Untangling Critical Thinking in Educational Cyberspace

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ABSTRACT

This study was methodologically situated within two cycles of insider action research and informed by the blending of the philosophical underpinnings of the interpretive and the praxis paradigms. It was conducted by one nurse-educator-researcher exploring the perspectives of eleven undergraduate student nurses, who engaged with Nursing Journeys: Virtual Reflective Centre, a researcher-developed virtual, simulation instrument designed to promote critical thinking, while enrolled in a first-year nursing course in a college in British Columbia over a 12-week semester. The study participants kept a reflective journal for the duration of the study and interviews were conducted at the end of the semester. While interviews and journal excerpts were the primary sources of data, participant-observation, field notes and online dialogue transcripts were also used as data collection techniques. The analytic strategy chosen for this study was grounded theory. This study also traced a self-reflective journey of practice as research in an attempt to develop a greater understanding of the teaching and learning process in educational cyberspace.

The findings of the study suggested that participants were able to articulate their definition of critical thinking and use this definition to work through the case narratives while role-playing the various virtual characters. The study participants were also able to recognize that they were only beginning to understand critical thinking and that it was not necessarily learned and actualized in a linear, individual fashion. The findings of the study also suggested the facilitation of critical thinking was contingent on a pattern of a way of knowing: Cyber-textual Mediated Knowing and several other factors: time, trust, facilitation, reflection, purposeful decision making in design. Although NJVRC may have properties that have the potential to promote critical thinking, its cognitive dimension was significantly more developed than the affective dispositions of critical thinking. Finally, this study illustrated that the insider action research was
a fitting methodology as it offered a systematic approach for educators to unravel the connections made between pedagogy, research and change. Its applicability as an appropriate methodology also served to support the emerging trend of moving nursing research toward an evidence-based model as the basis for advancing educational practices in nursing education.
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CHAPTER ONE—DRIVING FORCES SHAPING THE NEED FOR RESEARCH

My interest in the central tenets of educational cyberspace was first nurtured by an experience at a conference seminar exploring the use of computer-mediated communication. Following a description by the presenter of the various forms of computer-mediated communication (CMC), I participated in several activities involving these forms of communication. As a result, I envisioned how CMC would transform nursing education, prompting me to question the inherent value of the current learning technologies I employed to enhance critical thinking. I began to wonder how I could incorporate this particular learning technology into my teaching practice to promote critical thinking and assist undergraduate student nurses to more readily apply theory to practice. Concurrently, I realized that without understanding the underlying theoretical principles of educational cyberspace; I would merely be applying a learning technology without full consideration of the implications, and without the ability to assess its success or limitations.

1.1 My Philosophy of Teaching

A common theme identified in the literature is that many educators, in essence, teach within their own preferred learning style as a matter of comfort. Reflecting upon my early experiences with teaching, I would agree. I have come to appreciate Pratt’s (1997) research related to perspectives of teaching as a way to broaden my understanding of what it means to teach. My teaching philosophy is grounded in the belief that it is a dynamic state, constantly evolving and informing my practice. I regularly strive to improve my teaching practice by seeking feedback from learners and peers, attending professional development seminars and reading about relevant subject matter. Through these informative processes I am continually refining my teaching practice and growing as a nurse educator.

Much of my philosophy is based on my experiences as a lifelong learner and my evolving views about pedagogy. I have four main roles as a nurse educator, one as a content expert and others as mentor, as facilitator and as leader. It is my aim to foster undergraduate student nurses’ learning as a transformative experience. In my view, teaching is not only about instructing or imparting information to undergraduate student nurses. Rather, it is an integrative approach, blending a learner-centred paradigm with an opportunity to cultivate learning partnerships and
create an environment that is interactive and non-threatening. Learning is a complex process that is individual and context-specific. As a teacher, I am cognisant of these factors and strive to be flexible, accommodating my practice accordingly.

The theories of learning upon which I primarily draw in my practice presuppose freedom and responsibility for teachers as well as learners. I believe that individuals construct knowledge and abilities through their interactions with texts, other people, the environment and their own critical reflections. Constructivist pedagogy infers the legitimacy of diverse sources of knowledge, not only the knowledge that the teacher constructs, but also that of the knowledge constructed by learners. I see knowledge as constructed through discovery and through shared experiences. Ideally, I want undergraduate student nurses to intrinsically perceive a transition by their active participation in the teaching-learning process. I strive to promote diversity and multiple perspectives by encouraging undergraduate student nurses to be respectful of divergent views, to challenge existing bodies of knowledge and to critically question how they have come to know their world, individually and collectively. Hooks (1994) remarks:

Urging all of us to open our minds and hearts so that we can know beyond the boundaries of what is acceptable, so that we can think and rethink, so that we can create new visions, I celebrate teaching that enables transgressions—a movement against and beyond boundaries. It is that movement which makes education the practice of freedom. (p.12)

My teaching is an act of encouragement to promote learning, to inspire undergraduate student nurses to assume self-responsibility and to be active and critical learners. I believe that knowledge is diverse and, contextual; not given, but produced inside one’s self and with others.

1.2 The Rationale for Insider Action Research

In today’s era of striving for excellence and best practices in teaching and learning, it is pivotal for any profession to disseminate emerging knowledge to its members (Boyer, 1990; Drevdahl, Stackman, Purdy & Louie, 2002; French, 2000, Stevens & Cassidy, 1999). “Emphasising good teaching means gaining pedagogical content knowledge” (Drevdahl et al., 2002, p. 413). Boyer (1990) views teaching as “the highest form of understanding” (p.23) and places teaching at the very core of scholarship. Implicitly, his perspective broadens the traditional views of scholarship to encompass it as a form of research. Drevdahl et al. (2002)
assert "making sense of teaching, begins with a reflective posture toward knowledge creation" (p.416). As a nurse-educator seeking to articulate my assumptions and understand the conceptual theories applicable to my teaching, it is also purposeful to reflect upon my practice more systematically (Kember, 2000; Kemmis & McTaggart, 1988; McNiff, 2002; Palmer, Burns, & Bulman, 1994; Weimer, 2000). The search for a methodological approach to explore my teaching practices related to critical thinking and educational cyberspace in the educational and nursing literature led me to praxeology, reflective inquiry, and action research. Reflectivity is a commonality embedded within these constructs.

My engagement with action research stems from the passion to improve aspects of my teaching through critical reflection and expanding my role in the research process. I will be moving beyond that of consumer or object of research to that of researcher "locating [myself] and my research within, rather than outside the social world [I] am studying” (Drevdahl et al., 2002, p. 416). I am drawn to action research because of its concept of collaboration. I will be able to work collaboratively with my students, seeking input and acting accordingly as I pursue my inquiry and articulate my tacit knowledge. I am also drawn to the rigour of action research as it allows me to construct and generate theory from this tacit knowledge. Carr (1998) asserts that reflection is central to the evolution of nursing knowledge. However, some journal articles (Atkins & Murphy, 1993; Greenwood, 1993) tend to discuss the details of the process of reflection, rather than illustrate its application.

Action research, especially insider action research, is recognised as a fitting methodology to provide a structured, disciplined approach to systematically inquire, articulate and reflect about the teaching and learning process (Kemmis & McTaggart, 1988; Noffke & Stevenson, 1995). It is also appropriate to explore the constructs of critical thinking and educational cyberspace. The insider action research model combines the roles of educator and researcher (Cochran-Smith & Lytle, 1992; Coghlan & Brannick, 2001; Coghlan & Casey, 2001, Tichen & Binnie, 1993). Insider action research involves a spiral set of activity cycles, including identifying, gathering, interpreting, acting and reflecting, leading to further planning and iterations of the same cycle. Educators who embrace the insider action research approach are already immersed in the particular situational context, and thus engage in the exploration of "what it means to make disciplined - as opposed to intuitive - statements about teaching" (Freeman, 1998, p. 9). Dewey (1910) refers to this process as learning from practice and experience. Accordingly, the insider action researcher’s perspective is validated from findings
gathered through a systematic, praxis-oriented, and reflective inquiry (Cochran-Smith & Lytle, 1999).

Schön (1983) describes two constituents of the thinking process of the reflective practitioner. The first takes place in the midst of teaching as Reflection-In–Action, and it usually occurs as educators try to make sense of their situation. In contrast, Reflection-On-Action involves looking back on experience in light of the outcomes. Greenwood (1993) argues that Reflection-Before-Action (anticipatory reflection), is underrated as a critical constituent to the thinking process. She contends that thinking about intentions prior to action is just as significant; and that it avoids possible misinterpretation. The model proposed by Drevdahl et al. (2002) aligns with both Greenwood’s (1993) and Schön’s (1983) concepts of reflectivity. Drevdahl et al. (2002) propose a three-phase model for reflective self-study. In the assessment phase, educator-researchers ascertain the presence of an acceptable context in which to conduct a reflective inquiry. In the implementation phase, educator-researchers underline the importance of selecting a fitting methodology and research design focusing on process and validation issues. Finally, during the dissemination phase educator-researchers share their findings with members of their community. The study presented in the following chapters also traces these three constituents of my thinking process within a reflective framework drawn from the works of Drevdahl et al. (2002), Greenwood (1993) and Schön (1983).

1.3 Purpose of the Study

The question emerging from my practice is how I, as a nurse-educator, enhance the development of undergraduate student nurses’ critical thinking in educational cyberspace to assist them to more readily integrate theory in practice, while also unravelling the connections I make between pedagogy, research and change. The proposed solution is to develop a learning technology suitable to educational cyberspace. Specifically, this study investigates the effects of Nursing Journeys: Virtual Reflective Centre (NJVRC), a researcher-developed, virtual, pedagogical, simulation instrument aimed to foster critical thinking by exploring the experiences of eleven undergraduate student nurses over one semester of engagement. Explicitly, the following questions are addressed:

- How does Nursing Journeys: Virtual Reflective Centre promote the development of critical thinking among undergraduate student nurses?
• How do undergraduate student nurses describe their experiences of learning to think critically while engaged with *Nursing Journeys: Virtual Reflective Centre*?

• How do the blending of the theoretical underpinnings of role-play, computer-mediated communication and collaborative and problem-based learning promote the development of critical thinking among undergraduate student nurses?

Four fundamental forces underpin recent changes in nursing education: critical thinking as a learning outcome; paradigm shifts in nursing curricula; the evolutionary patterns of nursing knowledge; and finally, the introduction of educational cyberspace in higher education.

1.4 Critical Thinking in Nursing

The accelerated growth of medical technology and advances in healing makes it necessary for nurses to be adept critical thinkers. Committing to memory facts about disease processes, modifications in client care and standards of nursing is no longer sufficient as a teaching-learning strategy to adequately prepare undergraduate student nurses for today's highly complex health care environment (Gordon, 2000; Mastrian & McGonigle, 1999; Weis & Guyton-Simmons, 1998; Youngblood & Beitz, 2001). It has been established that critical thinking is essential to nursing practice (Alfaro-LeFevre, 1998; Baker, 1996; Haffer & Raingruber, 1998; Tanner, 1996). It is also well documented that critical thinking is complex, diverse, inconsistently applied and inadequately represented in the nursing education literature. Much of the research is quantitative and employs measurement instruments that give rise to validity and reliability issues in their application (Angel, Duffey, & Belyea, 2000; Simpson & Courtney, 2002). Notwithstanding that critical thinking, as a construct, is inconsistently defined and measured, accrediting bodies for basic nursing education programs endorse the acquisition of critical thinking as a competency of a new graduate. Thus, nurse educators are accountable for demonstrating the assessment of the development of critical thinking, both as a learning outcome throughout the curriculum and, most importantly, at the time of graduation (Registered Nurses Association of British Columbia [RNABC], 2000). The nature of critical thinking is discussed in greater detail in *Chapter Two*. 
1.5 Paradigm Shifts in Nursing Education

As critical thinking is an expected competency for nurses, there is a general assumption that nursing education should have a direct influence on this behaviour (Daly, 2001). Nurse educators have the challenge of designing innovative curricula that will foster critical thinking. There has been an increasing interest in the fundamental principles of many educational theories that has led to a subtle shift in framing curricula within a learning paradigm. This paradigm emphasises life-long learning, a learner-centred and active perspective, moving toward an integrative, constructivist approach to professional socialisation and away from the traditional pedagogy of teacher-directed, behaviourist, didactic and passive approaches to learning (Ben-Zur, Yagel, & Spitzer, 1999; Diekelmann & Rather, 1993; Dolence & Norris, 1995; Reutter, Field, Campbell & Day, 1997). A learning paradigm underscores the interdependent relationship between theoretical and practical knowledge and facilitates socialisation and role development as a process rather than a prescriptive conformity to pre-determined social standards. A number of scholars (Baron McBride, 1999; DeMarco, Hayward & Lynch, 2002; Lindeman, 2000; Skiba, 1997) support this paradigm shift.

Peters (2000) posits that a constructivist epistemology appears congruent with the learning paradigm and may offer an alternative pedagogical foundation to the traditional teaching pedagogy for nursing education. Constructivist approaches to teaching and learning have emerged from the works of Bruner (1986, 1990), Piaget (1928, 1977), and Vygotsky (1978). Two major strands of this perspective are cognitive constructivism and social constructivism (McMahon, 1997). The central tenet of constructivism is founded on the premise that an individual acquires meaning through interaction with others and the environment—"Thus, knowledge is viewed as contextual, with meaning depending on the situation" (Hood & Leddy, 2003, p. 95). A series of constructivist learning technologies to foster critical thinking has been the focus of numerous nursing education citations (Andrusyszyn, Iwasiw & Goldenburg, 1999; Chandler & Hanrahan, 2000, Edwards, Hugo, Cragg, & Peterson, 1999; Geibert, 1998). The most prominent of these studies include problem, case or inquiry-based learning; role-play; journal writing, and narrative. Findings from these studies offer variable, inconsistent and conflicting results. From personal experience, undergraduate student nurses have difficulty describing critical thinking, especially when applying theory to practice. It is unclear to me whether the aforementioned learning technologies in their current form help undergraduate student nurses be critical thinkers in practice.
1.6 Evolution of the Nature of Nursing Knowledge

Coupled with a changing paradigm in nursing education, trends in nursing knowledge development have also followed an evolutionary path. In Carper's (1978) seminal work, she identifies four fundamental patterns of ways of knowing embedded in the construction of nursing knowledge. These patterns are empirical, aesthetic, ethical and personal knowing. Empirical knowing “encompasses publicly verifiable, factual descriptions, explanations and predications based on subjective or empirical group data” (Fawcett, Watson, Neuman, Walker & Fitzpatrick, 2001, pp. 115-116). Aesthetic knowing “is that aspect of knowing that connects with deep meaning of a situation and calls forth inner creative resources that transform experience” (Chinn & Kramer, 1999, p. 183). Personal knowing involves “a person’s individualised and subjective ways of learning, storing and retrieving information about the world” (Rew, 1996, p. 96). Ethical knowing emphasises “what ought to be done” (Chinn & Kramer, 1999, p. 5). White (1995) proposes an additional pattern of socio-political knowing as “it addresses the wherein... in which to frame all other patterns of knowing” (pp. 83, 85). Chinn and Kramer (1999) describe knowing in general as “ways of perceiving and understanding the self and the world...Nursing’s patterns of knowing are interrelated and arise from the whole experience” (pp. 1, 7). Underlying their tacit belief, Chinn and Kramer (1999) posit the improbability of ever arriving at [a] truth without collaterally recognising other ways of knowing as a reality. “Different ways of knowing are not judged against one another ...because each pattern adds only one specific component, none alone is a sufficient source of knowledge” (Carper, 1978, p. 22). Sandelowski (1995a) infers that technology is also as a way of knowing. “Technology is also a way in which human beings come to know reality, nature or the world” (p. 69). However, this view has yet to attract much scholarly attention.

Historically, empiricism and logical positivist philosophy have dominated nursing research. Beginning in the 1970s and increasing into the 1980s, nurse researchers integrated principles of naturalism and interpretivist philosophy. Postmodernism began to emerge as a philosophical framework in the literature in the mid-1990s (Hood & Leddy, 2003). Conceivably, nurse researchers may have argued that embracing and endorsing only the positivistic paradigm with open arms was to generate the empirical way of knowing and to obtain academic and scientific respectability. Consequently, this narrow view of knowledge construction overshadows other paradigms better fitted to capture other ways of knowing, thereby precluding knowledge of other realities. “It could hence be surmised, that although scientific knowledge is a necessary,
important and critical element of nursing, it is important to acknowledge the aesthetic, personal, ethical and [socio-political, technological] knowledge too, because all are crucial to nursing” (Rutty, 1998, p. 246). What compelling force is at play that has led nurse researchers to re-examine nursing’s philosophical foundations of knowing and methods of inquiry? Copnell (1998), Gastaldo and Holmes (1999) and Lister (1997) suggest it is the attempt to find a balance between the objectivity and subjectivity and to endorse pluralism. Another interpretation lies within the effects of examining research and practice and how each informs the other to produce new knowledge (Kim, 1993; Reed, 1995; Thorne & Hayes, 1995).

1.7 Educational Cyberspace in Nursing Education

The literature on critical thinking in nursing education seems to be completely contained in the study of the face-to-face learning environment. As educational cyberspace is becoming a component of the future of higher education, including nursing education, it stands to reason that the implications for promoting critical thinking need to be explored. This study justifies the purpose of moving beyond and extending the current body of knowledge about teaching, learning, critical thinking and educational cyberspace in nursing.

The early studies involving educational cyberspace explore issues such as course delivery, group process, student participation, acquisition of knowledge and satisfaction with media (DeAmicis, 1997; Leeseberg-Stamler, Thomas & McMahon, 1999; Saranto, Leino-Kilpi & Isoaho, 1997; Simons, Baron, Knicely & Richardson, 2001; Thiele, Allen & Stucky, 1999). Often these studies outline advantages and disadvantages relating to the quality of educational cyberspace as an efficient learning medium. Additionally, a plethora of studies compare educational cyberspace with the traditional face-to-face classroom setting resulting in no significant difference in learning outcomes. This finding may demonstrate the perpetuation of adopting traditional pedagogy to stimulate learning in educational cyberspace, yet this is scarcely a pathway to educational progress. Carr (1998) concludes “…virtual classrooms carry the risk of not only maintaining what is positive about traditional classroom learning, but replicating what has been negative” (p. 36). Likewise, Skiba (1997) notes:

We in nursing must let the learning vision serve as the catalyst for change rather than technology. We in nursing need to examine our current use of information
technology in education rather than to have merely imposed technological
techniques onto traditional methods of teaching. (p. 148)

A more recent trend involves studies that focus on the effectiveness of the distinctive attributes of learning technologies in educational cyberspace in relation to the promotion of critical thinking (Andrusyszyn, et al, 1999; DeMarco, Hayward, & Lynch, 2002; Holeton, 1998; Jenkins & Turick-Gibson, 1999; Landis, & Wainwright, 1996; Murray, 2000; Naidu & Oliver 1996; Weis & Guyton-Simmons, 1998; Witucki, Hodson, & Malm, 1996; Wong, Wong & Richard, 1992). However, in these studies, a homogeneous learning technology or singular pedagogical principle are embedded in the design. I contend that the integration of heterogeneous learning technologies and multiple pedagogical approaches—such as cognitive and social constructivism, computer-mediated communication, collaborative and problem-based learning, and role play—into the design of one virtual, pedagogical, simulation instrument, will foster critical thinking. It is with this particular view I present this study of Untangling Critical Thinking in Educational Cyberspace.

1.8 Layout of this Dissertation

Established practices require that dissertations be composed in a particular style. The use of the first person is typically omitted and the structure is divided into three principal sections, the introduction, the development and the conclusion. I will follow convention where the basic structure is concerned because it facilitates coherence of thoughts and expression. However, I break from tradition by using first person terminology within the text as other insider action scholars have previously done. This hopefully serves as an effective vehicle to communicate genuinely and effectively with my audience.

This dissertation is organised into seven chapters and describes two cycles of an insider action research study. Interwoven within this insider action research study is a reflective framework beginning with Greenwood's (1993) notion of Reflection-Before-Action and extending through to Schön’s (1983) concept of Reflection-In-Action and Reflection-On-Action. The initial phase of the reflective thought process, Reflection-Before-Action and the first action cycle are summarised in Chapters One, Two and Three. Chapter One outlines the identification step of the first action cycle. It includes an overview of the context, rationale, purpose, significance and limitations of the study. Chapter Two presents the gathering and interpretation steps of the first action cycle. It includes a review of the literature relating to critical thinking,
educational cyberspace design and action research. Chapter Three completes the first cycle and describes the action and reflection steps by summarising the developmental process of creating the researcher-developed virtual, pedagogical, simulation instrument, Nursing Journeys: Virtual Reflective Centre (NJVRC), used in this study.

The second phase of the reflective thought process, Reflection-In-Action, initiates the second cycle and is summarised in Chapters Four and Five. Chapter Four outlines the identification and gathering steps of the second action cycle. It includes the modifications to NJVRC, my research philosophy, the research methodology and design—including the setting, sampling procedure and participants, data collection and analysis procedures, and trustworthiness of the procedures. The findings of the study—the interpretation step of the second action cycle—are described in Chapter Five. Chapters Six and Seven provide the reader with a description of the final steps of the second action research cycle—act, reflection and re-plan. These chapters also represent the third phase of the reflective thought process, Reflection-On-Action. Chapter Six outlines conclusions, implications for practice, and recommendations for further research. Chapter Seven completes the second action cycle with a description of the action and reflection steps, and summarises insights gained as a nurse-educator-researcher. The dissertation closes with references and appendices.

1.9 Significance of the Study

This dissertation is written from the perspective of both a novice insider action researcher and curriculum developer. It is drawn from my observations, experiences, and research as a nurse-educator working with undergraduate student nurses at a college in British Columbia. This dissertation represents a summary of findings and reflections for further research. Presenting what I have discovered to date will provide an opportunity for scholarly discourse.

Much of the literature surrounding educational cyberspace in nursing education addresses generic issues of retention of factual knowledge, satisfaction with the media or comparing educational cyberspace with traditional face-to-face classroom teaching that results in conclusions of no significant differences. This paucity of information potentially limits educators in uncovering other factors associated with educational cyberspace. Few studies explore critical thinking in educational cyberspace. This study also illuminates the complexities of teaching and learning in general, but particularly learning to think critically in educational cyberspace. Incorporating the themes and patterns that emerge from this study may transform the practices of
nursing education. Ultimately, these findings may guide other nurse educators in future decisions about teaching and learning in educational cyberspace in regard to critical thinking. "Knowledge developed through action research is grounded in actual practice situations and allows for refinement of basic knowledge developed through other methods of inquiry" (Holter & Schwarz-Barcott, 1993, p. 303).

With the blending of heterogeneous learning technologies and multiple pedagogical approaches underlying the design of NJVRC, undergraduate student nurses may come to fully appreciate the inherent value of personal and collaborative learning in the actualization of critical thinking. Additionally, undergraduate student nurses can challenge the taken-for-granted view and potentially reshape their preconceived worldviews of nursing. The merit or worth of such a new virtual, pedagogical, simulation instrument, designed in an educational cyberspace environment offers endless opportunities. The case narratives evoke critical reflection and value clarification about aspects of nursing practice and knowledge that are often omitted in textbooks. By composing or creating meaning from what is familiar, undergraduate student nurses can begin to move toward being critical thinkers by defining patterns of care, individually and collaboratively, and developing ways to think and virtually act in a less stressful learning environment. It therefore becomes possible for undergraduate student nurses to be better prepared to care for, and work with, individuals and their family members in the reality of the health care system.

While there is evidence of nurses engaging in insider action research, few studies highlight nursing education as the primary social context. This scarcity of research findings may limit nurse educators' ability to be informed about educational innovation. Most importantly, the lack of findings delays a move by nurse educators toward using an evidence-based research model as the basis for advancing educational knowledge and practices and becoming producers of research. In combining a move toward an evidence-based research model and using insider action research, this approach may potentially reduce the research-theory-practice gap (Holter & Schawarz-Barcott, 1993; Rolfe, 1996). "...[I]t directly addresses the knotty problem of the persistent failure of research in the social sciences to make a difference in terms of bringing about actual improvement in practice" (Somehk, 1995, p. 340).

Habermas (1971) argues that seeking knowledge always serves some interest. Insider action research provides a pathway to personal meaning-making. Educators can use insider
action research to disclose the subtleties of the teaching and learning process, to articulate a rationale for their own questions and how best to improve teaching and learning practices. It is time that I make “the intuitive and unconscious knowing and meaning” (Schmieding, 1999, p. 1141) of my teaching practice more visible.

1.10 Limitations of the Study

This study is a small-scale project and is limited to one specific classroom in one college. The eleven study participants were not randomly selected, but volunteered because of their interest in the project and possible affinity to their learning style and their registration in the particular nursing course. Additionally, to generalise the findings of this study to other settings is challenging and it is up to the reader to draw his or her own conclusions and inferences. However, the interplay of the pedagogical principles used in the design and development of NJVRC may be useful to draw upon across disciplines. Finally, one semester may too short to adequately assess the effects of NJVRC to promote critical thinking, a complex construct, in educational cyberspace.

