (teacher vs student centered).

REFERENCES

Albanese, M. A., & Mitchell, S. (1993). Problem-based learning: a review of literature on its outcomes and implementation issues. Academic Medicine, 68, 52-81

American Nurses' Association. (1977). Self-directed continuing education in nursing. Kansas City, Mo: Author.

Andrews, D. (1981). Teaching format and student styles: Interactive effects on learning . Research in Higher Education. 14 (2), 161-170.

Ault, K. (1986). Improving college teaching through adapting learning style and theory into practice. Paper presented at the annual meeting of the Mid west regional Conference on English in the two-year College. St. Louis, Missouri. 3-16.

Bastable, S. B. (1997). Nurse as Educator. Boston: Jones and Barlett Publishers.

Barrows, H. S., & Tamblyn, RM. (1980). Problem-based Learning. New York: Springer.

Bevis, E.O., & Watson, J. (1989). Toward a Caring Curriculum: A new pedagogy for Nursing. National league for Nursing, New York.

Bloom, B. S. (1982). Human Characteristics and School Learning. New York: David McKay Company.

Bloom, B. S. (1984). Taxonomy of educational objectives, handbook 1: Cognitive domain. New York: David McKay Co., Inc.

Brockette, R. G. & Hiemstra, R. (1991). Self-direction in adult learning: Perspective on theory, research, and practice. New York: Routledge.

Cook, M. J. (1997). An exploratory study of learning styles as a predictor of college academic adjustment. Unpublished manuscript. Fairfield University, Fairfield, CT. URL:<http://www.ammtypsych.net/cook/ls.html>.

Cranston, C. & McCort, B. (1985). A learner analysis experiment: cognitive style versus learning style in undergraduate nursing education. Journal of Nursing Education. 24, 136-138.

Curry, L. (1990). A critique of the research on learning styles. Educational Leadership, (48), 0-56.

Cusimano, M. K. (1995). Why Do You Do What You Do the Way You Do It? Examining Teaching Methods. The Catholic University of America,

Washington, DC (CSF.colorado.edu/csf-lists/casnet ng/cases-and-effective-teaching. Cusimano).

Dave, R. H. (1976). Foundations of lifelong learning education. New York: Pergamon Press.

Decoux, V. M. (1988). The relationship of academic achievement to the variables of learning style, intellectual development, age, and ACT scores among associate degree nursing students. (Doctoral Dissertations, University of Southern Mississippi, 1987). Dissertation Abstract International, 49, 698A.

Dewey, J. (1939/1993). Creative Democracy: The task before us. In D. Morris & I. Shapiro (Eds), *John Dewey: The political writings* (pp. 240-245). Indianapolis, IN: Hackett. (Original work published 1939).

Domino, S. (1971). Interactive Effects of achievement Orientation and Teaching Style on Academic Achievement. Journal of Educational Psychology, (62), 427-431

Dunn, R. & Dunn, K. (1978). Teaching students through their individual learning styles. Boston: Allyn & Bacon.

Dunn, R., & Dunn, K. (1993). Teaching secondary students through their individual learning styles. Boston: Allyn & Bacon.

Grow, G. (1991) Fostering Self-Directed Learning. Online, www.learnont.on.ca/mod2.html.

Giroux, H. (1988) Teachers as intellectuals: Towards a Critical Pedagogy of learning. New York: Bergin & Garvey.

Guglielmino, L.M., & Guglielmino, P.J. (1988) Self-Directed Learning in Business and Industry: An Information Age Imperative. Athens, GA: Adult Education Department, University of Georgia.

Haislett, J., Hughes, R.B., Atkinson, G., & Williams, C.L. (1993). Success in Baccalaureate Nursing Programs: A Matter of Accommodation? Journal of Nursing Education. 32(2), 64-70.

Heliker, D (1993). Meeting the challenge of the curriculum revolution: problem-based learning in nursing education . Journal of Nursing Education. 33(1), 45-47.

Highfield, M. (1988). Learning style. Nurse Educator. 13 (6), 30-33

Hodges, S. A. (1988). Individual Learning Styles of Student Nurses, Their Teachers and ward Sister. Journal of Advanced Nursing, (13), 341-344.