1.11 Definition of Terms

Throughout my dissertation, I introduce several terms to the reader. These terms are noted in the literature under various classifications. The following are the operational definitions of some special terms I have used in this study:

- Undergraduate student nurse - An individual who is enrolled in a basic nursing undergraduate education program (RNABC, 2000).

- Basic nursing undergraduate education - An educational program that prepares undergraduate student nurses to write the nursing registration exam and to practice as a Registered Nurse (RNABC, 2000).

- Insider action research - A systematic, disciplined form of reflective inquiry, which enables educators to assume the role of researcher, to improve practice and enhance student learning. Involves a cyclic process in which research, action and evaluation overlap. It unites “the doing and wondering” (Freeman, 1998, p. 3).
• Critical thinking - A purposeful thinking process that embodies a cognitive and affective nature. "The ideal critical thinker is one who is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest about facing personal biases, prudent in making judgements, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry and persistent in seeking results which are as precise as the subject and circumstances of inquiry permit" (Facione, Facione, & Sanchez, 1994, p. 345).

• Reflection - A purposeful process of introspective thinking about what one will do, is doing or about what one has done (Drevdahl, et al., 2002; Greenwood, 1993; Schön, 1983).

• Praxis - a process of translating ideas into action, the action of theory-based practice (http://www.hyperdictionary.com/dictionary).

• Educational Cyberspace - A virtual realm where learners, teachers and content are connected via a computer. Cyberspace is a term coined by William Gibson (1984) that is commonly referred to as the Net, the Web or the Information Superhighway. Cyberspace is represented as a network of computers that store data through which users can access information (http://wordreference.com).

• Learning Technology - An instructional information or communication device, tool or solution used to advance knowledge and support pedagogical practices (http://www.eddept.was.edu.au/t2000/ltdf.html).

1.12 Summary

This chapter introduces the reader to Reflection-Before-Action, the initial phase of the reflective thought process. It also summarises the identification and gathering steps of the first cycle of this insider action research study. It begins with an overview of the factors that shape the need to conduct research and concludes with a synopsis outlining the purpose, significance and limitations of the proposed research study. The identified issue presented in this chapter, pertains to how, as a nurse-educator, I enhance the development of undergraduate student nurses' critical thinking in educational cyberspace to assist them in more readily integrate theory in practice,
while I also unravel the connections I make between pedagogy, research and change. In the proceeding chapter, the reflective process—Reflection-Before-Action—continues by gathering and interpreting the relevant literature. A literature review, if presented well, adds to an understanding of a selected issue or problem (Locke, Silverman, Spirduso, 1998). It provides a summary and synthesis of relevant literature validating the rationale to pursue a scholarly inquiry.
CHAPTER TWO—MAKING SENSE OF THE LITERATURE

In line with the spirit of insider action research, the first step of the action cycle involves identifying the current situation and gaining an awareness of the need for improvement of aspects of an educator's practice (Holter & Schwartz-Barcott, 1993). In the preceding chapter, a synopsis is provided of my drive to explore critical thinking in educational cyberspace and to assume the role of nurse-educator-researcher. In this chapter, Making Sense of the Literature, I describe the gathering and interpretation steps of the first action research cycle by presenting a review of various areas of literature that are pertinent to my study. The search is limited to critical thinking, educational cyberspace design and action research. The purpose of this chapter is to develop an interpretation of the thinking in each of these areas, seeking to gain a greater understanding of what is known and not known, and to discover new possibilities, thereby legitimising the rationale to pursue a scholarly inquiry. I first examine critical thinking and how it has been the focus of research. In the second and third sections of this chapter, I examine educational cyberspace design and action research. Much of the review is critical in nature for the purpose of developing a research instrument and framework, which I describe in detail in Chapters Three and Four respectively.

2.1 Critical Thinking

The number of articles in scholarly journals and texts, including books specific to critical thinking in nursing (Alfaro-LeFevre, 1995; Miller & Babcock, 1996; Rubenfeld & Scheffer, 1995; Simpson & Courtney, 2002) provide an unrelenting verification of the widespread interest in critical thinking. In nursing, Baker (1996), Glen (1995), and Hendricks-Thomas and Patterson (1995) identified the epistemological shift in nursing education as an impetus for the interest in critical thinking. Daly (1998), Fowler (1998), Jones and Brown (1991), Nelms and Lane (1999), and Schank (1990) concurred but also stated that the catalyst to this interest primarily relates to a rapidly changing and complex health care environment and the need for nurses to be master critical thinkers. Sound nursing practice is founded upon sound thinking. Nurses are required to construct nursing care based on the needs of clients, client-by-client (Daly, 1998). Rossignol (1997) extolled such observations by claiming, “nursing practice requires creative, personalised solutions to client circumstances“ (p. 476). Paul and Heaslip (1995) further posited that failing to
understand that each client's circumstance is unique might result in "...practice performed automatically without care, vigilance and criticism" (p. 40). Three significant patterns emerge from the literature relevant to this study and these will be discussed in the following sections.

2.1.1 A Definition of Critical Thinking

The first pattern reveals that there is no single accepted definition of critical thinking apparent in the literature. Accordingly, Katoaka-Yahiro and Saylor (1994) and McMillan (1987) wrote that an overt omission in the research related to critical thinking, "is a common definition of critical thinking" (p. 3). The Delphi report (American Psychological Association, 1990) provided substantial insight about what critical thinking is and is not, yet the lack of a consensual universal definition and the inconsistent application of critical thinking still pervades the nursing literature as a concern (Boychuk-Duchsch, 2003; Daly, 2001; Gordon, 2000; Rane-Szostak & Roberston, 1996).

The concept of critical thinking has a myriad of conceptual and operational definitions that range from being specific, primarily cognitive in nature and limited in scope, to broader definitions embodying both the cognitive and affective domains. To add to the complexity surrounding critical thinking, several shared terms are also associated with critical thinking. Brookfield (1987) listed critical analysis, critical awareness, critical consciousness, and critical reflection as terms used interchangeably with critical thinking in discussions about critical thinking and in instruments to measure this concept. Simpson and Courtney (2002) and Gordon (2000) observed that the terms such as problem solving, creative thinking, nursing process and clinical decision making are used synonymously with critical thinking.

Dewey (1916) presented critical thinking as comprising the suspension of judgement and healthy scepticism. Kurfiss (1988) asserted that critical thinking was "an investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that can therefore be convincingly justified" (p.2). She viewed critical thinking as a form of problem solving, with problem solving being narrower in scope. In contrast, Meyers (1991) stated that critical thinking proceeds beyond problem solving. Rather than seeking a specific outcome, Meyers (1991) perceived critical thinking as centred on raising questions from all perspectives and critiquing solutions. Garland (1991) listed elements of critical thinking as including the ability to: "differentiate between fact and opinion, compare and contrast points of view, recognise and
evaluate author bias, rhetoric and faulty logic, determine cause and effect, and the validity and reliability of the information presented, and appreciate and tolerate ambiguity" (p. 447). Bittner and Tobin (1998) and Lipman and Deatrick (1997) saw clinical decision making as a systematic process of assessment, action, evaluation and judgement making that contributes to the attainment of a desired outcome. However, they affirmed that to arrive at the desired outcome, embracing the use of critical thinking is a requisite to clinical decision making.

Ennis (1985) saw critical thinking as a “practical activity, reflective and reasonable thinking that is focused on what to believe or do” (p.45). Siegel (1980) believed a critical attitude or spirit is necessary, in addition to cognitive ability, and includes the “willingness, commitment, and disposition to develop the habits of inquiry” (p.9). McPeck (1981) inferred that critical thinking involves both a “propensity and skill to engage in an activity with reflective scepticism and that one must develop the disposition to use those skills” (p.8). Similarly, Watson and Glaser (1980) viewed critical thinking as a “composite of attitudes, knowledge, and skills....” (p.1).

Attitude, according to Watson and Glaser (1980), referred to a frame of mind, an approach of intellectual curiosity that recognises existing problems. Brookfield (1987) agreed and claimed that critical thinking is a process rather than an outcome. In this way, Brookfield (1987) explained that a critical thinker continually questions assumptions:

A productive and positive activity, a process, not an outcome, manifested in various ways, according to context triggered by both positive and negative events, emotive as well as rational, a lived activity, not an abstract academic pastime. (pp. 5-7)

Brookfield (1987) identified the components of critical thinking as “identifying and challenging assumptions, challenging the importance of context, imagining and exploring alternatives, and reflective scepticism. It is something we all do, though its frequency, and the credibility we grant it, vary from person to person” (p. 14).

Paul (1992) defined critical thinking as the “art of thinking about your thinking while you are thinking in order to make your thinking better...” (p.643) and suggested that it is based on a set of intellectual standards. “Thinking that does not embody elements of reason or intellectual standards is pseudo critical thinking” (Paul, 1993, p. 47). Paul (1993) viewed critical thinking as the “essential foundation for education because it is an essential foundation for adaptation to the
A variety of tests have been developed to measure critical thinking, including the California Critical Thinking Skills Test, the Cornell Critical Thinking Test, and the Watson-Glaser Critical Thinking Appraisal Test. However, questions have been raised about whether such instruments can measure the concept without a concise definition, posing significant challenges in their reliability and validity (Angel et al., 2000). Pless and Clayton (1993) further supported this notion. These authors believed, in part, that standardised tests exclusively measure the cognitive domain of critical thinking, failing to recognise its affective counterpart.

Numerous studies have been conducted that involve the measurement of critical thinking. Gross, Takazawa, and Rose (1987), Miller (1992), Notarianni (1991), Pascarella, Bohr, Nora and Terenzini (1996), and Pepa, Brown and Alverson (1997) all measured critical thinking and academic preparation. Adams, Stover and Whitlow (1999), Bauwens and Gerhard (1987), Berger (1984), McCarthy, Schuster, Zehr and McDougal (1999) and Profetto-McGrath (1998) measured critical thinking and curricular impact. Critical thinking and academic success were investigated and measured by Bauwens and Gerhard (1987), Frederickson (1979), Gross et al., (1987) and Miller (1992). Many of these results of these were mixed, included inconsistent findings, and often contradicted each other. Videbeck (1997) proposed that one of the contributing factors leading to these inconsistencies was the lack of a universal definition of critical thinking. Videbeck (1997) found that among a majority of fifty-five American nursing programs targeted in her study, most framed their definition of critical thinking from various sources and used both standardised and locally-developed instrumentation to assess critical thinking.

2.1.2 Educational Paradigms in Nursing Education

A second pattern emerging from the literature reveals a subtle shift of educational paradigms in nursing education. Until recently, nursing curricula and learning technologies have been aligned with a traditional, behaviourist paradigm, a separatist philosophy (Dieckelmann & Rather, 1993). In this view, knowledge is viewed as abstract and is first acquired through external processes rather than internal processes. The knowledge is then applied, with the
assumption that the acquired knowledge can be applied in any situation. Teachers impart knowledge while learners recall what they have learned and follow instruction, limiting the development of critical thinking. In contrast, an integrative philosophy (Dieckelmann & Rather, 1993) emphasises the interdependent relationship between knowledge and application. A collaborative relationship exists between teacher and learner, broadening the development of critical thinking. Thus, knowledge is viewed as contextual, “the ability to use theory and/or knowledge effectively across a variety of clinical settings” (Bowers & McCarthy, 1993, p. 107). The importance of context was supported by Bevis (1993); Halstead, Rains, Boland and May (1996), Lindeman (2000), and Rolfe (1998).

In recent years, there has been an increasing interest among nurse educators in the fundamental principles of many educational theories, particularly constructivism. Pedagogical implications of constructivism include a natural affinity with lifelong learning and critical thinking—essential competencies of a graduate nurse (Peters, 2000; Simon, 2001; Skiba, 1997). Constructivism is grounded in the works of prominent individuals such as Bruner (1986, 1990), Piaget (1928), and Vygotsky (1978). The fundamental epistemological assumption of constructivism is that knowledge is a product of how individuals create meaning from their experiences (Blais, 1988; Tobin & Tippins, 1993). The constructivist sense of learning is not merely attending to, and approaching, the correct view of reality, but engaging and interacting with the surrounding environment to create a personal worldview. Conceptually, “constructivistic theory suggests that one has to experience the world to know it” (Peters, 2000, p.167). Oermann (1997) stated that “critical thinking is not developed through one lecture, nor one clinical experience, instead, skill in thinking develops over time...” (p. 25). Implicitly, “critical thinking then becomes a daily experience” (Elliott, 1996, p. 49), a way of being.

Constructivists believe that learners come to the learning situation with previously acquired knowledge from other learning experiences. This prior knowledge affects what new knowledge learners will construct from the new learning situation. Therefore, meaning-making, constructivists concur, is the ultimate aim of learning (Jonassen, Davidson, Collins, Campbell & Haag, 1995). Meaning-making requires articulation and reflection, both are proponents of critical thinking. Articulation and reflection involve internal, as well as social, negotiation. “We debate, wrestle and argue with ourselves [and] with each other ... meaning is the understanding that is derived from these processes” (Jonassen et al., 1995, p. 12). Johnson and Johnson (1991) based the cooperative or the collaborative learning paradigm on a notion that power structure in a
learning environment shifts toward a more active and egalitarian one from a competitive, passive one. According to these authors, cooperative or collaborative learning fosters social interdependence. They posited that if individuals worked together to achieve mutual goals, success is the outcome for all those involved. Fagin (1992) and Senge (1990) maintained that collaboration among health professionals is as essential as critical thinking. Thus, it seems logical that nursing education fosters collaborative learning.

A series of constructivist learning technologies to foster critical thinking has been the focus of numerous nursing education citations. The most prominent include problem, case or inquiry-based learning, role-play, journal writing and narrative. Findings from these studies offer variable, inconsistent and conflicting results. Explicitly, the inconsistent and conflicting results are partly due to the use of differing sampling populations and methodologies.

White, Amos, and Kouzekanani (1999) conducted a mixed method study evaluating the effectiveness of problem-based learning (PBL). Twenty-four registered nurses (RNs), participating in a course using PBL, were asked to evaluate the course using a researcher-developed questionnaire designed to solicit learning outcomes with open-ended questions. The outcomes identified by the study participants included critical thinking, learning to learn, collaboration, and personal growth. Comparable results were suggested in the study by DeMarco et al. (2002). These authors conducted a qualitative study evaluating the experiences of senior-level nursing students using case-based instruction. Over a 10-week term, participants worked through one hour, weekly case-based learning experiences using small group work. Seven students were interviewed over the 10-week time frame. Six thematic groupings emerged as distinct experiences and included "critical thinking, stimulation of thinking from a whole perspective, experimentation with solutions, reframing problems, changed thinking, multiple perspectives" (p. 169).

In contrast, Magnussen, Ishida and Itano (2000) sought to measure the effects of inquiry-based learning (IBL) on critical thinking. The purpose of the study was to determine if IBL enhances critical thinking after the exposure to IBL. The newly admitted undergraduate student nurses of 1991 were the subjects of this study. They participated over a period of four years, beginning in the spring 1991 semester until the fall 1995 semester. The Watson-Glaser (1980) critical thinking appraisal was administered to the 228 participants during their first semester and to 257 participants in their final semesters of the program. Of this number, 150 were paired
scores collected from the same student. Findings resulted in no statistical difference between the two scores, with the exception of students who were initially low at the onset.

Jenkins and Turick-Gibson (1999) examined role-play and critical thinking. Using a qualitative approach, the authors surveyed alumni over a three-year period. Alumni responses were generally positive suggesting role-plays were effective in promoting critical thinking and applying knowledge gained to their practice. Yet, Christiaens and Baldwin (2002) cite limitations to role-play that include disengagement in the activity as it is not perceived as real or finding role play "embarrassing, intimidating or outside of his/her personal or cultural comfort zone" (p. 251). To overcome these limitations, Christiaens and Baldwin (2002) proposed combining role-play and cooperative learning. "Working with a partner makes it difficult for students...to choose not to participate...and [they] may feel less intimidated" (p. 251).

Support using clinical narratives, storytelling and journal writing emphasise the effectiveness of the narrative and reflective practices approach as a learning technology to foster critical thinking (Baker, 1996; Cooper, 2000; Geanellos, 1996; Haffer & Raingruber, 1998; Heinrich, 1992; Ironside, 1999a, 1999b; Kirkpatrick, Ford & Castelloe, 1997; Swenson & Sims, 2000). A recent study conducted by Khok and Chubeli (2002) sought to determine the effectiveness of reflective journal writing in promoting the reflective thinking of seventeen, fourth-year undergraduate student nurses in a psychiatric clinical practice placement over a six-month period. Employing a qualitative, contextual, explorative, descriptive research design, the authors' results were mixed. Accordingly, the authors suggested that self-evaluation led to intellectual growth and self-awareness, indicating a positive perception. However, reported negative perceptions were that reflective journal writing was time consuming and challenging without clear guidelines and expectations. The authors concluded that journal writing does promote critical thinking and the use of the developed guidelines will minimise the negative perceptions. While it appears nurse educators have widely accepted the educational benefits of clinical narratives, storytelling and journal writing, research into these learning technologies is minimal and hampered by the lack of reliable and widely accepted methods for assessing critical thinking.

2.1.3 Educational Cyberspace

A third pattern emerging from the literature reveals educators turning to educational cyberspace. Recently, newer information technologies have emerged, resulting in the expansion
of learner control, more opportunities for dialogue in asynchronous and synchronous modes, and an emphasis on critical thinking skills. Learning technologies such as the Internet, interactive television, and advances in telecommunication have created a more learner-centred environment for learning (Bates, 1995; Bischoff, Bisconer, Kooker & Woods, 1996; Graveley & Fullerton, 1998; Landis & Wainwright, 1996; Mallow & Gilje, 1999; Naidu & Oliver, 1996; Wambach, et. al., 1999). There are two major classifications of research that focus on educational cyberspace in nursing education.

The first classification is studies measuring the efficacy of the technology as a cognitive tool. The findings of this body of research infer no significant difference in learning outcomes between educational cyberspace and face-to-face learning environments (DeAmicis, 1997; Knowles, 2001; Leeseberg-Stamler et al., 1999; Napholz & McCanse, 1994; Saranto et al., 1997; Simons et al., 2001; Thiele et al., 1999). No significant difference and inconsistent findings are also prevalent in the computer-assisted learning literature. For example, Gilbert and Kolacz (1993) explored the effectiveness of computer-assisted instruction (CAI) with small-group review as a supplement to teaching calculations. The sample consisted of 127 first-semester student nurses enrolled in an associate nursing degree program. The subjects were randomly assigned to either the CAI or small-group review supplemental instruction groups. A faculty-constructed 20-item exam was administered to both groups after two weeks of receiving 50 minutes of the supplemental instruction in calculations. An analysis of covariance of the scores of both groups revealed no significant difference.

Wong et al., (1992) sought to explore the efficacy of computer-simulation as a strategy for evaluating decision making among undergraduate student nurses when formulating care plans. A commercially prepared computer-assisted simulation was implemented in a course for third year student nurses and used over a period of one semester. Data were collected using a faculty-developed eight-item questionnaire at the end of the semester. Sixty-four per cent of the participants perceived the computer-simulation as positive. However, 75% of the participants found it time-consuming. Approximately 50% of the participants perceived it to be inferior to the traditional written method. Rouse (2000) examined the effectiveness of computer-assisted learning in teaching undergraduate student nurses about congenital heart disease. The study compared three groups of students enrolled in a paediatric nursing course. The first group of students received a traditional lecture, while the second group was exposed to the computer-assisted learning strategy. The third group received a combination of both lecture and computer-
assisted learning. Differences between the groups' pre and post-scores on a twenty-item multiple-choice test were analysed using variance analysis procedures. The authors reported a significant improvement in scores for all groups, no significant difference between the lecture group and the computer-assisted learning group but a significant difference in the combination group. The findings of this study inferred that when used together, traditional learning and computer-assisted learning can provide an improvement in learning over when either is used separately. Implicitly, factors such as students' learning styles, learning paradigms, satisfaction and comfort level with the educational cyberspace directly affected these findings (Eakin, Brady & Lusk, 2001; Effken & Doyle, 2001; Ross & Tuovinen, 2001; Schweizer, 1999). Nevertheless, educational cyberspace provides some learners with another avenue for learning.

The feasibility of technology as an interactive, collaborative learning tool is the second major classification of studies of educational cyberspace. Emerging from the literature are claims that suggest computer-mediated communication enhances the development of critical thinking in educational cyberspace. Asynchronous computer-mediated communication is cited as the most common form of communication in educational cyberspace. Naidu and Oliver (1996) explored the potentiality of a computer-mediated communication environment to introduce problem-based learning in order to stimulate critical reflection among student nurses. In a study covering a period of 16 weeks, 80 fourth-year baccalaureate student nurses were assigned to four groups. Each case situation, based on a selected topic, required the student nurses to post their reflections on the mailing list so that the group members could also share their opinions. Using factor analysis of all students' transcripts, the authors found that students reflected and critically discussed the case with peers, and identified possible solutions together within the distributed learning environment. Student feedback also suggested that they valued being able to read, to discuss their peers' opinions and to work together to identify solutions to the cases.

Andrusyszyn et al. (1999) examined computer-conferencing in a graduate nurse course as a means to support reflection and meaningful interactions. The sample consisted of ten graduate student nurses and three faculty members. A researcher-designed a 20-item Likert-scale evaluation form was used to obtain information about student and faculty perceptions regarding computer conferencing, learning and the degree of interaction between faculty and student, and student and student. Descriptive statistical methods were used. Student and faculty responses indicated that computer conferencing fostered a learning environment and promoted positive "social construction of knowledge" (p.5). Explicitly, the authors suggest viewing their findings
with discretion, as they were anecdotal in nature. Despite this warning, this study infers that asynchronous computer-mediated communication\(^1\) is a learning technology that can facilitate interaction and critical thinking.

Studies focusing on synchronous computer-mediated communication\(^2\) focus on the use of multi-user domains or multi-object-oriented domains. Multi-User Domains (MUDs) and Multi-Object-Oriented Domains (MOOs) are text-based, virtual environments in which synchronous communication takes place between players logged on at the same time, assuming a particular role or character. The players use specific commands to write text that describes objects such as characters, rooms, and things that create space. The players interact with, manipulate, or construct the story based on the interaction. Or, they may simply talk with each other in the created spaces with text. The commands also allow players to discover who else is currently logged on, to name and describe themselves, to communicate with other players, and to write text conveying non-linguistic cues such as emotions, physical appearance and actions. Fanderlai (1996), Holeton (1998) Looi (1999), Looi and Ang (2000), and Murray (2000) all claimed that the types of activities that can be created for a MOO or MUD are limited only by the imagination of the teachers and learners. Moreover, Fanderlai (1996) noted that the medium for which MOOs and MUDs are designed provides constructivist-supported learning environments, is interactive and requires a high level of thinking skills to play. Only now is empirical research in the educational literature beginning to document this new learning technology. I turn next to the literature on instructional design, development and delivery of educational cyberspace.

2.2 Design and Delivery of Educational Cyberspace

It is difficult to ascertain the exact date of the adoption of cyberspace as a viable medium for learning. Yet, the literature contains numerous citations offering its unparalleled propensity to revolutionise higher education (Bates, 1995; Harasim, Hiltz, Teles & Turoff, 1995; Kearsley, 2000). Early journal citations primarily feature the novelty of educational cyberspace, often leading educators to 'jump on the bandwagon' (Thurmond, 2002). In these cases, technology appears to emerge as a pivotal driving force toward curriculum development rather than

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\(^1\) Computer-mediated communication refers to human communication via computers and includes many different forms. The term asynchronous is usually used to describe communication which data can be transmitted intermittently rather than in a steady stream or in real-time. Definition taken from http://www.webopedia.com

\(^2\) Computer-mediated communication refers to human communication via computers and includes many different forms. The term synchronous is usually used to describe communication which data can be transmitted in real-time rather than intermittently. Definition taken from http://www.webopedia.com
philosophical and pedagogical principles. Educators simply added content to the educational cyberspace environment attempting to simulate the face-to-face environment only to capitalise on the potential of educational cyberspace as a learning technology. Sternberger (2002) posited that “there is an assumption that, because word-processing software can save documents in hypertext mark-up language, a course in [educational cyberspace] requires little preparation” (p.170). This implication raised concerns among leaders in educational cyberspace, including Bates (1995, 2000), Billings (1999, 2000), Cheek, Gillham and Mills (1998), Harasim et al., (1995), and Laurillard (1993).

Without thoughtful reflection on the choice of the instructional framework or the delivery approach and their distinguishing features, optimal learning can be jeopardised. Sternberger (2002) summarised that “congruence between instructional methods and the media is a must for a successful design” (p. 170). The more recent articles reveal a shift toward purposeful decision making as it relates to instructional design and delivery of educational cyberspace. It is time to move beyond asking if educational cyberspace is an acceptable medium to asking how best to use it (McBeath & Siragusa, 2000; Ross & Tuovinen, 2001).

2.2.1 Educational Cyberspace Delivery Approaches

There are three delivery approaches to educational cyberspace: the remote classroom, the systems-based independent study, and the network-multi-media approach (Bates, 1995). Of the three prominent delivery approaches of educational cyberspace, the remote classroom and the systems-based independent study approaches have been utilised extensively. The network multimedia approach in educational cyberspace is in its infancy. It is important, however, to note that each approach has a set of distinctive characteristics. Comparing the approaches, it is apparent that each of their perceived limitations can also be viewed as particular strengths.

In a remote classroom approach, cyberspace is used to re-create a virtual alternate classroom for a small group of learners at a remote site via videoconference. The educator provides instructional material in real-time. Teaching and learning in the remote classroom is frequently in concert with activities in a regular face-to-face classroom. The underlying strength of this approach can be attributed to its ability to increase access to education and its 'real-time' ability to deliver educational content to learners, geographically dispersed, who could otherwise not attend the university or college setting sponsoring the offered course. Moreover, it also provides the possibility for interaction among peers at each of the different satellite sites.
(Kearsley, 1986). Wright and Cordeaux (1996) demonstrated that collaborative work among learners was possible while using this approach. Learning is delivered to a group of learners rather than to an individual. The didactic, lecture format is employed, resulting in a more teacher-centred learning environment. This approach can be costly, not particularly user-friendly and create time delays while information is being transmitted to the distant sites. Learners at the different sites often are required to sit in specific seating arrangements as it is difficult to 'zoom in' on individual faces (Lochte, 1993). Despite the live, spontaneous nature of the remote classroom, this may be perceived as decreasing the flexibility of the 'any time, any place' learning phenomenon of educational cyberspace that the systems-based independent study or the networked multimedia approaches offer.

The systems-based independent study approach (SBIS), learners are free from the time and place restrictions of the remote classroom approach. Learners study independently at a time and place that suits their schedules. Learners are provided with a variety of instructional materials and access to an educator via telephone, facsimile or electronic mail. Explicitly, the strength of the SBIS approach is its individual, learner-centred feature. It provides learners with the ability to control portions of the learning process. The approach removes the hindrances of time and place, resulting in the flexibility of learning 'any time and any place' (Richey, 1986). The approach's instructional design and development approach are also visible elements of its utility. Using a team and a front-end (Bates, 1995) approach, careful attention is given to ensure that learners move through the material in a self-directed manner. Historically, an objective and behaviourist approach is firmly established within the systems-based independent approach. As a result, learners worked passively through predetermined content, without much room for personal meaning, collaboration and reflection. The predominant means of interaction occurs between teacher and learner. This type of interaction often creates a sense of social isolation for the learner. Despite the validity of the planning and evaluation approach taken at the onset of the particular project, following a systems-based independent study approach can be perceived as very time consuming.

The networked multimedia approach emerged in the early 1990s from the convergence of four learning technologies: the Internet, multimedia, computer-mediated communication, and computer-assisted learning (Harasim et al., 1995). Learners study both independently and collaboratively at a time and place that suits their schedules. Learners are provided with a variety of instructional materials accessible via the Internet and interact with peers via computer-
mediated communication. Learners can also access an educator via telephone, facsimile, electronic mail or computer-mediated communication. The underlying strength of the networked multimedia approach is its collaborative, learner-centred approach, emphasising Laurillard's (1993) interactivity concept. It also capitalises on a constructivist and a resource-based perspective as opposed to the passive, didactic nature of the remote classroom approach (Dérr & Seel, 1997). Bates (1995, 2000) contends that little attention has fallen on the network multimedia approach because of its emerging nature.

2.2.2 Purposeful Decision Making

Previous literature on evaluation of educational cyberspace, especially during the design and development phases, has focused predominantly on the summative form of evaluation (Manias, Bullock & Bennett, 2000). While summative evaluation is essential to determine learning outcomes, information gathered for formative evaluation greatly informs decisions made during the design and development phases of a learning technology for educational cyberspace (Alexander & Hedberg, 1994). Instructional design is a process that involves planning for and evaluating factors that directly influence learning so it can be thoroughly facilitated (Bates, 2000; Reiser & Dempsey, 2002; Schweizer, 1999). Venezky and Osin (1991) and Bates (2000) underscored the relevance of a guiding decision-making framework or model to successfully plan and evaluate the design of educational cyberspace. The educational literature is rich with articles on instructional design models or guiding frameworks. Underlying each model or framework is varying philosophical and epistemological underpinnings (Kearsley, 2000). Many of these models or frameworks follow a linear approach to design. For example, Romiszowski (1992) created a step-by-step linear, systems approach to decision making. This is the most traditional, characterised as reflecting a behaviourist perspective. The focus is narrow and focuses solely on content delivery. Other models or frameworks offer an open and flexible approach. Laurillard (1993) proposed a conversational framework, framed within a cognitive perspective. She argued that decision making should emphasise academic dialogue between teacher-learner and learner-learner. Bates (2000) presented a more holistic, constructivist framework. Kearsley (2000) argued that a constructivist rather than an objective approach in design and delivery is better suited for educational cyberspace.

Bates (2000) outlined a practical, question-oriented framework called ACTIONS that consists of seven categories. The first category is access in which accessibility of the particular
learning technology is assessed. Assessing the cost of the overall infrastructure of the particular learning technology is the intent of the second category. Choosing the appropriate epistemological tradition, perspectives on teaching, theory of learning and instructional design comprise the third category, teaching and learning. The fourth category consists of assessing the degree of interactivity and the user-friendly nature of the learning technology. Organisational issues such as the development approach, delivery method, student and faculty support and institutional context are the focus of the fifth category. Novelty and speed are the six and seventh categories, respectively. The aim is to analyse the newness of the learning technology and how quickly it can be implemented within the infrastructure of the organisation.

Correspondingly, in the nursing literature, there are articles related to purposeful decision making that address learning technologies for educational cyberspace design, development and delivery. Billings (2000) underscored the importance of a decision making framework as being how “an understanding of the complexity of teaching and learning in [educational cyberspace] can be facilitated by a framework that specifies the variables and their relationships” (p. 60). Billings (2000) developed a framework that specifically addresses instructional design for educational cyberspace. This framework consists of five concepts including outcomes, educational practices, faculty and learner support and the use of technology. Billings, Connors and Skiba (2001) tested this framework to determine best practices. Data were collected from 219 students enrolled in educational cyberspace in three universities. The questionnaire consisted of fifty-two questions that were clustered into fourteen themes. Findings reported that convenience, accessibility, computer proficiency, active learning, interaction and connectivity with faculty and peers were factors that enhanced a positive learning outcome in educational cyberspace. Compatibility between appropriate pedagogical principles and learning outcomes was also demonstrated. With results from their research, Billings et al. (2001) developed a set of standards that can determine best practices and can be used as a guiding framework in educational cyberspace design.

These findings are consistent with the thinking of DeBourgh (2001), Koeckerits, Malkiewicz and Henderson (2000) and Sternberger (2002). Koeckerits et al. (2000) proposed that Chickering and Gamson's (1987) ground-breaking seven principles of good practice in undergraduate education can be easily applied to educational cyberspace. In redesigning a traditional face-to-face course into a dynamic and interactive course for educational cyberspace, Sternberger (2002) used both Chickering and Gamson's (1987) seven principles of good practice
and Jeffries' (2000) hyperlearning model. She concluded that the process of embedding pedagogical principles into the infrastructure of educational cyberspace supports optimal learning. Central to that success was congruency between these principles and the chosen media, along with careful attention to the diversity of learners. Similarly, DeBourgh (2001) concluded that educational cyberspace built on the tenets of pedagogical principles—such as cognitive apprenticeship, communication, collaboration and coaching—supports positive learning outcomes.

2.2.3 Design Principles of Educational Cyberspace

Research on infrastructure design principles of educational cyberspace is in its infancy. However, there is a surprising amount of consistency among authors. When designing the infrastructure of educational cyberspace, the literature indicates that a factor critical to optimal learning is the incorporation of “usability design” (Henke, 1997, ¶ 6). Bannen and Milhelm (1997) also suggested that educational cyberspace be described in terms of its design characteristics. Boyce and Winnie (2000) proposed additional criteria to be considered that includes factors such as branching capabilities, user interface and navigational design that presents information in a multi-dimensional format. “The presentation structure should be designed so as to reduce the effort required of users to find the information required” (McCormack & Jones, 1998, p. 77). It is important that content is clear, accurate, appropriate for the level of the learner and flows in a logical manner. Navigation tools need to be simple and consistently accessible, allowing the learner to move to internal and external sites with ease (Butler, 1997; Cornell & Martins, 1997; Mills, 2000). Hawley and Desborough (1998), Khoiny (1995), Ribbons (1998), and Yoder (1994) suggest that quality affects student learning, interest and motivation.

It is essential to also address the divergent learning style with varying visual, textual and audio cues to accentuate learning, interest and motivation among learners (Cooper, 2000; Ribbons, 1998; Winfield, Mealy, & Scheibel, 1998). Without visual impact of shape, type size, aesthetically pleasing colour, and contrast, educational cyberspace is uninteresting and demotivating. Cotrell and Eisenberg (1997), DeBra (1996), and Jones and Farquhar (1997) also supported this position. These authors asserted that text should be limited and hyperlinked in order to avoid scrolling and reading pages and pages of information while increasing learner control and flexibility. The inclusion of graphics and sound, in combination with text, is also a
common principle (Cotrell & Eisenberg, 1997; DeBra, 1996). Explicitly, the addition of static or dynamic images and sound must serve a clear instructional purpose. Furthermore, too much textual or graphical information may also slow download time, resulting in less than optimal learning (Campbell, 2000; McCormack, & Jones, 1998).

Communication and interactivity are the most powerful tools that instructional designers of educational cyberspace have at their disposal. Connectivity involves connecting learners with other learners, learners with the teacher, or teachers with learners, via computer-mediated communication (Kennerly, 2001; VandeVusse & Hanson, 2000). Lack of socialisation is frequently offered as a criticism against the use of educational cyberspace. However, Johnson and Johnson (1994) and Hill's (1997) results indicated otherwise. This is consistent with Cragg (1994) and Bachman and Panzarine's (1998) findings. These authors found that learners in educational cyberspace formed strong bonds using computer-mediated communication. Furthermore, the use of educational cyberspace-based collaborative learning technologies has proven to be one of the most explored areas (Harasim et al., 1995). However, the findings demonstrate that incorporating computer-mediated communication applications does not guarantee productive interactive dialogue (Burge, 1994; Harasim, 1990; Jones & Farquhar, 1997; Jones & Okey, 1995). Activities need to be designed to elicit communication and collaboration (Berge, 1995; Rohfeld & Heimstra, 1995). Learning in educational cyberspace requires support, guidance and feedback. Wilson (1991) reported that learners with more previous experience and a positive disposition towards educational cyberspace and computers in general have significant less anxiety than learners with little experience with, and a negative attitude toward, educational cyberspace. Thus, it can be assumed that with adequate explanation and exposure to educational cyberspace and computers in general, anxiety and negative attitude is lessened (Khoiny, 1995).

Most of the reviewed literature is conceptual and anecdotal in nature. Little research addresses the effects related to compatibility and integration of heterogeneous learning technologies and multiple pedagogical approaches in the design or delivery of learning in educational cyberspace. I turn now to the literature to examine action research in order to discuss briefly its historical origins and its use in nursing, justifying it as a fitting methodology for my research study.

2.3 Action Research

There is no consensus on how best to explore undergraduate student nurses' learning to think critically in educational cyberspace. A growing trend is to use action research, which is a
systematic and reflective inquiry that educators can use to study an area of interest specific to their professional context. The action research process is emergent in design and can result in new learning, personal awareness and educational change. As a methodology, it fuses the elements of theory and practice. In research related to nursing education, educators have traditionally been seen as objects of the research study or recipients of its findings, but rarely the actual researchers (Hyrkäs, 1997). Hyrkäs (1997) posited that educators who assume a role of object of the research study or recipients of its findings lead to widening the historical gap that exists between theory and practice. For nursing education to increasingly develop, Holter and Schwartz-Barcott (1993), Hyrkäs (1997) and Riding, Fowell and Levy (n.d.) argued this traditional approach may not always be proven to be effective. Action research is accepted as an appropriate methodology to decrease this theory and practice gap (Holter & Schwartz-Barcott, 1993; Rolfe, 1998). This can be achieved because the basic assumption in action research is that “only members of a community can explore and develop their own community's functions in the best possible way” (Hyrkäs, 1997, p. 803).

2.3.1 The Historical and Philosophical Basis of Action Research

Scholars John Collier (1945), Kurt Lewin (1946) and Lawrence Stenhouse (1975) were influential in founding action research. Stenhouse's (1975) ideology was further grounded in the seminal work of Stephen Kemmis (1993) and John Elliott (1991) on action research. Kurt Lewin (1946) is credited as the individual who conceptualised this methodology as a collaborative problem-solving cycle to advance organisations. It is Kemmis (1993) & Elliott's (1991) work that is recognised as “the greatest impetus to the resurgence of contemporary interest in educational action research” (Kemmis, 1993, p. 180). Action research originated, in part, from the Frankfurt School where critical social theory was evolving at a time when positivism was failing to provide answers to all empirical questions, primarily because of its inherent reductionist nature. The members of the Frankfurt School contradicted this position with a proposal arguing a claim that individuals possess the ability to reflect upon a situation and effect change during the process of research (Carr & Kemmis, 1986).

Among contemporary action researchers, action research is viewed as being context-bound, lived, pragmatic and future-focused (Calhoun, 1994; Carson & Sumara, 1997; Hart & Bond, 1995; Kemmis & McTaggart; 1988; Whitehead, 1989). Boomer (1987) stated that action research is “deliberate, group or personally own[ed] and conducted, solution oriented
investigation" (p. 8). Carr and Kemmis (1986) explained action research as "a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices and the situation in which the practices are carried out" (p.162). Within these definitions, four basic themes emerge: empowerment, collaboration, acquisition of knowledge, and social change (Masters, 1995, ¶6). Action research draws upon the concept of praxis and this is particularly relevant to nursing education as this methodology is grounded in maintaining the focus on practice in reality rather than practice in a controlled environment.

2.3.2 The Typologies of Action Research

Part of the confusion I found in searching action research literature is its association with various labels such as participatory research, collaborative inquiry, teacher (insider) research, emancipatory research, and action learning. Action research is also associated with various typologies. Grundy (1982) identified three modes of action research as technical, practical and emancipatory. Similarly, Holter and Schwartz-Barcott (1993) recognised action research as a technical collaborative, a mutual collaborative or an enhancement approach. McKernan (1991) distinguished action research as a scientific-technical view, a practical-deliberative view or a critical-emancipatory view. Implicitly, each of these authors' frameworks of action research has its unique set of principles and approaches. The differences of each of the authors' perspectives are in the underlying assumptions and worldviews. Each framework is aligned with three major philosophical research paradigms, empiricism, interpretism and post-modernism. Masters (1995, ¶32) provided a useful overview of action research in relation to each of the major paradigms and these are shown in Table 2.1.

Explicit to insider action research is its emphasis on educators' researching their own practice within their own classrooms to improve teaching and learning, evaluate strategies, and raise questions about underlying assumptions and values about teaching and learning. This approach also prompts educators to reflect critically on their own practice (Coghlan & Brannick, 2001; Webb, Turton & Pontin 1999). Implicit to insider action research is its ability to bring to the fore the tensions that are at the heart of an educator's identified issue and to narrow the rift between theory and practice. This is accomplished by situating the educator in a dual role of producer of theory and immediate user of that theory, increasing a broader understanding of what is meant by teaching and learning (Borg, Gall & Gall, 1993; Carson & Sumara, 1997;
McTaggart, 1994). Thus, it is a fitting methodological framework to address the research questions I outlined in Chapter One.

### Table 2.1 Types of Action Research

<table>
<thead>
<tr>
<th></th>
<th>Empiricism</th>
<th>Intrepretism</th>
<th>Post-Modernism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophical Base</td>
<td>natural sciences</td>
<td>historical -hermeneutics</td>
<td>critical sciences</td>
</tr>
<tr>
<td>The Nature of Reality</td>
<td>single, measurable, fragmental</td>
<td>multiple, constructed, holistic</td>
<td>social, economic exists with problems of equity and hegemony</td>
</tr>
<tr>
<td>Problem</td>
<td>defined in advance</td>
<td>defined in situation</td>
<td>defined in the situation based on values clarification</td>
</tr>
<tr>
<td>Relationship Between Knower and Known</td>
<td>separate</td>
<td>interrelated, dialogic</td>
<td>interrelated, embedded in society</td>
</tr>
<tr>
<td>Focus of Collaboration Theory</td>
<td>technical validation, refinement, deduction</td>
<td>mutual understanding, new theory, inductive</td>
<td>mutual emancipation, validation, refinement, new theory, inductive, deductive</td>
</tr>
<tr>
<td>Type of Knowledge Produced</td>
<td>predictive</td>
<td>descriptive</td>
<td>predictive, descriptive</td>
</tr>
<tr>
<td>Change Duration</td>
<td>short lived</td>
<td>Longer-lasting, dependent on individuals</td>
<td>social change, emancipation</td>
</tr>
<tr>
<td>The Nature of Understanding</td>
<td>events are explained in terms of real causes and simultaneous effects</td>
<td>events are understood through active mental work, interactions with external context, transactions between one's mental work and external context</td>
<td>events are understood in terms of social and economic hindrances to true equality</td>
</tr>
<tr>
<td>The Role of Value in Research</td>
<td>Value-free</td>
<td>Value-bounded</td>
<td>related to values of equity</td>
</tr>
<tr>
<td>Purpose of Research</td>
<td>discovery of laws underlying reality</td>
<td>understand what occurs and the meaning people make of phenomena</td>
<td>uncover and understand what constrains equity and supports hegemony to free oneself of false consciousness and change practice toward equity</td>
</tr>
</tbody>
</table>

Source: Masters (1995, p. 32)

2.3.3 The Steps of Action Research

As previously described, action research has evolved into various typologies, however, all embrace an iterative process involving several steps. The steps of action research are continuous, cyclical in nature and overlap (Carr & Kemmis, 1986; Elliot, 1991; Patterson & Shannon, 1993). They consist of identification of an issue, collection of data, interpretation of data, taking action based on the interpreted data and reflection. During the identification step, the insider action researcher identifies a question. The focus of the collection step is to develop a
plan to answer the question and to implement it. In the next step, interpretation, the insider action researcher analyses the collected data and observes for trends, patterns and reflects on conclusions. Characteristically, based on this reflection, a new plan is created and the iterative cycle begins anew.

The question emerging from my practice is how I, as a nurse-educator, can enhance the development of undergraduate student nurses' critical thinking in educational cyberspace as a means to assist them to integrate theory in practice. The proposed plan is to describe the effects of Nursing Journeys: Virtual Reflective Centre (NJVRC), an innovative researcher-developed, virtual, pedagogical, simulation instrument, aimed at the promotion of critical thinking among undergraduate student nurses.

The study consists of two insider action research cycles. The focus of the first cycle originates with the exploration of the contributing factors that led to the creation and pilot testing of a prototype of NJVRC. The cycle terminates with a description of required modifications to the prototype based on the sought feedback from the two nursing faculty and one member from the instructional media department. A second insider action research cycle is initiated with the description of my experiences of conducting, reporting and interpreting the findings of implementing NJVRC on a larger scale within my classroom. It terminates with a presentation of conclusions, implications for practice and recommendations that explore opportunities for further discourse, prompting another cycle. Figure 2.1 outlines the steps of the two action cycles of insider action research I follow throughout this study.

2.3.4 The Validation of Action Research

The manner in which this methodology is perceived today remains contentious, yet it has been a particular form of inquiry since the 1940s (Calhoun, 1994). Action researchers, grounded in interpretism or post-modernism, argue that their work is judged in traditional, empirical terms. However, "issues such as replicability and generalisability are no longer seen as appropriate criteria for action research" (McNiff, 2002, p.107).
According to McNiff (2002), new criteria are required to assess action research reports. Intensifying this issue of developing new criteria is the perception that action research is viewed as either an object to be studied or as a lived practice. Winter (1989) suggested that regardless of form, action research reports should demonstrate six principles. These principles are:

- **Reflective critique**—an account of a situation in which the writer demonstrates reflection on issues and processes and makes explicit interpretations, biases, assumptions and concerns upon his or her decisions. Winter (1989) explained that accounts can give rise to theoretical considerations and new research questions.

- **Dialectical critique**—where reality is consensual and validated through language. Phenomena are therefore examined within context, focusing on elements that are perceived to be unstable and require change.

- **Collaborative resource**—acknowledging that all participants in action research are co-researchers, acting and learning together.

- **Risk**—accepting the possibility that change threatens or reveals preconceived ideas about practice and established ways of practising that are narrow in scope.
• Plural structure—capturing the notion of multiplicity of viewpoints, leading to multiple possible actions and interpretation. A report acts as a support for further discussion rather than a final conclusion of fact.

• Theory, practice transformation—a process of demonstrating a harmonious relationship between theory and practice. Theory informs practice and practice refines theory (pp. 43-65).

2.3.5 The Application of Action Research in Nursing

Nurses are increasingly engaging in action research to improve aspects of nursing practice, education and management that contribute to the development of the profession. Of the available action research literature, nursing practice is the predominant context of study; few studies focus on nursing education and management. However, the following studies are significant to understanding how insider action research influences teaching practices and fosters student learning in nursing education.

Employing action research to highlight the effectiveness of selected teaching practices, McCaugherty (1991) recognised the need to develop a teaching approach that promotes reflection and experiential integration of theory and practice among student nurses. The major feature of the teaching approach is small group discussion. In the action phase, McCaugherty (1991) used a group comparison method and met with three to five students of the experimental group over a forty-five minute period several times a week. In the reflective phase, McCaugherty (1991) found that impromptu meetings with these students suggested that this approach had value. Walker, Bailey, Brasell-Brian, and Gould (2001) evaluated problem-based learning, involving four lectures and 17 students. Data were collected over a sixteen-week period and findings indicate significant implications. The authors discovered that explaining the roles of both students and the lecturer, and the purpose of problem-based learning in detail, was essential for optimal learning. Maintaining ongoing open lines of communication is also critical to learning process. Coates and Chambers (1990) explored profiling as a way to improve clinical competence among student nurses. After identifying a need for a more reliable way to assess clinical competence, the authors designed a booklet consisting of twenty-two competencies. To promote student involvement, six students participated in an assessment of themselves on a pre-selected day. The data collected from the students' feedback suggested the strategy was useful, although modifications to the language were required to increase clarity. This initiated a second
cycle of action research. A different set of students participated in assessing their competencies over a longer period of time, resulting in findings similar to the first cycle.

Using action research to promote student learning, Wai-chi Chan and Wai-tong (2000) and Donaldson (1992) implemented and evaluated the use of learning contracts to facilitate learning among undergraduate student nurses in clinical practice. In the first study, the authors recognised the need to integrate learning contracts as a means to foster self-directed and active learning, a move from didactic teaching. Forty-seven third year undergraduate students and four clinical facilitators participated in this study set in a mental health practice setting. Since both clinical facilitators and students were new to learning contracts, an information session on their use was conducted before the commencement of the practicum. Included during this information session were guidelines for developing a learning contract. A week prior to the beginning of the practicum, students met with the clinical facilitator to review and finalise their learning contracts. At midterm and at the end of the practicum, student learning was assessed based on the criteria outlined in the learning contracts. Using questionnaires and semi-structured interviews with both students and clinical facilitators collected data. The findings indicated that the use of learning contracts was an effective learning technology. Learning contracts increased the interactions between student and facilitator, developed self-direction and increased motivation among the students. However, the lack of experience in using learning contracts and the increased faculty workload were identified as critical limitations. In the second study, Donaldson (1992), acting as researcher collected data using a questionnaire, students' self-evaluations from her seven undergraduate student nurses in a medical-surgical setting and her researcher's notes. She found similar benefits and limitations of using learning contracts to that of Wai-chi Chan and Wai-tong (2000). The benefits Donaldson (1992) identified included an increase in self-direction and student motivation. Participants also noted that guidance and preparation time in developing a learning contract were pivotal to an optimal learning experience. A common limitation among both studies was increases in faculty workload.

Jasper (1994) implemented and evaluated a student-centred learning paradigm among twenty-two student nurses enrolled in a graduate nursing program. Students and teacher were viewed as equal partners in the entire research process. A questionnaire was co-developed which addressed areas such as motivation and learning styles. The findings of the study suggested that a student-centred approach was contingent upon clear expectations and ongoing teacher feedback regarding students' perceived learning needs. Similarly, Rolfe (1994) focused on integrating a
student-centred evaluation process while a course was in progress rather than accepting the perceived inadequacies of traditional course evaluation delivered at the end. The students were seen as equal partners and developed an evaluation framework from the start of the course and implemented the results over the course of the term. Although the research was contextual, Rolfe (1994) argued that the process of student-centred evaluation is applicable to any course. The findings indicated several advantages and significant underlying causes of difficulties were made explicit. This allowed the students and teacher to be aware of the students' agenda and to modify the curriculum accordingly, thereby contributing to a more dynamic, growing and living curriculum.