Huckabay, L. M., Cooper, P.G., & Neal, M. C. (1977, September - October). Effects of specific teaching techniques on cognitive learning, transfer of learning, and affective behavior of nurses in an in - service education setting. Nursing Research. 26 (5), 380- 385.

Huch, M. (1981). Adult students' locus of control, learning styles and satisfaction with the baccalaureate nursing program. Unpublished doctoral dissertations, University of Mississippi.

Joyce-Nagata, B. (1996, February). Students, academic performance in nursing as a function of student and faculty learning style congruency. Journal of Nursing Education. 35 (2), 69-73.

Keefe, J.W. (1987). Theory and Practice. Reston, VA. National Association of Secondary School Principals.

King, J. E. (1984). A comparative study of adult developmental patterns of generic students and RN students in a baccalaureate nursing program and the correlation of impact of the educational experiences on the developmental patterns. Unpublished Doctoral dissertations, Vanderbilt University.

Korenman, S.G., & Shipp, A.C. (1994) Teaching the Responsible Conduct of Research Through a Case-Study Approach- A Handbook for Instructors. Washington, DC: Association of American Medical Colleges.

Kolb, D. A. (1976). Learning style inventory Technical Manual. Boston: McBer.

Kolb, D.A. (1975). Learning Style Inventory. Boston. McBer & Co.

Kolb, D. A. (1984). Experiential learning. New Jersey: Prentice-Hall.

Knowles, M. (1975). Self-Directed Learning: A Guide for Learners and Teachers. New York: association Press.

Laschinger, H.K. (1986). Learning styles of nursing students and environmental press perceptions of two clinical nursing settings. Journal of Advanced Nursing, (11), 289-294.

Laschinger, H.K. & Boss, M.W. (1984). Learning styles of nursing students and career choices . Journal of Advanced Nursing, (9), 375-380.

Laurence, E., & Lynn, Jr. (1999). Teaching and Learning with cases: a guidebook. New York: Cantham House Publishers.

Lewis, K. E. & Tamblyn, R. M. (1987). The problem-based learning approach in baccalaureate nursing education: how effective is it? Nursing Papers. 19 (2), 17-26.

Lynch, T.G., Woelfl, N., Steele, F., & Hansen, S. (1998). Learning Style Influences Student Examination Performance. The American Journal of Surgery. 176 (1), 62-66.

McAninch, A.R. (1993). Teacher thinking and the case method. New York: Teachers College Press.

McCarthy, B. (1987). The 4MAT system. IL: Excel Inc.

McCown, R., Driscoll, M., & Roop, P. G. (1996). Educational Psychology: learning centered approach to classroom practice. Boston: Allyn and Bacon.

McKeachie, W.J. (1994). Teaching tips. Toronto: D.C. Heath and Company.

McNergney, R. F., Ducharme, E. R., & Ducharme, M. K. (1999). Educating for Democracy . Case-Method Teaching and Learning . London: Lawrence Erlbaum Associate Publishers.

Mifflin, B.M., Campbell, C.B., & Price, D. A. (2000). A conceptual framework to guide the development of self-directed, lifelong learning in problem-based medical curricula. Medical Education. 34 (4), 299-306

Mocker, D.W., & Spear, G.E. (1982). Lifelong Learning: Formal, Nonformal, Informal and self-Direction. Information series No.241. The National Center for Research in Vocational Education, The Ohio University. (ERIC Document Reproduction Service no. ED 220723).

Nixon, M., Morgan, L., Forsyth, J., & Ellis, D. (1996). A comparative study of teacher directed and self-directed methods of teaching clinical skills to undergraduate nursing students. International Journal of Nursing Practice. 2 (2), 88-93

Nunn, G.D. (1995) Effects of a learning styles strategy and strategies intervention upon at-risk middle school student achievement and locus of control. Journal of Instructional Psychology, (22), 34-39

O'Conner, T. (1987). Using styles to adapt technology for higher education. 8 pages. Online www/isu-indsate.edu.html.

Polit, D., & Hungler, B. (1991). Nursing Research. Principles and Methods . Lippincot, New York.

Rideout E. M. (1994). Letting go: rationale and strategies for student-centered approaches to clinical teaching. Nurse Education Today. 14. 14(2), 146 -151

Rogers, C. (1969). Freedom to learn: A view of what education might become. Columbus, OH: Merrill

Ryan M. E., & Hodson K. E. (1992). Employer evaluation of nurse graduates: a critical program assessment element. Journal of Nursing Education, (31), 198-202.

Snider, V.E. (1990). What we know about Learning styles from Research in Special education. Educational Leadership. 48(2), 53.

Swendson, L.A. (1981) Self-instruction: Benefits and problems. Nurse Educator. 6 (6), 6-9

Tough, A. M. (1978). Major learning efforts: Recent research and future directions Adult Education. 28 (4), 250.

Woodward C. a., & Ferrier B. M. (1983). The content of the medical curriculum at McMaster University: graduates evaluation of their preparation and postgraduate training. Medical Education, (17), 54-60

Wells, D., & Higgs, Z.R. (1990). Learning styles and learning preferences of first and fourth semester baccalaureate degree nursing students. Journal of Nursing Education. 29 (9), 385-390.

Wilkerson, N.N. (1986). Relationship between preferred learning and clinical achievement of baccalaureate nursing students. (ERIC Document Reproduction Service no. ED 280 347).

Zemaitis, M.L. (1987). Learning styles, learning preferences, and registered nurse students in baccalaureate nursing programs. Dissertation Abstract International, (47), 38-43.

APPENDIX 1

Learning- Style Inventory: Instructions

The learning style inventory describes the way you learn and how you deal with ideas and day-to day situations in your life. Below are 12 sentences with a choice of four endings. Rank the endings for each sentence to how well you think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job. Then using the spaces provided, rank a "4" for the sentence ending that describes how you learn best, down to a "1" for the sentence ending that seems least like the way you learn. Be sure to rank all the endings for each sentence unit. Please do not make ties.

1. When I learn: ---- I like to deal with ---- I like to watch ---- I like to think ---- I like to be
my feelings and listen about ideas doing things

2. When I learn: ---- I trust my ---- I listen and ---- I rely on logical ---- I work hard
hunches and watch carefully thinking get things
feelings done

APPENDIX 2

SELF-DIRECTED LEARNING DIAGNOSTIC FORM

Student Number : -----

Date ----- :

Year of Study: -----

The following are skill areas that you can examine to determine your degree of self - direction. Knowing such information will help in identifying those areas of strengths and those areas that need to be enhanced in order help you in self-study. For each statement, check the most relevant column. To assist the decision regarding which column to check, use the information below.

NO: if you believe you currently are not able to use the skill listed.

LO: if you have low ability to use the skill listed.

MO: if you have moderate ability to use the skill listed.

HI: if you have high ability to use the skill listed.

SKILL: As a learner I:	NO	LO	MO	HI
1-Am able to question and inquire.				
2-Am able to problem solve.				
3- Undertake learning assignments on my own				
4-Continue working on assignments even when face with obstacles				
5-Can explore a topic on my own				
6-Voluntarily and actively participate in class				
7-Actively participate in class only when directly invited to do so by the teacher.				
8-Keep an open mind to other's points of view				
9-Need detailed direction to complete assignments				
10-Am able to diagnose my own learning needs				
11-Am able to set objectives to meet my learning needs				
12-Can select and utilize effective strategies to make good use of learning resources				
13-Can collect evidence pertaining to my accomplishment of learning objectives				
14-Can identify human and material resources appropriate to different learning needs				
15-Relate to teachers as helpers or facilitators				
16-View my self as being non-dependent and self directed learner.				

APPENDIX 3

Covering Page

Dear Student:

This study is intended to examine the relationship between learning style, stage of self-direction in learning and performance of students studying by the case-based method.

The assessment form is not an evaluation tool. There is no right or wrong answers, or best answers to your choices. All information will be kept confidential. You can receive information about which style you use in learning.

Your participation and cooperation in the completion of this form is highly appreciated.

Thank you
Nada Abou Hassanein
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