2.4 Summary

This chapter continues to develop Reflection-Before-Action, the initial phase of the reflective thought process. It also summarises the gathering and interpretation steps of the first cycle of this insider action research study. When a literature review is presented well it adds to an understanding of a selected issue or problem. There are several points relevant to this study that assist in delineating the scope of the literature.

First, the need for critical thinking in nursing is now perceived as an expected outcome of nursing education and is in direct response to the increasingly changing health care environment. To this effect, philosophical focus and developing pedagogical activities have shifted toward a learning, constructivist paradigm as a way to foster critical thinking among undergraduate student nurses. Yet, critical thinking is still widely defined and explored primarily in the context of the face-to-face classroom arena. The majority of research is quantitative and uses differing samples of student nurses. This makes it difficult to determine patterns of definite conclusions. Reports on educational cyberspace and critical thinking have only recently permeated the nursing literature. Yet, I could not find any research that assessed the integration of heterogeneous learning technologies and multiple pedagogical approaches in the design of educational cyberspace.

Second, notwithstanding that the literature on instructional design and delivery is anecdotal and conceptual in nature, this review provided me with the necessary foundation to create a researcher-developed pedagogical, virtual simulation instrument aimed at the promotion of critical thinking among undergraduate student nurses in educational cyberspace. In terms of instructional design and development, the findings suggest that the underlying principles of
interface design, coupled with a fitting learning epistemology and a learner-centred, constructivist perspective, are central to optimal learning in educational cyberspace. Likewise, addressing the various learning styles and the kind of interactivity manifested in educational cyberspace influences the developmental breadth of critical thinking.

Finally, while there is no consensus among scholars on how best to explore critical thinking in educational cyberspace, there is a growing trend toward action research. Across several social science disciplines, action research has been attaining momentum and credence, emerging as a justifiable process and method of inquiry. In nursing education, action research has been used primarily to assess and evaluate various learning technologies. While nurse educators are increasingly engaged in action research and making major contributions to nursing knowledge, there are few who assume the role of researcher.

Within the context of this study, reflective inquiries—particularly from a praxis perspective—can only propel the need for an evidence-based approach of nursing education, or what Boyer (1990) referred to as “application scholarship of teaching” (p. 23). Jones (1995) interpreted Bawden's (1989) view of praxis as “praxis includes deliberate action by which theory or philosophy becomes integrated into the social reality of the practice environment” (p. 127). Central to insider action research is the potency of maximising the meaningfulness of reflection, developing a repertoire of professional knowledge, improving educational practices and fostering learning. In the next chapter, the first insider action research cycle is completed with an overview of the action and reflection steps, initiating the second cycle of this insider action research study. In this chapter, the reader is introduced to Nursing Journeys: Virtual Reflective Centre. Chapter Three also ends the first phase of the reflective thought process, Reflection-Before-Action.
In the preceding two chapters, Reflection-Before-Action represented the identification of an issue, how I as a nurse-educator enhance the development of undergraduate student nurses' critical thinking in educational cyberspace, and the influencing factors that led to the decision to pursue a research study. The gathering and interpretation of the relevant literature led to postulating the necessity to expand the boundaries of the current body of knowledge.

Significantly, critical thinking is perceived as an expected outcome of nursing education. To this effect, the philosophical focus and the development of learning technologies have shifted toward a learning paradigm as a way to foster critical thinking among undergraduate student nurses. Moreover, action research has been attaining momentum and credence, emerging as a justifiable process and method of inquiry to explore the effects of these learner-centred learning technologies. Yet, the context in which these learning technologies are being explored is primarily the face-to-face classroom. Reports about educational cyberspace have only recently permeated the nursing literature. The most prevalent learning technologies utilised in educational cyberspace are designed with homogenous pedagogical principles, often leading to mixed findings related to their effectiveness in promoting critical thinking.

Customarily, the third chapter of a dissertation is a description of the proposed methodology and research design. Research methodology provides the researcher with a sense of the direction regarding how a study will proceed (Marshall & Rossman, 1989). Mason (1996) employs the analogy of an "intellectual puzzle" (p.21) to describe the purpose of research. The manner in which scholarly inquiry is conducted embodies the researcher's philosophy, strategy and instruments employed in the pursuit of the research goal, and the quest for possible answer(s) to research question(s). Briefly, the research questions as described in Chapter One are:

- How does Nursing Journeys: Virtual Reflective Centre promote the development of critical thinking among undergraduate student nurses?
How do undergraduate student nurses describe their experiences of learning to think critically while engaged with *Nursing Journeys: Virtual Reflective Centre*?

How do the blending of the theoretical underpinnings of role-play, computer-mediated communication and collaborative and problem-based learning promote the development of critical thinking among undergraduate student nurses?

Reflecting on these questions, the immediate role of a researcher is to design a methodological approach to solve the puzzle. I partially transgress from this tradition and designate this chapter—*Creating a Pedagogical, Simulation Instrument*—to an explanation of the instrument as it plays a central role in this research study. The description of the research design, including the setting and selection of study participants and data collection analysis procedures, is summarised in the next chapter, *Chapter Four*.

Reflection-Before-Action continues to be the focus of this chapter by acting and reflecting upon the literature relevant to the design of *Nursing Journeys: Virtual Reflective Centre*. The purpose of this chapter is to describe the creation of NJVRC from its early conception to its preliminary evaluation. It includes descriptions of the underlying instructional design, learning epistemologies, the characters, and the case narratives.

Tailoring a pedagogical, virtual simulation instrument requires careful attention. As I progress into the action and reflection phases and near the end of the first action research cycle, I draw from the literature four insightful and vital points that are characteristically relevant in the design of *Nursing Journeys: Virtual Reflective Centre* (NJVRC). The first is that without purposeful decision-making about the choice of a pedagogical framework or model and its distinguishing features, optimal learning experiences can be jeopardised. Second, the nature of critical thinking is complex and its multifaceted dimensions must be considered in the assessment and overall design of any learning technology. Accordingly, the kind of interactivity and epistemological learning perspective manifested in educational cyberspace influences the developmental breadth of critical thinking. Third, as Billings (2000), Eakin, Brady, and Lusk (2001), and Khoiny (1995) suggested, the qualities inherent in learning styles of the intended target audience need to be also addressed in the interface design of any learning technology. Finally, a learning technology designed for educational cyberspace must also foster contextual learning, collaboration, effective communication and creativity.
3.1 Original Concept of Nursing Journeys: Virtual Reflective Centre (NJVRC)

The original conception of Nursing Journeys: Virtual Reflective Centre (NJVRC) was derived from the underlying principles of problem-based learning. Problem-based learning (PBL) is recognised as a learning technology that is constructivist and student-centred in nature. PBL is also designed to facilitate critical thinking (Boyce, 1995; DeMarco et al., 2002; Dowd & Davidhizer, 1999). Problem-based learning allows learners to actively solve problems that imitate real world experiences, enabling learners to integrate and apply their developing knowledge within the safety of the classroom (Ashbaugh & Kasten, 1991; Ertmer & Russell, 1995). Principles of problem-based learning seem to be the driving force behind computer-assisted simulations in nursing education (Khoiny, 1995; Malloy & DeNatale, 2001).

Nevertheless, many computer-assisted simulation programs are designed so that the individual interacts solely with the content and the medium. Critical thinking and making meaning then become a solitary activity (Manias et al., 2000; Ross & Tuovinen, 2001; Sternberger & Meyer, 2001). Adding the features of Multi-User Domains (MUDs) to NJVRC design expands its potential effectiveness in supporting active learning, collaboration and critical thinking. Johnson and Johnson (1991) described cooperative or collaborative learning as a vehicle to create an egalitarian power structure within the classroom. It is believed that active learning, co-operative learning and critical thinking are intimately linked (Copp, 2002; MacIntosh, MacKay, Mallet-Boucher, & Wiggins, 2002; Youngblood & Beitz, 2001).

Multi-User Domain (MUD) is a game, fantasy-like environment housed on computers connected to the Internet. MUDs allow many individuals to share a common virtual space in which they can communicate through text in synchronous (real) time with one another about their thoughts or act out a role in a situation, imagined or real (Dyrli, 1996; Fanderlai, 1996). Variations on the MUD concept include MOOs (Multi-Object-Oriented virtual environments) and MUSEs (Multi-User-Simulated Environments). In exploring several MUDs in cyberspace, I noted that people develop virtual personas (commonly referred to as avatars), establish relationships with others and make decisions based on past, present and future events they encounter within the connected virtual community. Simulated events 'come alive', permitting the people to create a character, role-play the character, and interact with others to build a story and play it out. Within the educational domain, MUDs are being considered as a viable learning technology that can emphasise "learning, building, communication, cooperating, experimenting and interacting socially" (Dyrli, 1996, p. 20).
3.2 Description of Nursing Journeys: Virtual Reflective Centre

Recognising these benefits, NJVRC evolved into an interactive virtual health care centre designed to assist undergraduate student nurses with the development and refinement of their critical thinking skills, a competency fundamental to nursing. NJVRC was designed as an adjunct to a theoretical nursing course and as a place where undergraduate student nurses could meet and engage in virtual dialogue with their peers. The aim of NJVRC was to assist undergraduate student nurses to reinforce theoretical principles and to practice collecting information, examining assumptions, assessing the context, exploring possibilities, planning priorities, evaluating nursing care and reflecting collaboratively. In short, they could actualise and practice critical thinking about course concepts and content through virtual role-play.

The underlying conceptualisation of critical thinking chosen for NJVRC was strongly influenced by Facione (1990) and Paul (1993) because the central tenets of these authors' views involve the contextual application of a set of affective dispositions, cognitive skills and intellectual standards to the reasoning process. NJVRC featured a number of case narratives that were set within various health care settings. Each case narrative represented a reconstruction of a real-life situation that may be encountered by undergraduate student nurses while in the practice setting. Real-life situations allow undergraduate student nurses to identify, analyse, synthesise, reflect and establish links between theoretical concepts of the curriculum and its application to nursing practice (Benner, Tanner & Chesla, 1996).

3.3 The Design of Nursing Journeys: Virtual Reflective Centre

I initially designed NJVRC as a single web page\(^3\) that contained several hyperlinks\(^4\) to case narratives that depicted real-life nursing events. Other links to chat rooms\(^5\) were also added to the web page to promote textual dialogue and discussion among undergraduate student nurses about the case narratives. To add a sense of realism, undergraduate student nurses logged-in\(^6\) to NJRVC chat rooms as the characters in the case narratives, permitting them to not only discuss possible solutions but also to build and act out the story. Figure 3.1 represents the NJVRC original home page template.

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3 The starting point of a web site. It usually contains an index to other documents. Definition taken from http://www.webopedia.com
5 A channel, or space where one can type text into a message box to engage in dialogue with others via the Internet. Definition taken from http://www.webopedia.com
6 A combination of information that authenticates identity allowing access Definition taken from http://www.webopedia.com
Welcome to NJVRC, a virtual reflective centre (NJVRC) for student nurses to develop, strengthen and refine their skills of critical thinking and decision making, competencies so fundamental to nursing.

NJVRC is a place where you can meet in a synchronous environment (a chat room) with other peers and engage in dialogue about the process of critical decision making through role playing a given character within chosen narrative.

NJVRC, that you now will be entering, is divided into several areas. Each of the areas represents a virtual health care setting, constructed from reality. They are:

- Adult Care
- Long Term Care
- Community Care
- Mental Health Care
- Child/Pediatric Care

In each of these settings, you will be introduced to various characters and narratives.

Each narrative is a reconstruction of a real-life situation that you may encounter in the practice setting. This will allow you and your peers to co-create and establish links between the theoretical concepts of Self and Others of the Collaborative Nursing Process.

Because each narrative represents only a small point in time, you and your peers can develop the story line and move it in any direction you like, including introducing the presence of the other characters. Only imagination will limit creativity.

It is the intent that you and your peers will work through these different narratives as if you were the actual characters so that you build and reflect upon your developing critical decision making skills in a stress-free learning environment.

You may be asked to reflect about your experiences with NJVRC asynchronously (online discussion forum) and/or in your Self & Others class. May 3, 2001

Ways of seeing, Ways of Learning in Cyberspace

To enter NJVRC, please, click on the NJVRC link.

Creativity and fun are strongly encouraged!

Figure 3.1 Original NJVRC Homepage

From this original template, NJVRC evolved into a multiple paged web site. In addition to the underlying constructs of MUDs and problem-based learning, other processes followed for the design and delivery of NJVRC were adapted from instructional design frameworks from Bates (2000), Laurillard (1993), and Sternberger (2002). The delivery approach of NJVRC is framed within the networked multimedia model. The theoretical underpinnings of role-play and experiential learning were also foundational constructs of NJVRC. Bates (1995) described a framework that is functional in nature and offers a holistic, constructivist perspective, whereas Laurillard (1993) emphasised cognitive development through dialogue as the focus for media selection. Sternberger (2002) outlined a non-linear approach within four dimensions, including critical thinking. Even though the models are distinctively different, the authors underscored the relevance of being guided by a consistent theoretical, pedagogical framework or model when designing the infrastructure of learning opportunities for educational cyberspace. "The medium for delivery must provide congruency between the learner, the instructional activity and the objectives" (Sternberger, 2002, p. 173). WebCT™ (Universal Learning Technology, Inc, Andover, MA) is an authoring courseware software that contains a set of designer tools that assist teachers in the design, development and delivery of the visual layout of a course in...
3.3.1 The Interface Design

The original web page template was created using Netscape Composer™, (http://www.netscape.com) a web page software editor that facilitates the placement of text, graphics and the creation of HTML-based hyperlinks in documents, as I was familiar with its functions and commands. All pages were designed with a suitable colour scheme in order to minimise distraction. Graphics were created with Adobe Illustrator™ (http://www.adobe.com) for high quality. The graphics were sized appropriately to support easier downloading (Campbell, 1999; Mills, 2000). The text, including the hypertext links, was clearly written, using an appropriate font style and size, facilitating easy navigation and accessibility throughout the site. All pages were designed for a standard 15" monitor screen and a display setting of 1024x768 pixels to minimise the need for horizontal scrolling. Pop-up windows with embedded hyperlinks were used so the undergraduate student nurses could navigate to additional explanations, yet remain oriented within the central page.

3.3.2 The Learning Paradigm

The predominant epistemology and learning perspective of NJVRC is that of subjective knowledge and constructivism as undergraduate student nurses "build an internal representation of knowledge, personal interpretation of experience and....share multiple perspective[s]" (Bednar, Cunningham, Duffy & Perry, 1992, p. 21; Garrison, 1995). Within a constructivist paradigm lie two core assumptions. First, learners actively construct contextual meaning from what they learn and with whom they learn, in ways that contribute to their experience. "It is an active process in which learners construct knowledge in a way that makes personal sense" (Tippins, Tobin & Hook, 1993, p. 223; Peters, 2000). Second, that learning and knowing are adaptive and challenge the notion that truth exists outside of the mind of the individual. However, the epistemological perspective of objectivism also plays a pivotal role in construction of the learning situations, as there is a distinct body of nursing knowledge that is independent of the learner. Cognitivism stresses the significance of individuals' internal processes and the relationships of how they perceive, interpret, store and recall information. From this perspective,

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7 HTML is an acronym for Hyper Text Markup Language. HTML codes format a word processing document so it can read on a web browser. Definition taken from http://www.webopedia.com
it is an active process of building internal schema, learning how to categorise and interpret nursing knowledge and also how to access information when needed. Derry (1989) referred to this as examples of "schema building, pattern recognition, and reflective self-instruction" (p. 3-6).

3.3.3 The Access to NJVRC

WebCT™, like other authoring courseware with a password protection function, requires the user to log on with a user identity and accompanying password to access a particular course. A user identity and password were created for each character. Undergraduate student nurses were given a list of these identities and passwords in order to assume different characters with every engagement. Figure 3.2 represents WebCT™'s logon page. A significant advantage of logging on as an assumed character is anonymity that allows creativity to blossom (Fanderlai, 1996).

![WebCT Log On Page](image)

**Figure 3.2 WebCT™ Log On Page**

3.3.4 The Development of the Characters and Case Narratives

The creation of twenty characters and six case narratives depicted real health professionals and situations. In designing MUDs or problem-based learning activities, it was important to construct the educational context with realism to promote experiential and situated learning, enabling the opportunities for undergraduate student nurses to integrate theory with practice. In this case, practice was represented as the virtual health care centre in NJVRC. Equally significant, the context needs to suit the targeted audience's learning needs (Eakin et al, 2001; Khoiny, 1995; Weis & Guyton-Simmons, 1998). In this regard, the cast of characters included representative health professionals, clients and family members that an undergraduate nurse would encounter in the health care practice setting. Each had a unique name, personal and professional backgrounds, their own diverse health issues, medical histories, unique family
dynamics and ethnic backgrounds. The focal point of each case narrative was drawn from the concepts and content of the course in which the undergraduate students were enrolled.

Within NJVRC itself, there were five virtual spaces of nursing practice. These included acute care, child/family care, long-term care, community care and mental health care. Each virtual space was represented by a graphic depicting a building structure (see Figure 3.3). Once the undergraduate student nurse had read the overview and instructions on the home page, he or she could select one of the five hyperlinked health care buildings and navigate within the chosen building as one of the twenty characters relevant to the particular case narratives where the character resided.

Once inside the selected health care building, the undergraduate student nurse was instructed to read the case narrative or to seek additional information from the pop-up windows. The undergraduate student nurse could also directly go to the specific chat room to initiate communication with their peers who assumed the other virtual characters depicted in the particular case narrative. Figure 3.4 illustrates a prototype of a case narrative in NJVRC. In this case narrative, the focus was on pain management. Pi, the registered nurse, is reviewing Conceptia, the client's chart. Pi discovers that Conceptia received an analgesic every four hours the previous evening but none during the night. Meanwhile, Conceptia is wondering whether the scheduled appointment with the physiotherapist can be postponed because of the pain she feels. The guiding questions are seen in the figure as facilitative prompts and created in order to assist the students in establishing a dialogue base.
Pi is at the nurse's desk reviewing Conceptia's chart and discovers that Conceptia has not had any pain medication since early am. "From yesterday's MAR, Conceptia received Tylenol #3 every four hours until evening and none during the night. I wonder how her sleep pattern was?".

What additional data will Pi collect to validate the clinical impression of pain?

What standards of care will Pi discuss with Conceptia to alleviate the adverse effects of analgesics?

What standards of care will Pi provide to maintain Conceptia's level of comfort?

Meanwhile, the following thoughts are running through Conceptia's head in room VR1: "Where is that call bell? I'm in excruciating pain. There is no way I am getting out of bed today. Perhaps my scheduled appointment with Sutton can be postponed".

Instructions: Players, log onto Chat VR1 and collaboratively role play through this clinical narrative. Continue unfolding another chapter of the story. You may want to consider the guiding questions as you engage in dialogue. Once you have ended your dialogue await a visit from Les and Sutton.

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**Figure 3.4 Cognitive Perception: Pain Case Narrative**

3.3.5 **The Means to Interactivity**

Adding an interactive, computer-mediated communication application, such as synchronous communication, expanded the ways undergraduate student nurses constructed knowledge both individually and collectively as they interact with others. This feature also increased the realism of the situation presented by the developed characters and case narratives. The strength of computer-mediated communication lies in the central tenets of social constructivist epistemology. Underlying this assumption is that learning is contextual, and that learning experiences are constructed collaboratively through reflection and negotiation (Brown, Collins & Duguid, 1998). Using synchronous, computer-mediated communication, each undergraduate student nurse cast out their assumed role and subsequently responded to the other characters as if they were those characters within the context of the case narrative. The major disadvantage of computer-mediated communication is the lack of body and facial expressions and audible cues that normally occur during face-to-face communication.
The format of traditional computer-assisted simulations requires a learner to individually work through a problem using a step-by-step approach to an appropriate answer. Unlike the traditional computer-assisted simulations, NJVRC was designed so that undergraduate student nurses collaborated and were free to create the story depending on how the enacted characters responded and role played with each other. Subjectivity allows learners to make meaning and acknowledge multiple perspectives (Bender, 1995; Boschmann, 1995; Campbell, 1999; Doll, 1993; Laurillard, 1993). As Kurfiss (1988) stated, "in critical thinking, all assumptions are open to questioning, divergent views are aggressively sought and the inquiry is not biased in favour of a particular outcome" (p. 2). Figure 3.5 illustrates Virtual Room 1, where Conceptia resides and Pi is to enter.

Figure 3.5  NJVRC, VR1 Chat Room

3.4 Evaluation of NVRC

In order to add credibility and authenticity to each of the twenty characters and six case narratives, two faculty members from the nursing department, who were selected based on their expertise in nursing, subjected them to critical scrutiny to assess content validity. Subsequent editorial and content changes to the characters and case narratives ensued. One member of the college's instructional technology department reviewed NJVRC interface design, branching and navigation elements, all in an effort to refine and make revisions. The web pages, graphics, characters and case narratives were then uploaded to the NJVRC site on the WebCT™ server.

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3 The process of sending a file from one computer to another system. Definition taken from http://www.webopedia.com
The two faculty members from the nursing department explained that the characters and case narratives were perceived as real-life and the guiding questions were beneficial in the sense that they helped to clarify preconceived assumptions and initiate dialogue and critical thinking. The navigation within the site was fairly uniform with the exception of the direct access to NJVRC health care buildings. The one member from the instructional media department reported that having no direct access to NJVRC health care buildings increased user frustration because they had to reread the overview, instructions and directions. This member felt that the overview, instructions and directions to use NJVRC were somewhat clear, but suggested they be more simplistic in nature and hyperlinked to the home page. The pop-up windows were practical, but required more information, more graphics and easier access when moving from one window to another.

3.5 Modifications to NJVRC.

Following these suggestions, the first task was to make the necessary modifications to NJVRC. I redesigned the interface to incorporate the feedback and developed new characters and case narratives, for a total of twenty-eight characters and twelve case narratives. The same members of the nursing faculty and instructional media department who had examined the first prototype version of NJVRC then examined the modifications with the same degree of scrutiny as in the initial phase of refinement. Subsequent development and revisions to NJVRC were done using Dreamweaver™ (http://www.macromedia.com).

Dreamweaver™ is a web page editor that was more useful than Netscape Composer™ because it permitted me to be more creative in the design of NJVRC. I was introduced to this software after the original design of NJVRC infrastructure was complete. The new homepage (see Figure 3.6) contained four hypertext links to the various characters (Cast of Characters), each of the five virtual spaces of nursing practice, and the chat rooms (Enter NJVRC). The homepage also included an overview (About NJVRC) and explicit instructions (Directions) on how to use NJVRC.
Upon entering NJVRC, the undergraduate student nurse views a screen containing a shift report and information on the whereabouts of the character he or she is to role-play. From this point, the undergraduate student nurse points the mouse over the particular health care building and clicks the mouse (see Figure 3.7). This action takes the undergraduate student nurse to the case narrative and the particular chat room to begin a story.
Good Morning, this is Cinda with a report of the last 24 hours. Tag Listelle, in VR2 Chronic Care (building 4), will be cared by Sundeen. Dr. Fuller-Olu will in today to explain to Tag and Corelle the pathophysiology of a CVA. Lee More, in VR1 Chronic Care (building 4), will be cared by Jordie. Lee is very serious about living with diabetes. Cam wonders about diet management. Chaska has been asked to see Cam and Lee today. Camelle in VR2 Acute Care (building 1), will be cared by Sam. Hart is coming to visit today and I have asked Tino to come and stop by. Tala, in VR 1 Mental Health (building 5), will be cared by Amonte today. Notia has now become involved. Conceptia, in VR 1, Acute Care (building 1), will be cared by Pi today. Sutton is to review the use of a walker with Conceptia. Les wants to be there to also understand how to use the walker. Cran, in VR 1 Community Care (building 2), will be cared by Kurty today. Dysan is coming to review the principles of administering eye drops to Curt and his daughter, May. Have a pleasant day.

NOW click on the appropriate building to begin the story.

Figure 3.7 Entering NJVRC

3.6 Summary

This chapter completes the first insider action research cycle and the first phase of the reflective thought process, Reflection-Before-Action. This phase entails a process of thinking about intentions prior to action (Greenwood, 1993). In this chapter, the reader was introduced to the process I undertook to arrive at the decision to assume a nurse-educator-researcher role, improve my practice as a form of scholarly inquiry, and develop an appropriate instrument to pursue this goal. Prepared with a broader perspective on critical thinking and educational cyberspace, and equipped with a well designed but unevaluated research instrument, the stage was set to carry out a research study.

The importance of a pedagogical framework as a guide for developing, designing and evaluating a learning technology in educational cyberspace is the focus of this chapter. Learning technologies that are well designed for educational cyberspace are built using a pedagogical
framework. Design begins with selecting the appropriate framework or model to meet the identified learning outcome.

The design of *Nursing Journeys: Virtual Reflective Centre* is guided by the efficacy of three pedagogical frameworks adapted from Bates (2000), Laurillard (1993) and Sternberger (2002). Based on these authors' views, several key ideas were stressed: create an interactive learning technology, emphasise active learning and collaboration, and humanise educational cyberspace by addressing diverse ways of learning. This chapter also included descriptions of the underlying epistemological learning paradigms, the instructional, interface design, the case narratives and characters, and the subsequent modifications of NJVRC.

The next chapter, *Chapter Four*, initiates the second phase of the reflective thinking process, Reflection-In-Action. It also describes the initial steps—identify and gather—of the second cycle of this insider action research study. The literature review provided me with the necessary foundational principles to develop, and design a pedagogical, simulation instrument. The literature review also confirmed that the insider action research was a fitting methodological approach for me to follow. Included in *Chapter Four* is an overview of the research design for selecting the context and study participants, data collection and analysis used in this study and the methods used to ensure the validity, accuracy and quality of the research findings. It begins with an overview of my research philosophy.
CHAPTER FOUR—ARRIVING AT CYBER-TEXTUAL MEDIATED KNOWING

The focus of the introductory three chapters of this dissertation is to describe the reflective practice of Reflection-Before-Action phase embedded within the first of two insider action research cycles. As previously summarised in Chapter One, Reflection-Before-Action entails a process of thinking about intentions prior to action (Greenwood, 1993). It is during this phase that I identified the contributing factors that led to the justification for improving my practice, pursuing this goal as a research study within the context of my own classroom, and the need to create and evaluate a learning technology suitable for educational cyberspace. From the members of the nursing faculty and instructional media' responses, it appears that, with several modifications to the NJVRC interface design, it may be an appropriate pedagogical, simulation instrument to explore critical thinking in educational cyberspace.

Progressing to the second phase of the reflective thought process, the emphasis in Reflection-in-Action phase is to think consciously and conscientiously about the reasons behind actions while in the midst of these actions (Drevelahl et al., 2002; Schön, 1983, 1987). I begin the second phase of the reflective thought process by initiating the first three steps—re-plan, identify and gather—of the second insider action research cycle. The plan is to implement and evaluate NJVRC as an instrument in a research study aimed at exploring its significance in the promotion of critical thinking among undergraduate student nurses. The purpose of this chapter is to give a detailed description of how I arrived at Cyber-Textual Mediated Knowing, the preliminary theoretical model. The chapter begins with a brief overview of my research perspective in relation to the major research paradigms and introduces the research design, the setting and selection of study participants and the analytic strategy for data collection and analysis. The steps to ensure the trustworthiness of the findings are also outlined.

It is generally acknowledged in the research literature, that decisions about a research methodology should be informed by the underlying philosophy to which a researcher subscribes and the nature of the research questions (Mason, 1996; Simmons, 1995). As explained in the preceding chapter, a research methodology provides the researcher with direction on how to conduct a study (Marshall & Rossman, 1989). The literature review confirmed that insider action
research was a fitting methodological approach for me to address the proposed research questions outlined in Chapter One. The second task was to frame my research methodology.

4.1 The Major Research Paradigms

A research paradigm is a conceptual framework or a set of beliefs that guides action about the way in which data about a phenomenon should be gathered, analysed and used (Patton, 1990; Simmons, 1995). Burrell and Morgan (1979) state “to be located in a particular paradigm is to view the world in a particular way” (p. 24). For the researcher it is critical to distinguish the subtleties of his or her paradigm. Three major research paradigms are identified in the literature—empirical, interpretive and post-modern (Denzin & Lincoln, 1994; Hood & Leddy, 2003). Each is guided by three paradigmatic questions: What is the nature of reality? (ontological question); what is the nature of knowledge? (epistemological question); and what is the process of transforming things believed into things known? (methodological question).

The empirical paradigm is also commonly referred to as the analytic, positivist or quantitative paradigm and represents the most established of the three paradigms that guide research, primarily in the physical and natural sciences domain. Empiricism involves a belief that reality is static and is observed, predicted, controlled and repeated from a scientific, experimental perspective. Separation from the phenomena under study is preferred so that objectivity can be maintained. Proponents advocate theoretical reduction as an important goal of research and that parts of reality can be separated from the whole while cause and effect relationships among the parts can be revealed. Proponents also accept that knowledge exists apart from the beliefs of individuals (Denzin & Lincoln, 1994; Hood & Leddy, 2003). As the nature of many social science disciplines evolved, nursing being no exception, there has been much discussion regarding the appropriateness of the empirical paradigm for the social sciences (Glesne & Peshkin, 1992; Lacey, 2000; Merriam, 1998; Mertens, 1998).

Many labels also refer to another dominant research paradigm—the interpretivist approach. These include terms such as naturalistic, constructivist, hermeneutic, phenomenological and qualitative approaches. The central tenet of interpretivism is that reality is dynamic and continually evolving. Interpretivists believe that the individuals who are active in the research process socially construct reality. Additionally, interpretivists view the whole as more than the sum of its parts. A phenomenon is studied, as a whole, in a natural setting and from a subjective perspective and there is no detachment from reality to explain its different
dimensions. The emphasis is on process, and knowledge is considered contextual and value-bound (Denzin & Lincoln, 1994; Hood & Leddy, 2003).

Where advocates of the empirical paradigm believe in objectivity and followers of the interpretive paradigm affirm subjectivity, proponents of post-modernism—or the critical praxis paradigm—view reality as having multiple meanings that may conflict instead of having “a single, transcendent meaning” (Reed, 1995, p. 71). Lather (1991) asserted that the post-modern approach “increases awareness of the contradictions distorted or hidden by everyday understandings, and in doing so it directs attention to the possibilities...” (p. 52). Inherent to this paradigm is that theory and practice are interrelated in a hermeneutic and dialectic process. Knowledge is both derived from, and guides, practice. Reflection has the potential to enhance self-awareness of dominating influences, leading to change. Knowledge is therefore shaped by historical, cultural and socio-political influences. Post-modernists believe in pluralism and view knowledge as unpredictable and aimed at contradicting the status quo (Hood & Leddy, 2003; McNiff, 2002). Dissension is purposeful for provoking alternative meanings (Holmes & Warelow, 2000; Lather, 1991).

4.2 Situating Insider Action Research

Insider action research is a means of gaining personal insight into the process of teaching and learning in an educator's own classroom. As discussed in chapters one and two, there are several reasons cited in the literature why educators should participate in insider action research. One of its primary benefits is that it contributes to advancing the current body of knowledge and supports educators in becoming producers of knowledge rather than solely consumers of research. Knowledge development displaces “concern over the truth of one's findings to concern over the practical significance of the findings” (Reed, 1995, p. 72). Most significantly, insider action research can result in new student learning and promotion of educational change (Carr & Kemmis, 1986; Carson & Sumara, 1997; McNiff, 2002; Parsons & Brown, 2002).

My research approach can be described as insider action research, framed within a blending of the central tenets of the interpretive and the praxis paradigms. Philosophically, I view reality as subjectively constructed. Individuals create the social world; therefore, there are multiple realities. I sought to interpret these multiple realities among eleven undergraduate student nurses by exploring the effects of NJVRC on the promotion of critical thinking in educational cyberspace. I also believe that research must be practical and have immediate
application. Knowledge is shaped by historical, cultural and socio-political influences and is derived from and guides practice. Immersed in my classroom, I simultaneously observed and acted on reflective observations, tacit knowledge and input from the study participants. Accordingly, this process enacted educational change. Figure 4.1 summarises the methodological underpinnings of this research study.

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Figure 4.1  Diagrammatic Representation of my Methodology

4.4 Setting and Selection of Study Participants

The groundwork for this study took place in a college in British Columbia. Permission was sought from the college to conduct research and recruit study participants. A letter, addressed to the head of the college and the nursing department, requested permission to access the institution and invite participation in the research (Appendix A). A meeting was set up to meet with both parties to further explain the details of the research. Permission was granted, contingent upon ethical approval obtained from the University of British Columbia's ethics committee. Tichen and Binnie (1993) identified possible ethical issues with the insider action.
research model that is set in an educational context. Of particular importance pertains the recruitment process and to the collection of information during the progress of a graded course. Prospective study participants need to be aware that their participation is entirely voluntary and they are free to withdraw at any time, without penalty to grades or progress in a course. As well, recognizing the hazards of eliciting data from the undergraduate student nurses while the course was in process, I revised the research design to contain only one interview, which would be conducted at the end of the semester and after the submission of final grades. The university’s ethics committee subsequently approved this revision. This decision replaced the original plan of scheduling one interview at mid-semester and another at the end of the semester.

Once the ethical approval was obtained, the twenty-two undergraduate student nurses enrolled in a first year nursing course were invited to participate. I would facilitate this particular course. During the second week of the semester an information session was held where the purpose of the research was defined and explained. Details about the students’ role as study participants, including that participation was voluntary and withdrawal could occur at any time without penalty. My own role as researcher was also reviewed. Matters referring to collection, transcription, storage of the raw data and confidentiality were also discussed. I explained that a code name would be used to ensure anonymity and this identifier would be recorded on all documentation. At the end of the information session, a reply card (see Appendix C) and a letter outlining all the details of the study covered in the information session (see Appendix B) were distributed in class.

I had originally suggested using a convenience sample of eight students for this study. However, twelve of the twenty-two reply cards indicating interest in participating in the study were returned, seven indicated no interest and three replies were not returned. I met with interested study participants individually to once again review the research in detail. The research was verbally defined and explained to each participant. Details related to the participation, collection, transcription, storage of the raw data and confidentiality were also discussed. Study participants were also made aware that they would not be asked to identify themselves during the interview, when journal writing, or while engaged in the online discussions with their peers. Study participants were also made aware that the interviews would take place once their grades were submitted to the registrar in order to adhere to the ethical standards of the research study. Study participants were also made aware of how the findings of
the study were to be used. A signed written consent form (see Appendix D) was obtained from each of the twelve study participants prior to the commencement of the research.

At the end of the meeting, the study participants were given a journal, coded with their personal identifier, and were asked to begin recording their experiences over the semester while engaged with NJVRC. Each study participant also received a copy of the signed consent form. Before the interviews were scheduled to begin, one study participant withdrew from the research study. None of this particular study participant’s journal excerpts, online dialogue or behaviours gained from participant-observations were used as findings for this research study.

4.5 Research Methods

Much of the literature on insider action research does not adequately explain how data is collected and analysed. The analytic strategy I chose for this research is commonly referred to as grounded theory analysis (Glaser, 1978; Glaser & Strauss, 1967; Strauss, 1987; Strauss & Corbin, 1990). Grounded theory shares a salient feature with insider action research in that it is emergent in nature. In grounded theory, reality is socially constructed and it aims to provide interpretive explanations of events as they occur (Rolfe, 1996). The collection and interpretation of data therefore occurs simultaneously. This permits the gap between theory and practice to be made more explicit, advancing practice and, in this case, enhancing student learning (Sheldon, 1998). Grounded theory seeks to inductively build theory about a phenomenon using analysed themes and patterns that have been grounded in systematically gathered data (Strauss & Corbin, 1990). “One does not begin with a hypothetical theory and then prove it” (Backman & Kyngös, 1999, p. 148). This approach can also be used to generate a new point of view about an existing phenomenon (Smith & Biley, 1997; Strauss & Corbin, 1990). In this approach of gathering data, theory is perceptibly generated through a continual interplay between collection and analysis of data. This is referred to as “the method of constant comparison” (Glaser & Strauss, 1967, p. 101-116).

Constant comparison drives the researcher to focus on the theory that is emerging from the data, rather than assimilating new information into a pre-existing theory. This does not mean that pre-existing theory is not relevant. As Strauss and Corbin (1990) recommended, theoretical sensitivity is the “attribute of having insight, the ability to give meaning to data, the capacity to understand, and the capability to separate the pertinent from that which is not” (p.42). This contributes to conceptually denser and well-integrated descriptions of the data being grounded.
Theoretical sensitivity also helps the researcher maintain an attitude of scepticism about the pre-existing views.

Selective sampling is a process that includes choosing participants before data collection begins and collecting data within a certain time frame (Schatzman & Strauss, 1973). Yet, “if data are collected within a certain time frame and not analysed simultaneously, it is difficult to determine the theoretical shape and to recognise saturation” (Backman & Kyngös, 1999, p. 149). Selective sampling often proceeds to theoretical sampling (Sandelowski, 1995b). The principle of theoretical sampling includes a process of alternating between data collection and data analysis. The process seeks information about concepts that are repeatedly present or notably absent in the data “and are of sufficient importance to be given the status of categories” (Strauss & Corbin, 1990, p.176). This process terminates only when theoretical saturation is achieved—when new data confirm what has already been found and does not bring any new aspects to the research (Strauss & Corbin, 1990). I used selective and theoretical sampling (Strauss & Corbin, 1990) as the study progressed.

4.5.1 Data Sources

This study employed a variety of data gathering sources, including participant-observation, interviews, journal writing and artefacts (online dialogue excerpts) in order to strengthen the trustworthiness of the research findings through multiple sources (Bogdan & Biklen, 1998; McNiff, 2002; Tomal, 2003). Data sources were gathered over a period of one semester while the study participants engaged weekly with Nursing Journeys: Virtual Reflective Centre (NJVRC). The entire class also engaged with NJVRC, because it was a set component of the course. Each week I assigned the study participants to specific characters of NJVRC and case narratives. This step was to ensure that only the study participants' online dialogue would be collected, avoiding the possibility of collecting data from the non-participants. Every week, study participants had the opportunity to ‘play’ a client, a health professional or a family member and work through the various case narratives.

One of the primary data collection techniques used in an insider action research study includes interviews for collecting data that is descriptive and narrative in nature. Seidman (1998) stated that “if a researcher's goal...is to understand the meaning people involved in education make of their experiences, then interviewing provides a necessary, if not always completely sufficient, avenue of inquiry” (p.4). Interviews served to elicit the participant's personal stories...
while engaged with NJVRC. Stories provide the audience with a glimpse of the world as perceived by the narrator. “Good stories are compelling and ...open up new possibilities for understanding. The best stories are the ones we learn from, linger in our memories and are often revisited for what they can teach us, for the insights they offer...” (Bullough & Baughman, 1998, p. 487).

Interviewing begins with the supposition that the views of others are meaningful, discernible and explicit (Patton, 1990). Since I could not directly perceive the study participants’ thoughts, feelings and convictions, I needed to ask questions that sought their perspectives regarding their experiences with NJVRC. Glesne and Peshkin (1992) and Mertens (1998) identified three forms an interview may take. These three forms an interview may take include structured, semi-structured or unstructured. A structured interview is one that follows a similar format for each participant. In a semi-structured interview, a researcher may ask the same questions of each participant, but also has the freedom to alter the sequence or probe for more information. The aim of an unstructured interview is to elicit as much information as possible about a particular event, topic or phenomenon from the participants. The most critical element to any interview, according to Mishler (1986) is to ask the right kind of questions in the right kind of format. The interview guide in this research was composed of open-ended questions as outlined in Appendix E. Open-ended questions allow participants to give freer responses (Glesne, 1999; Reissman, 1993; Tomal, 2003). Questions aimed to determine what, when and how the study participants experienced critical thinking in educational cyberspace while engaged with NJVRC.

A total of eleven semi-structured one-hour interviews were conducted after the study participants’ grades were submitted. The interviews took place in a private and quiet office at a mutually agreeable time. The interviews were recorded on audio-tape and conducted by first providing each participant with a context statement, “Thank you for participating in my study, before we begin, let me review...” and an opportunity to clarify any misunderstanding about his or her role. Special attention was placed on establishing rapport and a non-threatening environment. During this stage of the interview, I demonstrated respect for the study participants, using a non-judgemental perspective and established a confidential environment. It would appear from the nature and detail of the experiences being reported that I was successful in establishing an appropriate environment.
Initially, I asked the study participants to articulate their definitions of critical thinking and how they viewed the implementation of this definition while engaged in Nursing Journeys: Virtual Reflective Centre. To gain a greater description of this process, I asked each participant to describe a meaningful learning experience while engaged in NJVRC. From this point, the course of the interview was guided by the context of the study participants' story. Interview prompts and probes were also open-ended and used when appropriate to elucidate the study participants' description or evoke further response to the question.

In addition to the individual interviews, journal writing also served as a primary data source. Study participants kept a reflective journal throughout the semester. Journal writing served to capture significant personal narratives of the undergraduate student nurses. An inherent strength of journal writing is self-expression and, as Mallon (1984) pointed out, it has a built-in audience. In this way, journal writing can serve as a purposeful tool for critical reflection. As noted in the previous section, the study participants were given a journal, coded with their personal identifier, and were asked to begin recording their experiences over the semester while engaged with NJVRC. A brief description of the journal's purpose was written on the opening page of each journal. To minimise the risk of breaching the study participants' confidentiality, every undergraduate student nurse in the course kept a reflective journal. Allocated time was given in class at the end of each engagement with NJVRC to write in the journal. My personal journal was more comprehensive and mostly kept on a computer disk. It contained several folders and files relating to my experiences as a graduate student, novice researcher, nurse-educator, and ideas about the design of learning technologies and educational cyberspace and field notes. Hand-written documents and memos were placed along with the disk in a three-ring binder.

Other sources of data collection utilised in this study included participant-observation and artefacts, such as the online dialogue transcripts. Participant-observation is a method in which a researcher actively participates in the setting while simultaneously observing in order to gain access to data (Tomal, 2003). Participant-observation is particularly useful where self-reporting from study participants may distorted through biases such as Hawthorne effect, the impact on the study participants’ knowing that they are part of a research study (Polit & Hungler, 1998). The advantage of participant-observation is to gain data that may be unattainable using other data sources. However, this approach has many limitations such as difficulty in gaining access to a group (Polit & Hungler, 1998; Tomal, 2003). The benefit of being already immersed in this class
as the course facilitator lessened this limitation. This observational time allowed me to capture the study participants' patterns of engagement with NJVRC.

In total, I conducted ten hours of participant observation. Following Lofland and Lofland's (1995) recommendations, I jotted down notes consisting of key terms or phrases encountered during the sessions of engagement with NJVRC. These notes were then referenced to complete full field notes. These field notes were recorded soon after the class was completed to create a perception of what was being observed and expressed. Maykut and Morehouse (1994) justified this data collection technique and stated, “the keen observations and important conversations one has in the field cannot be fully utilised in a rigorous analysis of the data unless they are written down” (p.73). My field notes contained descriptions of the setting, study participants' habits, informal discussions, quotations and illustrations. Data were coded and entered into the comparative analysis process in the same manner as the interview data.

A final data source collected in this study was the artefact, or the product that emerged as the study participants engaged in NJVRC. According to Hodder (1995) and Tomal (2003) artefacts act as physical items that trace elements of behaviour that can provide significant insights; these may differ from those obtained through interviews, journal writing and participant-observation. Online dialogue transcripts were used to capture the study participants' patterns of application of their critical thinking abilities. To ensure that the online dialogue transcripts were saved after each engagement with NJVRC and not destroyed during a possible technical interruption, they were saved in a backup file, downloaded to a disk and appropriately coded with the date and the study participants' personal identifier. To minimise any ethical dilemmas, the saved online dialogue transcripts were not analysed until the submission of the study participants’ grades.

4.5.2 Data Analysis

As the interview data was one of the primary sources of data collection, I began with this source. Reissman (1993) recommended beginning the analysis process by transcribing the entire interview, including words, emotions, and pauses onto paper. A professional transcriber was engaged to transcribe the interviews for this study. To facilitate analysis of the transcribed interview data, I used three coding processes: open coding, axial coding, and selective coding.

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9 A precautionary process of copying a file to a second medium, such as a disk. Definition taken from http://www.webopedia.com
(Strauss & Corbin, 1990). The ideas that emerged from one interview were also explored and compared with other study participants at subsequent interviews. The main themes behind these ideas were coded in an iterative and constant comparative process, clustering into recognisable linked categories. Categories are emergent patterns that may be a description, observation or interpretation of the underlying phenomena (Strauss & Corbin, 1990). This coding process was also applied to the other data sources, searching for units of information, relationships and patterns. This involved seeking similarities and differences among the data. The overall goal was to organise the data in order to best describe the undergraduate student nurses' experiences of engagement with NJVRC.

I began by organising and assembling the data collected by date, data collection method, research questions and interview questions. Open coding is the part of the analysis that focuses on identifying, naming or labelling the data and where the aim is to discover abstract categories (Strauss & Corbin, 1990). During open coding, I first read each interview transcript to gain an appreciation of the text as a whole. I then re-examined the data line-by-line and assigned initial category labels to the ideas and units of information. These units of information ranged in length from a term or a short phrase, to a paragraph in length. I repeated the process when I read the remaining interview transcripts, the study participants' journal entries, my field notes and the online dialogue transcripts, continually using the constant comparison strategy.

The intent of axial coding is to establish connection between the categories that emerge from the open coding process (Strauss & Corbin, 1990). During axial coding, I began to identify similar units of information in successive interview transcripts. I used Microsoft's™ 'find' feature to identify these terms and upon identification, the units of information were then colour-coded. The colour-coded system was also used when searching for similarities in journal entries, my field notes and journal and online dialogue transcripts. These units of information were then assigned to major categories.

Selective coding is the process of choosing one category to be the core category and relating all other major categories to that particular category (Strauss & Corbin, 1990). With the selective coding process, the aim is to integrate and pull together the developing analysis, and develop a single storyline (Strauss & Corbin, 1990). During selective coding, I arrived at the core category and was able to relate the other major categories to this core category. The literature was also sampled selectively throughout the analysis to assist in supporting the emerging major
themes, categories and patterns. The following example illustrates the application of the coding process and the arrival of the theoretical model, *Cyber-Textual Mediated Knowing*.

During the interview process, I directed the study participants to focus on their experiences of role-play. Key words from the study participants' views included thinking about knowledge, role-playing knowledge, asking about knowledge, and not being afraid of knowledge. Donovan (1995) suggested that to minimise the inadvertent superimposing of participants' perceptions upon those of the researcher, care should be taken to employ the actual words, sayings and phrases employed by the participants. *Knowledge* emerged as a theme, a unit of information noted during the open coding and the constant comparison process. Literature was used concurrently to validate emerging themes. For example, Jenkins and Turick-Gibson's (1999) findings suggested that role-play stimulates knowledge development. This enabled me to develop a degree of theoretical sensitivity and attempt to understand the study participants' experiences as they understood it.

Several study participants expressed that role-playing assisted them to validate their degree of knowledge, and also helped them establish a personal perception of other health care professionals' roles, including the family; thus gaining a multi-dimensional perspective. Other study participants expressed that a knowledge base was essential. Anonymity was also identified as a benefit, as it decreased judgement or intimidation from peers while engaged with NJVRC. Several study participants also expressed the need to incorporate the other character's responses during role-play and reflect on what to say before typing their reply. Without this reflection, they stated that miscommunication occurred and learning was hindered. The study participants' inferred that knowledge was intimately linked to knowing. *Knowing,* therefore, was individually and collaboratively learned. During the axial coding process, *knowing* was further identified as constructed knowing, containing properties similar to that of a continuum and labelled as from *self-constructor of knowledge to others as co-constructors of knowledge.* During the selective coding process *constructed knowing* emerged as a core category and one of the five manifestations of *knowing* that established the preliminary theoretical model, *Cyber-Textual Mediated Knowing.* The coding process of this example is displayed in Figure 4.2. Further details of the coding process of each of the core categories of *knowing* are described in *Chapter Five.*
To actually think for myself.

In order to understand on a deeper level you have to have that knowledge. It makes you realise what you do know and what you don't know.

It reduced the anxiety levels by talking over a computer screen. I was not afraid to make a mistake or say something that was wrong.

And I was asking those questions based on her answers.

I began trying to get into the character and was analysing the feedback coming back to me and how appropriate it was.

### Figure 4.2 Example of the Coding Process

4.5 Trustworthiness of the Study

Lincoln and Guba (1985) used the term trustworthiness to account for credibility and accountability. Two main sources used in this study were triangulation and member checks. A source of trustworthiness in insider action research is obtained when there are multiple data sources (Bogdan & Biklen, 1998; McNiff, 2002; Tomal, 2003)—this is often called triangulation. Triangulation is a commonly endorsed method used to illustrate a more complete contextual portrayal of the phenomenon under study (Nagle & Mitchell, 1991; Shih, 1998). Triangulation minimises the risk of distortions that can occur when only one data source is employed. The triangulation of qualitative data may also, to some extent, serve to ameliorate
concerns about the Hawthorne effect. According to Fetterman (1998), “triangulation always improves the quality of data and the accuracy of research findings” (p.95). This study has used several data sources that complement each other and that increase the validity, quality and accuracy of the research findings.

A number of measures were taken in order to guard against researcher bias. It is important to recognise that I had a unique position within this research study and that my attitudes, perceptions and beliefs would add another perspective. It was my role as researcher to be open and make these attitudes, perceptions and beliefs visible, through reflective practice, while also being cognisant that the study participants’ understandings were not being overshadowed. Another strategy to reduce bias is member checks (Lincoln & Guba 1985; Maykut & Morehouse, 1994; Miles & Huberman, 1994). Maykut and Morehouse (1994) define member checks as verification whether the researcher “has produced a recognisable reality” (p. 147) in the study participant’s view. During the interview process, an on-going member check was conducted when I asked if my paraphrasing or summarisation was accurate. If I had been inaccurate, the participant would clarify the inaccuracy and I would then repeat the paraphrasing or summarisation process. Once the interview was complete, I summarised the whole interview using key phrases that I had recorded during the interview in order to frame my summary. At this time, the study participants were again asked if my summary of their views was correct.

In order to satisfy requirements of rigour, adherence to the six criteria identified by Winter (1989), as described in Chapter Two, were maintained throughout the study. An audit trail (Lincoln & Guba, 1985) was also formed. Interview and online dialogue transcripts, journals, and field notes were maintained throughout the investigation. The coding process was checked periodically with members of my doctoral committee. Member checks also provided the study participants opportunities to comment on “the accuracy of descriptions, explanations and interpretations” (Miles & Huberman, 1994, p. 48). At the end of the analysis, the core category and related categories that emerged from the coding process were also checked in follow-up interviews with each of the study participants via electronic communication. Lincoln and Guba (1985) claimed that sharing findings with study participants of the study helps to validate the data collection and analysis process. Each of the study participants agreed with the descriptions of the core category and related categories.
4.6 Summary

This chapter introduced the reader to Reflection-In-Action, the second phase of the reflective thought process. It also summarised the identification and gathering steps of the second cycle of this insider action research study. It began with an overview of the factors that shaped my research philosophy, the setting and the selection of the study participants, and the method used to collect and analyse the data, and then concluded with a summary of the steps undertaken to ensure trustworthiness of the finding.

Insider action research is a fitting methodological framework because educators can trace their self-reflective lived journeys of analysing their beliefs and values while gaining a greater understanding of the teaching and learning process, enhancing their own teaching as a form of research. An educator can also assume an active role of researcher, simultaneously acting on observations and input accordingly, enacting change. Insider action researchers can potentially produce theories from their tacit knowledge, resulting in the advancement the current body of knowledge of education.

Grounded theory, as the principal analytic strategy, is a systematic set of procedures to arrive at a theory about basic social processes. The aim of this inductive approach is to discover the underlying social factors that best shape the phenomenon being investigated. This study uncovered themes and patterns about what it meant to critically think while undergraduate student nurses were engaged with Nursing Journeys: Virtual Reflective Centre in educational cyberspace. In the next chapter, Chapter Five, the results of the study are outlined. Chapter Five completes the Reflection-In-Action, the second phase of the reflective thought process with a description of the interpretation step of the second cycle of this insider action research study. While sound interpretations are offered, derived from the research findings, my goal is to provide a thick, full description of the self-reflective journeys and experiences of undergraduate student nurses while engaged with NJVRC, in order to stimulate further reflection and scholarly discourse. The applicability of the interpretations of the research findings to similar educational settings rests solely with the reader and his or her particular educational situation.
As I continue with the second phase of the reflective thought process, Reflection-In-Action, I progress to the interpretation step of the second cycle of this insider action research study. While I remain focused on unravelling and interpreting the connections between pedagogy, research and change, I am simultaneously learning more about the effects of Nursing Journeys: Virtual Reflective Centre on the promotion of critical thinking in educational cyberspace through the exploration of the experiences of eleven undergraduate student nurses.

Chapter Four provided a synopsis of the research design for selecting the context and the study participants, the data collection and analysis procedures used in this study. The methods used to ensure the validity, accuracy and quality of the research findings were also described. An essential aspect in the dissemination and utilisation of research findings is a well-written research report (Backman & Kyngäs, 1999). Descriptive language is often cited as a way of providing the reader with clarity and an in-depth view of the entire research process (Tomal, 2003). It is important to note that data are only utilised to demonstrate how a theory is produced (Sandelowski, 1998) “and that it was indeed constructed from this data” (Backman & Kyngäs, 1999, p. 151). The purpose of this chapter is to report the analysis and interpretation of the data collected for this study in a clear and comprehensive manner.

5.1 Unravelling Connections between Themes and Patterns

As presented in Chapter Two, Carper (1978) identified nursing knowledge as being comprised of four interrelated and fundamental patterns of knowing. These patterns of knowing include, empirical, aesthetic, personal and ethical. Carper (1978) argued, “understanding these patterns is essential for the teaching and learning of nursing” (p. 13). In keeping with Carper’s (1978) thinking about understanding patterns of knowing as a key to unlocking the nature of nursing knowledge, this study identified a pattern of a way of knowing unique to educational cyberspace.
As a result of employing a grounded theory process, *Cyber-Textual Mediated Knowing* emerged as a preliminary theoretical model of a pattern of a way of knowing. *Cyber-Textual Mediated Knowing* involved a process that consciously shapes knowledge. It evolved when individuals were immersed in a cyberspace world, interacted as virtual characters with others as virtual characters, and perceived a true sense of a physical presence. Coupled with this sense of a physical presence and a developing sound knowledge base, a mediated dialogue was initiated. Unlike other verbal dialogues, these dialogues were textual and individuals perceived the notion of conversation through composing text.

As indicated previously, the findings presented here are derived from online dialogue transcripts, interview transcripts, study participants' journals and my field notes. Literature was used concurrently to validate emerging themes and patterns. Time, trust, facilitation, authenticity, anonymity, empowerment, confidence, participation, communication, reflection, learning and knowledge are identified as major themes important in the study participants' experience with NJVRC that were extracted from the data. Knowing appears as a prevalent pattern that bonds these themes, emerging as a core category of the preliminary theoretical model. A subsequent analysis of data identified that there are five distinguishing manifestations of knowing. These are represented as proficient knowing, authentic knowing, intrinsic knowing, constructed knowing, and interactive knowing and give rise to five discernible process-oriented patterns. These patterns are also identified with supporting data that establish the preliminary theoretical model, *Cyber-Textual Mediated Knowing*. These patterns are identified as from chaos to competency, from virtual experience to experiencing reality, from critical thinker as active learner to reflective thinker as discovered learner, from verbal communication to textual dialogue and from self-constructor of knowledge for others to co-constructors of knowledge. Each manifestation of knowing and related process-pattern is explained in greater detail in the next section.

### 5.2 Framework for Organising the Findings

The themes and patterns are organised within a framework by referring back to the questions that guided this insider action research study and as illustrated in Table 5.1. As indicated in Table 5.1, several of the themes and patterns are interrelated and apply for more than one research question. For the purpose of clearly summarising the findings, each theme and pattern will only be described once.
### Table 5.1 Organisational Framework for Reporting the Results

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Themes</th>
<th>Patterns</th>
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<tr>
<td>How does <em>Nursing Journeys: Virtual Reflective Centre</em> promote the development of</td>
<td>Knowledge</td>
<td>• From Critical Thinker as Active Learner to Reflective Thinker as</td>
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<td>critical thinking among undergraduate student nurses?</td>
<td>Reflection</td>
<td>Discussed Learner</td>
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<td></td>
<td>Anonymity</td>
<td>• From Verbal Communication to Textual Dialogue</td>
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<td>• From Virtual Experience to Experiencing Reality</td>
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<td>Trust</td>
<td>• From Chaos to Competency</td>
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<td>How do undergraduate student nurses describe their experiences of learning to</td>
<td>Trusting</td>
<td>• From Virtual Experience to Experiencing Reality</td>
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<td>critically think while engaged with <em>Nursing Journeys: Virtual Reflective Centre</em></td>
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<td>Empowering</td>
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<td>Authentic</td>
<td>• From Verbal Communication to Textual Dialogue</td>
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<td>How does the blending of the theoretical underpinnings of role-play, computer-</td>
<td>Knowledge</td>
<td>• From Virtual Experience to Experiencing Reality</td>
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<td>mediated communication and collaborative and problem-based learning promote the</td>
<td>Time</td>
<td>• From Chaos to Competency</td>
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<td>development of critical thinking among undergraduate student nurses?</td>
<td>Anonymity</td>
<td>• From Self Constructors of Knowledge to Others as Co-Constructors of</td>
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<td>Resources</td>
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<td>5.2.1  Research Question 1</td>
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<td>**• How does <em>Nursing Journeys: Virtual Reflective Centre</em> promote the development</td>
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<td>of critical thinking among undergraduate student nurses?</td>
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Intrinsic Knowing is identified as one of the five core categories that produced Cyber-Textual Mediated Knowing. Intrinsic knowing is a process by which the study participants characterised the modelling of critical thinking while engaged with *Nursing Journeys: Virtual Reflective Centre*. Intrinsic knowing is recognised by the study participants as acknowledging the presence of critical thinking as a skill developed through active learning. Most importantly, intrinsic knowing is recognised by the study participants as an essential principle in becoming a
critical thinker. Without acquiring *intrinsic knowing*, the study participants expressed that the development of their notion of critical thinking was hindered.

During the interview process, I directed the study participants to focus on their experiences of critical thinking while engaged with NJVRC. Key words from the study participants' views included, being aware of possibilities, not taking things for granted, making a best decision, being analytical and intuitive, and thinking about knowledge. "*In order to understand on a deeper level you have to have that knowledge. It makes you realise what you do know and what you don't know*" (Transcript 17, p.1). This statement is congruent with Copp (2002), Knowles (1980) and Skiba’s (1997) views that learners who take an active role open their minds to new possibilities.

All the study participants acknowledged having a working definition of critical thinking. From the transcribed interviews, critical thinking was predominately defined as a cognitive skill that was either product or process oriented. One participant interpreted critical thinking as having a set of cognitive skills and affective attributes: "*It is a process...analytical, intuitiveness, having a broad spectrum of knowledge about what you are talking about, what the problem is. Having an open mind*" (Transcript 6, p. 1). Five study participants characterised critical thinking as that of arriving at a particular solution, a product. For example, Participant 12 characterised critical thinking as:

> Gathering all the information that you've been taught and making a decision based on that knowledge and thinking on your feet. (Transcript 12, p. 1)

Participant 16 defined critical thinking as:

> You think about what you do before you do it really carefully in order that if there is a decision to be made, a good decision will be made. And it's analysing and using your knowledge. (Transcript 16, p. 1)

Participant 19 identified critical thinking as:

> Take your knowledge that you've learned, experience that you have and intuition and use all those facets to make a decision, a best decision. And to formulate without someone telling you what the answer is. (Transcript 19, p.1)
Participant 5 described critical thinking while engaged with NJVRC as:

*Actively being able to analyse the data you've got to come up with a solution or an answer that, that incorporates all the information so that it's a reasonable answer with the data.* (Transcript 5, p. 1)

Participant 4 defined critical thinking as:

*To look at something with the information that I have been given to make my own decision about it. To actually think for myself.* (Transcript 4, p. 1)

These definitions suggest that these study participants were inclined to view critical thinking in a manner that closely represented Kurfiss' (1988) definition. Kurfiss (1988) defined critical thinking as "an investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that can therefore be convincingly justified" (p.2).

In contrast, five study participants characterised critical thinking as that of an intellectual process-oriented activity. Participant 1 characterised critical thinking as:

*Where you don't look at just, at just, how do you say, just at its surface. You look beyond it and you think of other things that come around it, every angle, at every perspective.* (Transcript 1, p. 1)

Similarly, participant 17 described critical thinking as "getting underneath" (Transcript 17, p. 1). Participant 11 explained that critical thinking was "not just taking things for granted...question why something is the way it is" (Transcript 11, p. 1), and participant 14 stated, "to put things together, make the connections between symptoms, diagnosis. It's a thinking process that involves praxis and theory and being able to put those two together so that you can care for a client in a better way" (Transcript 14, p. 1). Participant 18 viewed critical thinking as:

*It's taking the knowledge that you have and really using that knowledge..., and reflecting on the decision that you make.* (Transcript 18, p. 1)

These definitions suggest that these study participants were inclined to view critical thinking in a way that closely aligned with Brookfield's (1987) definition of critical thinking as a process rather than an outcome. In this way, Brookfield (1987) explained that a critical thinker
continually questions assumptions as "a productive and positive activity. [It is] a process, not an outcome, manifested in various ways, according to context triggered by both positive and negative events, emotive as well as rational, a lived activity, not an abstract academic pastime" (pp. 5-7).

Study participants indicated that they perceived themselves as critical thinkers. All study participants believed they practised actualising their definition of critical thinking when role playing as the virtual characters and working through the case narratives. Significantly, the study participants discovered that, through reflection, they were able to acknowledge they were still being led by their preconceived assumptions, especially in the beginning engagement sessions with NJVRC. After successive sessions, these study participants were also able to recognise that they were only beginning to understand critical thinking as a complex construct and that it was not necessarily learned and actualised in a linear, individual fashion. Study participants began asking more questions to clarify or to unearth hidden meaning while virtually engaged with peers. "[NJVRC] helped me understand what kinds of questions needed to be asked in order for the individual to respond accordingly" (Journal 4 p. 3). "And I was asking those questions based on her answers" (Transcript 4, p. 5). Brookfield (1987) explained that a critical thinker grows by continually questioning assumptions. In that respect, I noted:

Behaviours noted in the online dialogue transcripts and journal excerpts show study participants increasingly reflecting and developing some of the affective dispositions associated with critical thinking. They are clarifying the intent of messages and recognising when assumptions are being used. (Field Notes, June 2, 2003)

Participant 19 observed, "I began trying to get into the character and was analysing the feedback coming back to me and how appropriate it was" (Journal 19, p. 1). As Participant 1 stated:

*When I was playing a family member, I was asking more questions to the reasons given. I didn't settle for a poor answer. When I played a health professional, I've become more aware of things like why is this person in denial, why does he refuse care, what does he fear." (Journal 1, p.3, 4)*

*I started to see and be open to the perspectives from all sides." (Journal 11, p.3)"
I also noted:

I discover that NJVRC did not directly fail to promote the affective dispositions of critical thinking. However, without the students deliberately taking the time to write out their experiences in their journals, these dispositions were underdeveloped. Reflection can serve as a means to propel the particular to the foreground, against the background of the general. In reviewing the journal excerpts more closely there are embedded terms, phrases and explanation of the affective dispositions of critical thinking (see Figure 5.1). Indirectly, the results of keeping a journal allowed study participants to flourish and become critical thinkers and not just think critically. “Knowing is doing is being” (Davis and Sumara, 1997, 106). (Field Notes, May 31, 2003)

The following online dialogue transcript (Figure 5.1) between Participant 18 and a peer, Participant 19, along with the corresponding journal excerpts illustrates both study participants' reflection on their learning and how their affective dispositions of critical thinking matured.
Participant 18 reflects:
I began to look at a health challenge from the client's perspective. In this scenario, Cran, the client had glaucoma and feared going blind. I really played it on. I mean to lose your vision would be really huge. I had to know a bit about glaucoma but also a bit of how people with glaucoma might react...And a bit about communication and then bring it all together. And I picked up on communication techniques my peer used that were ineffective. I challenged the nurse, my peer, by saying "how can you possibly understand?" The nurse began to work through Cran's feelings, let her vent. (Journal 18, p.4-5)

Karty Koz>>How are you feeling today.
Karty Koz>>Are you experiencing any pain.
Cran Lut>>I tripped on my table on the way to the washroom and I cut my upper lip.
Cran Lut>>I am very scared.
Karty Koz>>Let's get you back in bed so I can assess the cut on your lip and then we should assess the room for you.
Cran Lut>>Alright

Karty Koz>>It will be okay I will be here working with you.
Cran Lut>>I wasn't expecting when I went to the eye doctor for him to tell me I have glaucoma. I thought I only needed a new prescription.

Karty Koz>>I understand that the frustration and shock of finding out you have a condition that you must maintain and deal with now.
Cran Lut>>How can you possibly understand!
Karty Koz>>I know of some support groups if you would like to join. Or we can sit and talk together about your feelings.
Cran Lut>>Well I am feeling very anxious but I don't know if I would feel comfortable sharing those feelings in a support group.

Karty Koz>>Would you like to read some literature about glaucoma to help you understand the condition more?
Cran Lut>>Yes, I think that might be helpful. My biggest fear is not being able to see and losing my independence. I live alone and am very independent. I don't want to rely on other people.
Karty Koz>>Unfortunately that may become a possibility for you. You will of course still be able to live at home with the help of occupational therapists they can help you rearrange your home and teach you techniques that will help you maintain an independent lifestyle.
Cran Lut>>It sounds like quite an adjustment.

Participant 19 reflects:
I liked that I was able to have to explain a condition and answer a real person's questions and concerns. Really made me think deeply and bring up all my knowledge. I was challenged by my peer, actually taken by surprise by the comment "how can you possibly understand?". I thought I was attending and listening well. I realised I had to more appropriate ways to communicate and that I was only thinking that therapy was the only solution and not identifying Cran's fear as the main concern. At the end of class, I asked who played Cran and thanked my peer for the challenge. (Journal 19, p.3-6)
Several study participants reported that the maintenance of a journal fostered self-awareness. Reflection enhances the affective dimension of critical thinking and, thus, *intrinsic knowing* evolves. The significance of reflection is well documented in the literature (Atkins & Murphy, 1993; Mezirow, 1981; Poirier, 1997; Schön, 1983, 1987; van Manen, 1977). These authors seem to agree that the technical rational approach assists an individual to think critically. When this approach is used alone it suppresses individuals' ability to be critical thinkers. This finding indicates that *intrinsic knowing* can be further conceptualised as a continuum and labelled as from *Critical Thinker as Active Learner* to *Reflective Learner as Discovered Learner*.

5.2.2 Research Question 2

- How do undergraduate student nurses describe their experiences of learning to critically think while engaged with *Nursing Journeys: Virtual Reflective Centre*?

*Proficient Knowing* is identified as a second core category that produced *Cyber-Textual Mediated Knowing*. *Proficient knowing* is a process by which the study participants' characterised their overall experience while engaged with *Nursing Journeys: Virtual Reflective Centre*. *Proficient knowing* is recognised by the study participants as having a sound knowledge base of nursing theory, confidence in applying this knowledge and effective computer skills to successfully engage as the virtual characters of NJVRC.

During the interview process, I directed the study participants to focus on their experiences while engaged with NJVRC. In the beginning classes, most of the study participants initially expressed their apprehensiveness about using NJVRC because of a lack of confidence in their knowledge base. Key words from the study participants' views included lost, frustrated, struggling, impatient, self-doubt and challenging. Participant 18 acknowledged "lack of knowledge base made it difficult to play all the characters to their fullest" (Journal 18, p.6). Participant 12 echoed similar comments about the perceived lack of confidence with knowledge. "In the beginning, I did not have enough to really feel comfortable and role playing as in a conversation and all" (Transcript 12, p. 2). Without developing a degree of *proficient knowing*, the study participants expressed that learning was hindered. Paul (1995) postulated that knowledge and thinking are inseparable entities. "One has to have content [knowledge] to critically think" (Loving & Wilson, 2000, p. 70). In order for meaningful learning to occur, learners need to recognise the significance and relevancy of the learning process. Adult learners are usually goal and applicability oriented (Knowles, 1990; Mayer 2001). Four study participants also expressed a
lack of seriousness by others in the first two sessions. One study participant was quite specific and did not perceive NJVRC as meaningful at the onset of engagement:

*To be honest with you, in the beginning I didn't even take it seriously. I only got into it within the last three weeks. But eventually, I was more confident in my knowledge base and I could talk and see the benefits of Nursing Journeys.*

*Before then I didn't even know what I was doing.* (Transcript 14, p.4)

I also noted:

Some students seem to participate in this activity simply for the sake of participating and with no interest in learning. Contributing factors to consider are that I have not adequately addressed learning styles completely. Perhaps NJVRC is not a helpful learning technology and is not congruent with these students preferred learning styles. Perhaps, I have made a great assumption that the directions on the homepage are sufficient. Are the directions on the home page not specific enough? Something to review. In the interim, during the next class, I will give more of a detailed verbal explanation of the purpose of NJVRC. Although, I can't ignore the technological glitches we experienced today contributed to this not knowing how to proceed. (Field notes, January 30, 2003)

Coupled with a perceived lack of confidence in their knowledge and the limited skill of self-direction, four study participants also expressed that their computer skills were minimal. Technological illiteracy in educational cyberspace is not a new phenomenon. Within the literature, learners are often reported as having technological illiteracy and that this is a perceived disadvantage (Billing, Connors & Skiba, 2001; Morris, Buck-Rolland & Gagne, 2002; Thiele, Allen & Stucky, 1999).

Time also appeared as a contributing factor in the development of proficient knowing. Participant 18 suggested there was “*Not enough time. It was confusing at the beginning and didn't leave enough time to really get into it*” (Journal 18, p.1). Participant 18's journal excerpt also revealed that with additional time “*I could see how it [NJVRC] could enhance my critical thinking skills*” (Journal 18, p. 1). I also noted:
After spending a few minutes at the beginning of the past two class sessions with NJVRC to clarify students' concerns, students seem to be more relaxed and 'getting in to it'. Engagement was extended for 90 minutes instead of the original scheduled time of 60 minutes. Silence filled the classroom. Students' eyes were affixed to the monitors. Sounds permeated the room only toward the end of the session. Some students were asking “who played so and so”, I had to think on the spot” or “that was interesting”. (Field Notes, February 27, 2003)

These experiences underscore the importance of providing adequate time and continuing guidance in becoming acquainted with the newer learning technologies, enabling knowledge to evolve. This supports the findings of Bullen (1998), Morris, et al. (2002), Weis & Guyton-Simmons (1998).

Trust in receiving credible information or lack thereof also appeared as another factor hindering learning and critical thinking. As Participant 11 explained:

> I think also if another person was to give you, if you didn't know a lot about a certain diagnosis and they were to give you incorrect information but you thought they were right then you might, it might be something you kind of carry with you as incorrect information. (Journal 11, p.2)

Several study participants described “stepping out of the role” momentarily as an effective strategy to overcome this perceived mistrust.

> If I really didn't understand where to go, and so did my partner, I would step out and say look [or type] I don't get this, let me look something up for a moment or I would put my discreetly raise hand up and ask you [facilitator]. (Transcript 6, p. 3)

I also noted:

Some study participants are coming more frequently to the computer class with their notes from class and their textbooks. Post-its™ are affixed to selected pages. Other study participants are transcribing points from the case narrative on a piece of paper while others are minimising the pop-up windows with the detailed descriptions of the case narrative to use as references. Whispered consultations occur with a peer sitting to their
left or to their right to ask a quick question or help them remember a medical term. Hands would also be raised for facilitator guidance. Their questions were mostly to validate whether their thought process or the content was appropriate. Two students asked if we could begin next class with an oral debriefing of the case narratives. I consider this request with much trepidation and decide at this time not to follow it through. On the one hand, this form of group reflection can enhance critical thinking among the students. However, it may also aid in developing fixed ideas among the students, especially since every student has not worked through all the case narratives at this point. In giving them what they may perceive as 'right answers', it defeats the purpose of NJVRC. In future applications of NJVRC, this may be a possibility. (Field Notes, March 13, 2003)

By the end of the semester, the study participants expressed satisfaction with the purpose of NJRVC. Key words expressed by study participants were fun, reflective, creative, interesting, interactive, and rewarding. "I think it was a very good learning experience to get everything that we learned in class and actually applied it ourselves" (Transcript 4, p. 5). As Participant 5 stated "What I liked is that it [NJVRC] gave me the time to think, I had confidence in using my knowledge" (Transcript 5, p. 2). Participant 1 explained that with the verbal guidance, repeated sessions and the additional time of engagement:

You're not being placed under pressure, where you know if someone is watching you. You're just on your own thinking, like you've got the freedom to learn. It's, I think it's a positive learning experience. Valuable. I mean I initially, intimidated by computers, I'm so bad at computers, but not now. (Transcript 1, p, 19-20)

Participant 18 discussed the overall benefits of NJVRC as “you can develop the scenario as you go along. You are in control of your learning” (Journal 18, p.6). Participant 6 summarised the experience as “a preparation and the actualisation of putting together theory and practice” (Journal 6, p.2). Similarly, Participant 12 stated “it [NJVRC] really makes you think on your feet for the appropriate words and what to do in the given situation” (Journal 12, p. 1). “Able to learn and think critically without being judged by other peers. Able to simulate possible experiences I may have” (Journal 11, p.8). Participant 19 stated, “it built confidence. It was also frustrating in certain parts. If I were to title my experience, it would be Enhancement of a Basic Learning” (Transcript 19, p.16).
It was good, comfortable, very enlightening in terms of knowledge. I learned a lot. And, improving my communication. If I were to title my experience, it would be 'Improving One’s Critical Thinking Skills through Nursing Journeys'.

(Transcript 14, p.15)

During axial coding the data indicated that proficient knowing evolved. It was further conceptualised as a continuum and labelled from chaos to competency. This finding supports research by Benner (1984), Billings et al., (2001), Knowles (2001), Mezirow (1981) and Tanner (1989) about how experience, knowledge, confidence and meaning-making improve and develop with time.

5.2.3 Research Question 3

- How do the blending of the theoretical underpinnings of role-play, computer-mediated communication and collaborative and problem-based learning promote the development of critical thinking among undergraduate student nurses?

Constructed Knowing is identified as a third core category that produced Cyber-Textual Mediated Knowing. Constructed knowing is a process by which the study participants' characterised the benefits of validating their developing knowledge while engaged with Nursing Journeys: Virtual Reflective Centre. Constructed knowing was recognised by the study participants as building a knowledge base of nursing theory individually and with others in a safe, stress-free environment of NJVRC. Without acquiring constructed knowing, the study participants expressed that learning and critical thinking were hindered.

During the interview process, I directed the study participants to focus on the elements of NJVRC foundational design, especially role-play. Key words used by the study participants included thinking about knowledge, role-playing knowledge, asking about knowledge, not being afraid of knowledge. Nine study participants noted that role-playing assisted them to validate their degree of knowledge. Jenkins and Turick-Gibson’s (1999) findings suggested that role-play stimulates knowledge development. Most of the study participants also reported that role-play helped them establish a personal perception of other health care professionals’ roles, and that of the family, thus gaining a multi-dimensional perspective. Parsons and Mitchell (2002) and Rogers and Frieberg’s (1994) views of experiential learning support this finding. According to Rogers and Frieberg (1994), experiential learning is equivalent to personal change and growth.
I could understand the character’s feeling of denial, fear, agitation and difficulty in coping with this CHC [chronic health challenge] especially when he does not think it is anything important. This helped me understand that not everyone perceives the same. (Journal 1, p. 4)

Participant 4 also stated that “I also realised that as a patient it’s very frustrating to be talking to a health care professional who doesn’t have a clear understanding of what you are experiencing” (Journal 4, p. 19).

Anonymity also appeared as a contributing factor in the development of constructed knowing. Seven study participants expressed anonymity as a benefit in that it helped decrease judgement or intimidation from peers. The following statement by one participant described what anonymity meant: “it reduced the anxiety levels by talking over a computer screen. I was not afraid to make a mistake or say something that was wrong” (Journal 17, p.6). Participant 16 suggested that anonymity was also beneficial by stating, “I thought it was better that way. So then you’re not, you’re not concerned about what are they going to think about me” (Transcript 16, p. 5). There are a number of authors who have indicated that anonymity is advantageous (Rosenorm & Kofoed, 1998; Shaw, McTavish, Hawkins, Gustafson & Pingree, 2000). NJVRC also provided undergraduate student nurses with a safe environment to practice the integration of theoretical concepts of nursing without provoking the anxiety that is often heightened in the face-to-face learning environments. Participant 18 stated she did not enjoy role-play in the face-to-face classroom. “In those situations I get a lot more nervous and I can’t think as well. So for me it’s easier to do it on a computer where there’s no pressure and I find I can think faster for me” (Transcript 18, p. 9). Christiaens and Baldwin (2002) suggested that on of the limitations of role-play is the disengagement in the activity. Learners who did not perceive the experience as real or found role play “embarrassing, intimidating or outside of his/her personal or cultural comfort zone” (p. 251) did not participate.

Other perceived benefits that the study participants derived from being anonymous as a virtual character while engaged with NJVRC included increased autonomy, collaboration and developed purposeful communication. Six study participants expressed the need to incorporate the other characters’ responses during role-play and reflect on what to type before typing their reply. “I was using a lot of...from the communication class we’re taught questions to ask. And I was asking those questions based on her answers” (Transcript 4, p. 5). Participant 19 claimed, “I began
trying to get into character and was analysing the feedback coming back to me and how appropriate it was” (Transcript 19, p. 3). I also noted:

In the beginning classes, when students would ask for facilitator guidance, often it would be to clarify the intent of NJVRC or ask for the correct answers. Now, the request for guidance is to consult about the direction she/he wants to take the story. The decision to take the story in one direction or another is based on several factors, their knowledge base, the character they are playing and most importantly, the virtual character with which they interact. (Field Notes, March 27, 2003)

Without this reflection, study participants stated that *constructed knowing*, critical thinking and learning were hindered.

The study participants inferred that *constructed knowing* evolved by both individual and collective processes. With other units of information, *constructed knowing* was further conceptualised as a continuum, from *self-constructor of knowledge* to *others as co-constructors of knowledge*. This finding is consistent with reports by DeBourgh (2001), Gokhale (1995) and Mastrian and McGonigle’s (1999). These authors inferred that collaborative learning in educational cyberspace promotes learning and critical thinking. DeBourgh (2001) emphasised that collaboration is an essential skill for successful nursing practice and “collaborative learning builds communal knowledge through conversation” (Blumenfeld, Marx, Soloway & Krajcik, 1996, p. 39).

*Authentic Knowing* is identified as a fourth core category that produced *Cyber-Textual Mediated Knowing*. *Authentic knowing* is a process by which the study participants' characterised their feelings of virtuality while engaged with *Nursing Journeys: Virtual Reflective Centre*. *Authentic knowing* is recognised by the study participants as having the ability to imagine being fully immersed in educational cyberspace and practising nursing care as if in a face-to-face context. Their experience was real, meaningful, and relevant.

During the interview process, I directed the study participants to focus on the elements of NJVRC foundational design, especially the case narratives and characters. The study participants felt that their virtual experiences were authentic replicas of real or real-life experiences. This finding supported DeMarco et al. (2002), Happell, 1998, and Shulman's (1986) results that
indicate that, in problem-based learning, cases must be personally relevant and realistic to be meaningful to the student. Five study participants also described 'being there' or being immersed in the case narrative and playing a character as if it were a real situation and not imaginary. This experience was a strong determinant in authentic knowing development. “I was able to think and talk on the spot...be spontaneous...I felt that I was actually talking to someone” (Transcript 16, p. 1). “It made the experience of being a diabetic pt's (patient’s) family member more real, not simulated through a computer screen. It gave me a window into a person’s thought process” (Journal 14, p.1-2). “I learned that you really need to know your stuff before I (sic) can actually work with a client. It’s like clinical” (Transcript 4, p.6). “My character allowed me to understand that it takes a lot of technique and understanding to deal and calm a patient with dementia” (Journal 12, p. 2). “It gave me some good examples on what I could do if in that position” (Journal 19, p. 2). Another participant described educational cyberspace:

I think I kind of needed to be there in order to say OK, what needs to be done next here? What or what should I not be doing...I mean when you read a story...you need to picture [it] in your head and play it out. (Transcript, 4, p. 7)

Participant 19 reflected upon one experience as:

It definitely was different than a class setting because I felt like I was playing a real doctor in a sense and had a real patient. So it felt more real life even though it was through a computer, I felt the responsibility of a doctor and my patient was challenging me compared as to when in class, everybody just sort of agrees with you at times. (Transcript 19, p. 3)

Time was also a contributing factor in the development of authentic knowing. Participant 19 emphasised “taking time and you feel like you are truly experiencing the reality of the experience. Finally actual application” (Journal 19, p.6). Without this active perception of 'being there' in a virtual situation, the study participants reported that authentic knowing was not achieved.

Eight study participants also expressed the idea that engaging as the different characters and working through the case narratives helped them be more focused, more confident and prepared for clinical nursing practice. They reported that NJVRC reinforced what they had
learned in class. Accordingly, the study participants perceived they were contextually applying content within the given case narratives. Participant 5 stated “definitely, I feel more prepared for clinical” (Transcript 5, p.2). “Instead of just kind of putting people into situations [in clinical], this [NJVRC] introduces you to a situation you may encounter [in clinical]” (Transcript 17, p.13). “And in using virtual journey’s I kind of got experience” (Transcript 16, p. 3). Participant 6 summarised authentic knowing as:

I think working through the virtual case studies as an actual character is one element that really helps you to apply the abstract knowledge to something that is based on reality but you’re not quite there yet. It’s [NJVRC] like a nice stepping stone. (Transcript 6, p.7)

These comments are congruent with Brown, Collins, and Duguid’s (1998) views that “knowledge is situated, being in part a product of the activity, context and culture in which it is developed and used” (p. 32). With these units of information, authentic knowing also evolved and was further conceptualised as continuum, labelling it as from virtual experience to experiencing reality. These experiences corroborate findings that virtual environments, as a spatial metaphor, often overlap with the physical environment and thus create a sense of presence that is essential (Dede, 1995; Dillenbourg, 2000; Enlund, 2001; Towell & Towell, 2001).

Interactive Knowing is identified as a fifth core category that produced Cyber-Textual Mediated Knowing. Interactive knowing is a process by which the study participants characterised their communication while engaged with Nursing Journeys: Virtual Reflective Centre. Communication is an integral element to nursing, as nurses seek to connect with individuals and understand their lived experience. Interactive knowing was recognised by the study participants as having a mediated conversation with another individual with written words, rather than with spoken words, to successfully engage with NJVRC.

During the interview process, I directed the study participants to focus on the elements of NJVRC foundational design, especially the synchronous communication. Key words related to this concept expressed by the study participants included speaking, discussing, talking or dialoguing. Participant 6 summarised interactive knowing as “taking what I think a conversation is to a completely different level” (Transcript 6, p.9). I also noted:
It is interesting that the study participants, including myself, describe that we are actually talking or conversing when using computer-mediated communication. This is a text-based form of communication. We write to speak to others and yet not realise it completely. It seems as though unconsciously mental images of individuals dialoguing are set up in my mind and I am immersed in conversation by way of the keyboard. (Field Notes June 13, 2003)

Eight study participants stated that one benefit of synchronous communication was that feedback was immediate and thus reflection ensued. Participant 11 explained, “talking with a peer helped me validate my own knowledge and thought” (Journal 11, p.6). Another participant reflected upon the effects of computer-mediated communication as being able to “talk to my peers and having them ask me questions... helps me understand what I don’t know and what I do know” (Journal 1, p. 5). Participant 17 judged the utility of synchronous communication function as:

It gave me practice on how to communicate effectively. Talking to the virtual patient requires me to think about the exact word to describe the procedure of administering medications and more importantly analyse if [the patient] understands. (Journal 17, p.2)

The use of synchronous communication for educational purposes is relatively new (Aoki, 1995; Benedikt & Chiskowski, 1995; Day & Batson, 1995; Dillenbourg, 1999; Harris, 1995; Reed, 2000). Consequently, synchronous communication is often criticised as a form of computer-mediated communication (CMC) that does not promote reflection and critical thinking. A contributing factor to this criticism is that there are often several simultaneous threads of conversations that move too rapidly, so that participants have no time to reflect, frame questions or compose responses (Aoki, 1995). However, the data in this study indicated otherwise. All the study participants expressed that synchronous communication did have its limitations, but the inability to reflect or to critically think were not identified as limitations. “[NJVRC] helped me understand what kinds of questions needed to be asked in order for the individual to respond accordingly” (Journal 4 p. 3). Participant 18 pointed out, “I picked up on communication techniques that may be effective as well as ineffective” (Journal 18, p. 5). Similarly, Participant 12 claimed, “I realised that it is important to explain in words a family member will understand” (Journal 12, p. 3). Participant 6 described a view of synchronous CMC as “I found it ... difficult because I wanted to say more and I didn’t want to keep typing. So but it was good as well, because you ... had to shorten
instead of ... babbling” (Transcript 6, p.5). A contributing factor was limiting the ratio of individuals in each virtual room. Three study participants expressed that interactive knowing was constrained when additional characters joined the virtual chat rooms. The ebb and flow of the conversation was easier to maintain and reflect upon with only two individuals engaging in dialogue at once.

Creativity was identified as a contributing factor in enhancing the development of interactive knowing. Creativity was essential when attempting to act out a feeling or a non-verbal cue in educational cyberspace. For the most part, study participants were unaware of the conventional text cues, such as capital letters indicating shouting or emoticons to emphasise emotions. Two study participants expressed that the style of writing, which their peers utilised, was a benefit because it demonstrated perceived feelings or emotions. “I knew that when the typing was really fast, that meant they were anxious...repeating the same sentence before I had a chance to respond, so I asked” (Transcript 16, p.10). Participant 17 interpreted the repetitive typing as needing to be a listener. “Just being a good listener instead of just talking all the time or always typing...letting the patient actually ask questions...talking with the patient instead of talking to the patient” (Transcript 17, p.8). I also noted:

Some study participants playing characters who could not verbalise, one played a character that was short of breath and the other played one that was aphasic began replying with the y or n key. Confused at the beginning, but with guidance by me, the study participants playing a health professional realised the importance of close-ended communication. They began composing their statements so that their peers would respond with yes or no. (Field Notes, March 27th, 2003)

Factors that hindered interactive knowing were the lack of intonation and visual cues and this finding is also consistent within the literature (Murphy & Collins, 1997; Suler, 1997). Using only text can contribute to misunderstandings and the lack of intonation and visual dependence on non-verbal and body language was frequently reported as limitations of CMC. Participant 6 stated “getting to know someone, you get a lot of information that way just by observing. It's difficult over the computer too because you can't see all that” (Transcript 6, p. 2).”Without person to person contact, you can't see how the other person reacts” (Journal 1, p. 5). Participant 5 explained, “you miss non-verbal cues that can say a lot in a conversation, even change your response” (Journal 5, p.8). However, Participant 16 and 6 also identified a benefit to the lack of non-verbal cues. “I think it's
really neat not to have these non-verbal things going on so you can really concentrate on what you are saying and what it’s like when you are receiving” (Transcript 6, p. 7). Participant 16 claimed:

I had to verbalise everything, which is good because I got a lot of practice verbalising...like putting into words what I was teaching. But I wasn’t able to show and I would have liked to do that. (Transcript 16, p. 2)

Other factors that hindered the development of interactive knowing were keyboard input and the speed of response. Synchronous communication requires substantial typing skills to communicate effectively (Aoki, 1995). Participant 11 disclosed that “I was frustrated because the other player was very impatient, not letting me think through and then type...it would have been better if that person would have just sat back for a minute and given me an opportunity to respond. After all everyone has their own pace in thinking and typing” (Transcript 11, p.4).

The study participants inferred that interactive knowing evolved from transforming oral speech to a textual form. Interactive knowing was further conceptualised as a continuum and labelled as from verbal communication to textual dialogue. These descriptions are consistent with those of Harasim et al. (1995), Holeton (1998), Lawley, (1992), Linder and Naidu (1999), and Reed (2000) who asserted that computer-mediated communication (CMC) has significant effects on the patterns of traditional forms of communication. Interactive knowing through synchronous CMC forms a new functionality for verbal communication, leading to the notion of possible new modes of interaction, especially that of composing text talks.

5.3 Summary

This chapter has summarised the interpretation step of the second cycle of this insider action research study. It also completes the second phase of the reflective thought process, Reflection-In-Action phase. Reflection-in-Action involves thinking consciously and conscientiously about the reasons behind actions while in the midst of these actions (Drevdahl et al., 2002; Schön, 1983, 1987). This reflective phase introduced the reader to the process I undertook to arrive at the decision to use insider action research, framed within an interpretive and praxis paradigm, by describing my experiences of conducting the study, reporting and finally interpreting the findings.
As indicated, the findings presented here are derived from online dialogue transcripts, interview transcripts, study participants' journals and my field notes. The results also represent answers to the research questions posed in this study. Grounded theory, as the principal analytic strategy, is a systematic set of procedures to arrive at a theory about basic social processes (Strauss & Corbin 1990). The aim of this inductive approach is to discover the underlying social factors that best shape the phenomenon being investigated. Knowing emerged as a commonality among themes during the open coding and the constant comparison process. Literature was used concurrently to validate emerging themes and patterns.

A subsequent analysis of data identifies five distinguishing manifestations of knowing—Proficient Knowing, Authentic Knowing, Personal Knowing, Constructed Knowing, and Interactive Knowing. These manifestations of knowing give rise to five discernible process-oriented patterns and these are also identified with the supporting themes that establish a theoretical model, Cyber-Textual Mediated Knowing. These patterns include: from Chaos to Competency; from Virtual Experience to Experiencing Reality; from Critical Thinker as Active Learner to Reflective Thinker as Discovered Learner; from Verbal Communication to Textual Dialogue; and from Self-Constructor of Knowledge to Others as Co-Constructors of Knowledge.

In the next chapter, the second cycle of this insider action research continues with an overview of the action and reflection steps. Chapter Six also introduces the reader to a summary of Reflection-On-Action by outlining conclusions, implications for practice and recommendations for further discourse and research. Reflection-On-Action, involves purposefully looking back on experience in light of the study's findings and the overall research process (Drevdahl et al., 2002; Schön, 1983, 1987). It begins with a summary of the conclusions and implications for practice derived from the study's findings.
CHAPTER SIX—FRAMING ACTION RESEARCH

In Chapter One, this inquiry began with a question: "How can I, as a nurse educator, enhance the development of undergraduate student nurses' critical thinking in educational cyberspace?" Subsequently, the research question also prompted a closer examination of the underlying assumptions of teaching, learning, and the research process. Implicitly, this question underscores the relevance of articulation and reflection. This dissertation traced three constituents of my thinking process within a reflective framework based upon the views of Drevdahl et al. (2002), Greenwood (1993) and Schön (1983, 1987).

The focus of the first three chapters of this dissertation was to describe the reflective practice of Reflection-Before-Action that was embedded within the first of two insider action research cycles. As previously summarised, Reflection-Before-Action entails a process of thinking about intentions prior to action (Greenwood, 1993). It is during this phase that I identified the contributing factors that led to the justification of improving my practice, pursuing this goal as a research study within the context of my own classroom, and the need to create and evaluate a learning technology suitable for educational cyberspace. The interest in using educational cyberspace in nursing evolved from consistently observing undergraduate student nurses' difficulties in applying theory to practice. The study began with a desire to use educational cyberspace to promote undergraduate student nurses' abilities to critically think and lessen the challenges of linking theory to practice. This led to the development of Nursing Journeys: Virtual Reflective Centre (NJVRC).

The emphasis of Chapters Four and Five of this dissertation was to summarise the reflective practice of Reflection-In-Action that was embedded within the second cycle of this insider action research study. Reflection-In-Action attributes conscious and conscientious thinking about the rationales behind actions while in the midst of these actions (Drevdahl et al., 2002; Schön, 1983, 1987). It is during this phase that I identified a fitting research methodology, conducted, analysed and reported the findings of this study. As a result, this inquiry has attempted to qualify the effects of NJVRC in promoting critical thinking by exploring the experiences among eleven undergraduate student nurses.
As I progress to the third phase of the reflective thought process, the emphasis is on Reflection-On-Action. This phase involves purposefully looking back on experiences in light of these experiences (Drevdahl et al., 2002; Schön, 1983, 1987). Although the insider action research approach is often conducted to improve one's practice, it is essential that the larger community be informed of the knowledge generated through such inquiries (Angen 2000; Boyer, 1990; Drevdahl, et al, 2002; McNiff, 2003; Tomal, 2003). The purpose of this chapter is to describe the action and reflection steps, the final steps of the second cycle of this insider action research study. It presents the conclusions, implications for practice and recommendations for further research. An explication of personally gained insights from conducting this reflective inquiry will be the focus of the concluding chapter, Chapter Seven, of this dissertation.

6.1 Conclusions and Implications for Practice

This insider action research study has explored the experiences among eleven undergraduate student nurses arising from their engagement with a virtual pedagogical, simulation instrument, Nursing Journeys: Virtual Reflective Centre. Based on the findings described in Chapter Five, there are several potential conclusions that suggest that NJVRC is an effective instrument to promote critical thinking. There were a series of interconnected factors integral to the promotion of critical thinking among undergraduate student nurses while engaged with NJVRC. These principal factors are identified as the instructional design of NJVRC, anonymity, reflective journal writing, the role of the educator, trust, time and a distinct pattern of a way of knowing.

By the end of the semester, study participants were able to articulate their definition of critical thinking and use this definition to work through the case narratives while role-playing the various virtual characters with their peers. Study participants were also able to recognise that they were only beginning to understand critical thinking as a complex construct and that it was not necessarily learned and actualised in a linear, individual fashion. The study participants expressed that they were challenged to discover their own taken-for-granted views, to shape new perspectives and to reinforce previous learned knowledge. Additionally, the study participants learned to work collaboratively, recognise the significance of context, explore alternative perspectives and co-create new knowledge.
6.1.1 Instructional Design of NJVRC

Creating the case narratives and the virtual characters from a reality perspective was perceived as advantageous. Study participants were able to freely develop the story-line and respond accordingly. Engaging as these virtual characters and working through the case narratives also aided the study participants in the mastery of theoretical concepts and the promotion of critical thinking. This is congruent with the views of Brown, Collins, and Duguid (1998) that "knowledge is situated, being in part a product of the activity, context and culture in which it is developed and used" (p. 32). The implication of this finding suggests that learning technologies should be designed to encourage and foster the development of asking questions rather than merely providing prescribed answers.

The use of synchronous communication for educational use is a relatively new phenomenon (Aoki, 1995; Benedikt & Chiskowski, 1995; Day & Batson, 1995; Dillenbourg, 1999; Harris, 1995; Reed, 2000) that is often criticised as a form of CMC that does not promote reflection and critical thinking. Synchronous communication increases thought disruption among participants when there are several dyadic conversations occurring at the same time within a single virtual space, making it challenging to follow the conversation (Aoki, 1995; Schwier & Balbar, 2002). The findings of this study established an alternative perspective.

Study participants expressed the idea that synchronous communication of NJVRC did have its limitations but the inability to reflect or to critically think were not identified as limitations. A contributing factor that fostered the ability to reflect and to critically think was the pairing of undergraduate student nurses in their own virtual space. This strategy enabled the study participants to interact simultaneously with theoretical concepts and their peers. This feature of NJVRC also aided in the opportunity to focus and negotiate the meaning through these interactions, creating the potential for a deeper and longer lasting learning. However, keyboard input and the speed in responding appeared as significant limitations that hindered critical thinking and reflection among some study participants. To help reduce this hindrance, explicit instructions and directions about the nature of synchronous communication is warranted.

It appears reasonable to suggest that the effectiveness of NJVRC to develop such results was derived from purposeful decision-making in design and the integration of heterogeneous learning technologies and multiple pedagogical approaches. The implication of this finding is that without purposeful decision-making on the choice of a pedagogical framework—such as the
blending of cognitive and social constructivism and its distinguishing features—optimal learning experiences can be jeopardised. Additionally, the integration of experiential, active, problem-based and collaborative learning principles framed within a constructivist approach, accompanied by synchronous mediated communication, complemented and reinforced each other, producing a successful pedagogical innovation for educational cyberspace that was much larger than the sum of its parts.

6.1.2 Anonymity

The effects of anonymity in educational cyberspace are mixed. Ahern and Durington (1995) and Lea and Spears (1991) demonstrated that anonymity reduces group salience, interaction and participation. In contrast, Raybourn (1997), Rosenorm and Kofoed, (1998) and Shaw et al. (2000) found that anonymity fostered a balance of participation control among individuals. Anonymity allowed the individuals to communicate in ways that were perceived as more challenging in a face-to-face context. The study participants of this insider action research study demonstrated that anonymity was a benefit while engaged as the virtual characters of NJVRC. This resulted in the study participants feeling less judged or intimidated by their peers. Other perceived benefits derived from being anonymous included increasing autonomy, improving collaboration and developing purposeful communication. NJVRC also provided undergraduate student nurses with a safe environment to practice the integration of theoretical concepts of nursing without provoking the anxiety that is often heightened in the face-to-face learning environments. The implication of this finding suggests that NJVRC has the potential to encourage empowerment among undergraduate student nurses.

6.1.3 Time

It is clear from the study participants' responses that the experience of NJVRC was generally positive, especially toward the end of the semester. Time appeared as a significant contributing, and also hindering, factor that shaped the study participants' experiences while engaged in NJVRC. In the early sessions, the study participants met with a sense of being overwhelmed by their inexperience with NJVRC. Despite incorporating descriptive explanations about the purpose of NJRVC and how to navigate the home page, the journal excerpts and interview data indicated that this information was not adequate. The underlying theme in many of the study participants' comments suggested that self-directness was a new concept. Another mitigating factor was a presumptive belief that having just completed a face-to-face theoretical
class reviewing specific content related to nursing care, the study participants would have the necessary knowledge to engage as the NJVRC's virtual characters and work through the particular case narratives with certainty.

The implication of this finding underscores the importance of providing adequate time along with detailed explanations, supporting the conclusions of Bullen (1998), Morris et al. (2002), and Weis and Guyton-Simmons (1998). According to these authors, explicit explanations and continued guidance aid learners in becoming acquainted with newer learning technologies and promoting self-direction. Additionally, with adequate time, experience and practice, learners are able to better synthesise, reflect and develop an understanding of theoretical concepts. As the study participants' confidence in their knowledge base evolved and matured over the semester, so did the application of this knowledge of nursing theory while engaged with NJVRC. Research by Billings et al. (2001), Knowles (2001), Mezirow (1981), and Tanner (1989) supports the conclusion that relevant meaning-making improves and develops with time.

6.1.4 Reflective Journal Writing

Although NJVRC may have properties that have the potential to promote critical thinking, its cognitive dimension was significantly more developed than the affective dimension associated with critical thinking. The literature described the cognitive dimension of critical thinking as a series of skills, including interpreting, analysing, synthesising, making inference and defending the process of inductive and deductive reasoning. Being open-minded, truth seeking, inquisitive, flexible, reasonable, and self-confident are dispositions related to the affective dimension of critical thinking (Daly, 1998; Paul & Heaslip, 1995; Simpson & Courtney, 2002). Facione, Facione and Sanchez (1994) argued that, without internalising these dispositions, the engagement in the process of critical thinking is impaired. Shaping the affective dimension of critical thinking was dependent upon the act of reflection through journal writing.

Journal writing, as previously identified, has an inherent strength of self-expression and serves as a purposeful tool for reflection (Baker, 1996; Heinrich, 1992; Khok & Chubeli, 2002), and the act of reflective writing "illuminates reality" (Shor & Freire, 1987, p. 1972). The writer can "make sense or meaning out of the experience and incorporate this experience into one's view of the self and the world" (Baker, 1996, p. 19). This exploration assists in developing an attitude of inquiry and a way of 'being' a critical thinker. Since journal writing was a means to collect data for this study, the implication of this finding suggests that journal writing needs to
become an integral feature of NJVRC. Asynchronous debriefings would represent a virtual place where individuals could post their thoughts about their experience or pose questions for others to reflect upon or seek additional feedback. These debriefings could be held at the end of every engagement with NJVRC. Essentially, these debriefings become a mechanism to continue discussing learning outcomes of the particulars of the case narrative or roles in greater detail while focusing on helping the undergraduate student nurses to uncover their beliefs and values about nursing, people, health and healing. For asynchronous debriefings to be effective, educators need to be virtually present in educational cyberspace and assume a role of facilitator.

6.1.5 The Role of the Educator

The case narrative contained embedded internal and external linked resources as a supplement and an aid in reinforcing previous learned knowledge and fostering self-direction. However, not all study participants accessed or relied on these resources, especially in the beginning engagements with NJVRC. As previously noted, self-direction was a new concept to many study participants. As a consequence, trust in the educator's knowledge superseded trust in self-knowledge or the knowledge of others. Trust in self and others' contributions significantly increased with time. Paul (1995) postulated that knowledge and thinking are inseparable entities. "One has to have content [knowledge] to critically think" (Loving & Wilson, 2000, p. 70).

The implication of this finding highlights the need for educators to be virtually present in educational cyberspace. More importantly, this necessitates that educators assume the role of facilitator. One aspect of how undergraduate student nurses learn to understand nursing is through facilitative interaction with those within its profession (Benjamin, 1988). Facilitation keeps learners focused and organised. An educator's role is to assist in teasing out the underlying held assumptions in an applied sense, making learners' tacit knowledge more explicit, discovering the power of questioning, while providing them with validation. Brookfield (1987, p. 31) claimed that "Positive triggers" build confidence in undergraduate student nurses. Facilitation can also legitimate the inherent value of all learners' contributions as equally significant. By internalising this perspective undergraduate student nurses can be empowered and nursing practice can be renewed and transformed, instead of remaining circumscribed.
6.1.6 A Pattern of a Way of Knowing

The findings of the study suggest the facilitation of critical thinking was contingent on a distinct pattern of a way of knowing. Cyber-Textual Mediated Knowing is explicated as a feasible way of knowing that influenced the promotion of critical thinking in educational cyberspace among undergraduate student nurses. Interwoven within this preliminary theoretical model were the five manifestations of knowing identified as proficient knowing, authentic knowing, intrinsic knowing, constructed knowing and interactive knowing. Each manifestation evolved from one of five process-oriented patterns. These process-oriented patterns were characterised as from chaos to competency; from virtual experience to experiencing reality; from critical thinker as active learner to reflective thinker as discovered learner; from verbal communication to textual dialogue; and from self-constructors of knowledge to others as co-constructors of knowledge.

Cyber-Textual Mediated Knowing is potentially more fluid and involves a process that consciously shapes knowledge. It evolves when individuals are immersed in a cyberspace world, interact as virtual characters with others as virtual characters and perceive a sense of physical presence. Coupled with this sense of physical presence and a developing sound knowledge base, a dialogue is initiated. Through this mediated dialogue—a textual form of communication—individuals perceive the notion of conversing through composing text. As a result, they negotiate meaning and experience, simulate and reflect upon real world issues as real-life virtual individuals, becoming critical thinkers who co-create knowledge. Thus, Cyber-Textual Mediated Knowing can be perceived as an agency to create knowledge and an agency in which to experience knowledge in educational cyberspace. The emergence of this pattern of a way of knowing causes me to reconsider what constitutes knowing. Additionally, this pattern of a way of knowing potentially makes a significant contribution to the wider body of educational knowledge that is worthy of scholarly discourse.

6.2 Limitations of the Study

Given the small number of self-selected study participants, a localised context, and a specified time frame, from which data were collected, this study yielded limited results. To generalise the findings of this study to other settings and to draw conclusions and inferences is the responsibility of the reader. However, the interplay of the pedagogical principles used in the
design and development of NJVRC may be useful for those within other disciplines to draw upon.

6.3 Recommendations for Further Research

There are four specific areas from this study that warrant ongoing exploration. It would be useful to know the effects of NJVRC on promoting critical thinking with the additional integration of the theoretical underpinnings of a graphical virtual learning environment to further conceptualise reality. Graphical and manipulated objects—such as medical charts, or graphs that can be read or written in, and client teaching tools that can be actually viewed—would aid individuals in visualising and enacting NJVRC more authentically as a real-life simulated world. Such a study would enable undergraduate student nurses to continue to integrate theory in practice in a safe environment while gaining more self-confidence in making the transition to the clinical nursing practice setting.

With reference to the sample size and time frame, it would be useful to examine the effects of NJVRC on a larger pool of undergraduate student nurses. Participants in this study were undergraduate student nurses registered in one first year nursing course, efforts should be made to study similar cohorts of undergraduate student nurses in other nursing programs. There also appears to be a need for research that is longitudinal in nature. As indicated, participants in this study were in their first year of nursing and only beginning to develop their critical thinking. Following these study participants throughout the duration of their program as they engage with Nursing Journeys: Virtual Reflective Centre could serve to facilitate further assessment of the effects of NJVRC and how critical thinking evolves in the clinical nursing practice setting. This study would substantiate Cyber-Textual Mediated Knowing as a justifiable way knowing that is particular to educational cyberspace.

Finally, the findings show that that insider action research methodology assisted in intentionally and systematically assessing teaching practice and changing views of teaching, learning and research. Therefore, a longitudinal study that investigates the long-term influences of internalising the central tenets of insider action research would be beneficial to educators and the field of education. It offers the opportunity to reflect upon the value of the insider action research approach as a means to broaden evidence-based teaching as a viable model of research.
6.4 Summary

This chapter introduced the reader to Reflection-On-Action, the final phase of the reflective thought process. It also summarised the action and reflection steps of the second cycle of this insider action research study. It began with an overview of the conclusions and implications for practice obtained from this study's findings. It concluded with a discussion of possible recommendations for further research.

This study illustrates that teaching and learning in educational cyberspace is a complex process and not a simple replication of the face-to-face classroom. It also establishes that Nursing Journeys: Virtual Reflective Centre should be given considerable regard by nurse educators as a way of promoting critical thinking in educational cyberspace and overcoming some of the limitations that undergraduate student nurses encounter when integrating theory in practice. With ongoing modifications to its interface design and the advances in virtual graphic reality, NJVRC has the potential to simulate the health care environment and continue to promote critical thinking. NJVRC cannot replace the real experiences that undergraduate student nurses encounter in a face-to-face health care environment, but offers an alternative to practical application of theoretical concepts when clinical nursing opportunities are limited or when clinical educators are not available.

The findings of this study cannot be generalised to other disciplines. However, the pedagogical principles and learning technologies used in the design and development of NJVRC may serve as a model useful to those in other fields of study. Educators in other disciplines promoting critical thinking as a learning outcome can compose case narratives and characters that depict the particular realities of that discipline. Learners can then potentially create meaning from what is unfamiliar and begin to move toward defining patterns of knowing—individually and collaboratively. Although NJVRC has features with the potential to promote critical thinking and a positive learning experience among undergraduate student nurses, its creation involved more than the implementation of various learning technologies. It was also contingent upon multiple pedagogical approaches, ongoing evaluation of its interface design in response to learner needs, time, trust, the role of the educator and a distinct application of a way knowing, Cyber-Textual Mediated Knowing.

In the next chapter, Chapter Seven, the second cycle of this insider action research study is completed with an overview of the re-planning step that ultimately prompts a third action
cycle or an entire new insider action research study. In this chapter, the reader is introduced to personal insights acquired throughout this reflective study. Chapter Seven also ends the final phase of the reflective thought process, Reflection-On-Action.
As I near the end of the second cycle of this insider research action study and complete the final phase of the reflective thought process, Reflection-On-Action, I am reminded of Drevdahl et al.'s (2002) assertion that "making sense of teaching, begins with a reflective posture toward knowledge creation" (p.416). In the preceding chapter, I attempted to contribute to the growing body of knowledge on teaching and learning by presenting conclusions, implications for practice and recommendations for further research with respect to Nursing Journeys: Virtual Reflective Centre, that were based on observations and interpretation of the findings of this study.

The purpose of this chapter is to describe the lessons learned while assuming the role of nurse-educator-researcher in the action research study. Re-planning is the final step of any action cycle (Kemmis & McTaggart, 1988; Noffke & Stevenson, 1995). The focus of this step is to deliberately identify the strengths and limitations of the phenomenon under investigation, prompting a new cycle. Nearing the completion of the second action cycle of this insider action research, I present insights generated from the experience as a nurse-educator-researcher conducting an action research study that will ultimately lead to further planning and iterations of another cycle.

7.1 Lessons Learned

I have learned that teaching is not an inherited behaviour and educators must study, practice and learn from their teaching experiences. "Teaching to help learners develop critical thinking is simply teaching better" (Loving & Wilson, 2000, p. 74). Insider action research provides a pathway to personal meaning-making and improved practice (Cochran-Smith & Lytle, 1992; Coghlan & Brannick, 2001). This perspective suggests that educators’ careful study of the conditions and context of their work will help them learn and change, practising in ways that fit their unique teaching settings (Cochran-Smith & Lytle, 1992; McNiff, 2002). I have used the insider action research approach to disclose the subtleties of the teaching and learning process, to articulate a rationale for my own questions, and to determine how best to improve my practice. I believe I have made "the intuitive and unconscious knowing and meaning" (Schmieding, 1999, p. 1141) of my teaching practice more visible.
As educators continue to explore new learning technologies in both the face-to-face and educational cyberspace classrooms, they characteristically pause for reflection. Yet, they often pause without explicitly articulating the knowledge that is implicit within their actions. I have learned that engaging in reflection and articulation during each of the five steps of the two action cycles of this research study has enabled me to re-conceptualise the interrelationships between curriculum, learning, teaching and research. I have discovered that any such reflective inquiry requires an understanding that self is fluid, dynamic, and always transforming (Buley-Meisnner, 1990; Davis, 1995; Mezirow, 1981; Richardson, 1994). Accordingly, self is simultaneously a personal voice and a subject of discourse. I found the greatest benefit from an insider action research approach is in the involvement and ownership of the research process.

The significance of framing this action research project from a praxis paradigm is that it allowed me and continues to allow me to really look at my teaching from many perspectives. It is a process of evaluation and self-renewal. It is really allowing me to explore what is happening in my classroom, involving my students and seeing how my students are learning. It is an important source of learning and is a way of giving a voice to how I live and breath teaching and learning. I have become more interested in pedagogical aspects of teaching and learning. I more motivated to find ways to build and cross the bridges between theory and practice. I not only integrated my research findings but am beginning to share those findings with others members of my professional community. (Journal Excerpt, July 11, 2003)

This revelation is most important to me; as in insider action research one of the voices is that of the educator-researcher and there is a certain degree of risk involved in revealing that voice. The importance of ownership and the benefits of assuming the role of educator-researcher are well documented in the literature (Pearcey & Draper, 1996; Tichen & Binnie, 1993). During my engagement with insider action research I developed confidence as a beginning nurse-educator-researcher and realised that I had more than a preferred learning style and intuition to guide my practice. A common theme identified in the literature is that many educators tend to teach within their own preferred learning style and intuition — as a matter of comfort. Reflecting upon my early experiences with teaching, I would concur with this claim. However, as I moved through each action cycle, reflection became intentional and systematic, synthesising Brookfield's (1987) notion of change. "Change is regarded as the fundamental reality, forms and
structures are perceived as temporary, relationships are held to involve developmental transformations and openness is welcomed" (p.13).

Another lesson learned is that I also have discovered a greater understanding of my educational values through living them (Davis & Sumara, 1997; Whitehead, 1989) in my teaching. The elements of my teaching philosophy are more consciously actualised. This is evident in experiences such as in the integration of my evolutionary ideas of educational cyberspace, my original conception of NJRVRC, the pedagogical design of NJVRC and the continual modifications in direct response to the undergraduate student nurses' active involvement. My perspectives on teaching and learning are now guided by more than just the preferred learning style, intuition, content and my comfort level, but rather by evidence-based research.

I am also more cognisant of the role of learning partnerships I described in Chapter One. I recognise how collaboration with, and immediate feedback from, my students have moved me to acknowledge their views more readily. As a result, the learning environment became flexible and responsive. In this study, I made regular adjustments to my teaching as to match with students' learning needs. These adjustments were directly attributed to what I learned while engaged in an insider action research process. For example, the students voiced a need for additional time of engagement with NJVRC. Accordingly, the engagement time with NJVRC was extended to one and half hours. Additionally, the students voiced a need for group debriefings. Accordingly, follow-up group discussion took place at the end of class. I recognised the significance of reflecting and acting on this new information throughout the course, rather than solely using this information as a vehicle to improve the next course offering and my teaching practice. As noted in an excerpt of my field notes described in Chapter Five, I designed clarification sessions after the first two initial sessions to minimise the students' frustrations with NJVRC. It proved to be a positive strategy.

After spending a few minutes at the beginning of past two classes sessions with NJVRC to clarify students' concerns, students seem to be more relaxed and 'getting in to it'. Engagement was extended for 90 minutes instead of the original scheduled time of 60 minutes. Toward the end of the semester, a perceived sense of a focused silence filled the classroom. Students' eyes were affixed to the monitors and less giggling occurred. Verbal engagement permeated the room only toward the end of the session. Some students were
asking "who played so and so", "that was interesting", or "I had to think". (Field Notes, February 27, 2003)

The most pivotal lesson learned is that for me, curriculum has now become a dynamic form, allowing unforeseen possibilities rather than being restricted to pre-determined outcomes. In a familiar way, Grumet (1988) beautifully characterises curriculum as a waterfall, an exemplary metaphor for my newly framed view of curriculum:

Curriculum is a moving form. That is why we have trouble capturing it, fixing it in language, lodging it in our matrix. Whether we talk about it as history, as syllabi, as classroom discourse, as intended learning outcomes, or as experience, we are trying to grasp a moving form, to catch it at the moment that it slides from being the figure, the object and goal of action, and collapses into the ground for action. (p.172)

The implication of these insights is that learning through reflection enabled me to grow from experiences throughout this entire study. As previously discussed, Greenwood (1993) and Schön (1983, 1987) explain that reflection makes thinking more critical and focused on one’s actions before, during and after they have occurred. I found that the insider action research approach was the impetus for my increasingly intentional and systematic reflective practice that led to questioning assumptions, changes and improvement in my teaching. Ultimately, this practice led to enhancing student learning.

Moreover, articulation and intentional reflection have now become an intrinsic part of my practice. Boyer (1990) and Drevdahl et al. (2002) assert that academia needs to embrace the notion that teaching is a scholarly form of research. "By clarifying and making explicit the practices of teaching, researchers can add to the body of knowledge" (Drevdahl et al., 2002, p. 418). Therefore, I believe that when educators are supported to promote professional and personal growth through intentional and systematic reflective practice, engagement will become a natural disposition and practice will improve. Furthermore, teaching as scholarship will be further enhanced and legitimised as a form of research. I identify with Habermas' (1971) view that knowledge always serves some interest. I hope that the example of engaging with this approach will inspire other educators to become researchers in their own right, in order to create new knowledge, improve their practice and student learning, and advance the art and science of teaching and learning.
7.2 Summary

As I close the chapter, I revisit the title of this dissertation. Have I *Untangled Critical Thinking in Educational Cyberspace*? As McNiff (2002) affirms "action researchers do not aim for closure...but to explain fully the process of learning so [we] can learn from the account" (p. 90). This study has untangled, perhaps only a strand, of the complex concept of critical thinking in educational cyberspace. It offers opportunity to reflect upon the value of the insider action research approach as a means to broaden evidence-based teaching as a viable model of research in nursing education. Moreover, this inquiry offers opportunity to reflect upon a possible newly framed pattern of a way of knowing for optimal learning in educational cyberspace. It has also shown the changing nature of my teaching practice, my role as nurse-educator-researcher and my evolving views about pedagogy. Internalising these views, in the light of the research experience, I have grown as an educator.

This research study represents the beginnings of a long journey exploring educational cyberspace. Any journey begins with a single step and I believe I have taken quite a leap. True to the inherent reflective cyclical nature of insider action research, this research project raises new possibilities for me to consider for the future, including for example:

- How does the integration of the theoretical underpinnings of graphical-based virtual learning enhance the effectiveness of NJVRC to promote critical thinking among undergraduate student nurses?

- What are the experiences among undergraduate student nurses using group reflection and journal writing post NJVRC engagement to promote critical thinking?

- What are the experiences among one group of undergraduate student nurses using NJVRC throughout their nursing program?

- How does engaging with NJVRC influence undergraduate student nurses’ transition to, or performance in, the clinical nursing practice environment?

These research questions can become the impetus of a new insider action research cycle or an entirely new action research project as I continue my pursuit to improve my teaching practice and moving forward in further untangling critical thinking in educational cyberspace.
Finally, this reflective study illustrates that the insider action research is a fitting methodology to transform one educator's tacit knowledge into generated theories. It offers a systematic approach for educators to unravel the connections made between pedagogy, research and change. Its applicability as an appropriate methodology also serves to support and legitimise the emerging trend of moving research toward an evidence-based model as the basis for advancing educational practices in nursing education and acknowledges Boyer's (1990) view of teaching as a form of research.
References


Dyrli, O.E. (1996), Educational MUDs, MOOs, and MUSEs. Technology & Learning. 16(8), 20.


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Appendix A—Sample of Letter for Permission

Permission Letter to Conduct Study

Dear College President:

My name is Sharon Ronaldson. I am a graduate student in the faculty of education at the University of British Columbia. I am writing to request permission to conduct a research study, as part of my doctoral program, in your institution. In addition, I am also requesting permission to invite eight undergraduate student nurses to participate in this inquiry.

I have chosen Langara College as this study's philosophical underpinnings demonstrate congruity with your mission statement. This is about educational innovation, advancing knowledge of teaching practices and improving in student learning. Below is a brief summary:

The research study is entitled 'Untangling Critical Thinking in Educational Cyberspace'. It is methodologically situated in insider action research and informed by the interpretive and post-modern paradigms. Insider action research is a systematic inquiry that educators can use to study an area of interest specific to their professional context.

The purpose of this research is to explore the development of undergraduate student nurses' critical thinking abilities while engaged with an instructional unit Nursing Journeys: Virtual Reflective Centre (NJVRC) in educational cyberspace as part of the normal curriculum of Nursing 1141. Specifically, the research addresses the following initial questions:

1. How does Nursing Journeys: Virtual Reflective Centre promote the development of critical thinking among undergraduate student nurses?
2. How do the blending of the theoretical underpinnings of role-play, computer-mediated communication and collaborative and problem-based learning promote the development of critical thinking among undergraduate student nurses?
3. How do undergraduate student nurses describe their experiences of learning to critically think while engaged with Nursing Journeys: Virtual Reflective Centre?

The findings of this study will provide additional knowledge about critical thinking, educational cyberspace and learning. It has implications for curriculum and teacher knowledge development in nursing education programs.

Ethical approval will be obtained through the University of British Columbia's Ethics Committee. The eight participants will be recruited through the use of an information letter (see attached). Criteria for inclusion include having experience with the constructs of critical thinking and educational cyberspace. Informed consent will be obtained prior to the commencement of the study.

Over the course of the semester, participants will engage with an instructional unit, Nursing Journeys: Virtual Reflective Centre, for one hour per week, for twelve week as part of your normal activities of Nursing 1141. In addition to the twelve hours of online participation during
Appendix B—Sample of Letter of Information

Information Letter to Participants

Dear Student Nurse:

My name is Sharon Ronaldson. I am a graduate student in the faculty of education at the University of British Columbia. I am carrying out a research project for my doctoral dissertation and requesting volunteers to agree to be interviewed and keep a journal about their learning experiences in order to assist me in learning more about critical thinking in educational cyberspace.

The purpose of this research is to explore the development of undergraduate student nurses' critical thinking abilities while engaged with an instructional unit entitled Nursing Journeys: Virtual Reflective Centre in educational cyberspace that is part of the normal curriculum of Nursing 1141. Specifically, the research addresses the following questions:

- How will the use of Nursing Journeys: Virtual Reflective Centre promote the development of critical thinking among undergraduate student nurses?
- How will the blending of the theoretical underpinnings of role-play, computer-mediated communication and problem-based learning promote the development of critical thinking in educational cyberspace?
- How will undergraduate student nurses describe their experiences of learning to critically think while engaged with Nursing Journeys: Virtual Reflective Centre in educational cyberspace?

The findings of this study will provide additional knowledge about critical thinking, educational cyberspace and learning. It has implications for curriculum and teacher knowledge development in nursing education programs.

Over the course of one semester, participants will engage with an instructional unit, Nursing Journeys: Virtual Reflective Centre, for one hour per week for twelve weeks as part of the normal learning activities of Nursing 1141. Participants will be asked to keep a journal and participate in a taped interview describing your experiences over this time period. The journal writing activity should take no longer than 30 minutes per week for the twelve weeks to complete. The interview will be one to two hours in length and take place at Langara College at a mutually agreeable time and date in a meeting room that provides privacy. The journal will be reviewed and the interview will be scheduled at the end of the semester once the grades for N1141 are submitted to the registrar. The online transcripts will also be collected as data at the end of the semester and analysed once grades are submitted.

Participants will not be required to identify themselves anywhere during the taped interview or in the online discussions. All information will be identified only by code number and be kept strictly confidential and securely stored in a locked filing cabinet as per the university's policy. After the analysis, the documents, including the tapes will continue to be securely stored in a locked filing cabinet. The results will be in the form of a research report so that individual
Reply Card

☐ I can be involved in your research study about critical thinking in educational cyberspace.

☐ I can not be involved in your research study about critical thinking in educational cyberspace.

You may call me at _____________. The best time to phone is ________________

You may email me at ________________

______________________________
(name)
Appendix E—Interview Questions

Interview Questions

In opening the interview, the researcher will ask the participant to tell his or her own story using the following framework.

Introduction

First, the participants will be asked to tell something about themselves

Focus questions may be:

- How do you define critical thinking?
- How do you describe your experience while engaged with NJVRC?
- How do you perceive that NJVRC promoted the development of critical thinking?
- Tell me about a specific learning experience in NJVRC
  - what was familiar to you about the situation?
    - what assumptions contributed to the way you responded to the situation?
  - what was important and what was not?
  - what was going on in this situation that may have influence the outcome?
    - were there any other possible explanations for what was happening in the situation?
    - what made you sure of your interpretation of the situation?
  - why was it important to intervene?
  - what information was missing?
  - how did you go about getting that information?
  - what factors influenced your responses?
  - what had you taken for granted in the situation?
• Its significance to your development of critical thinking.

• What did this experience mean to you at that time?

• What does this experience mean to you now as a learner, as a student nurse, a critical thinker?

• What particular aspect of NJVRC do you believe assisted you in the development of critical thinking?
  • how would describe the influence of role play?

  • How did the case narrative that you were engaged in assist you in applying, analysing, synthesising or evaluating what you knew about its focus?

  • Tell me about your experiences of dialoguing with a peer

  • What are the benefits of developing your critical thinking abilities using an instructional tool, like NJVRC

  • What are the limitations of developing your critical thinking abilities using an instructional tool, like NJVRC?

• Jot down a list of 5 words describing your experience while engaged with NJVRC. What links can you make among the words you've listed?

• If you were to title your experience what would it be?

**Conclusion**

Is there anything else you would like to tell me about your experience?