Chapter One

Situating the Study

Ongoing learning has a central place in a nurse's ability to function effectively in a critical care unit, as illustrated below:

> *Anne-Marie: I had the first heart from theatre. I took the opportunity to stay with Heather and help out / learn more about the balloon pump her patient had insitu.*
>
> *Heather also had a handout about the IABP which was interesting ... very 'user-friendly language'. My patient arrived just after 1100.*
>
> *[S]he didn't seem to be warming up well, I found a Bair Hugger which was more appropriate. The surg. reg. came to see her for fast-tracking.*
>
> *At 1415 on change of shift. I looked at the monitor, noticed the MAP was 88, lowered the SNP. However the MAP dropped instantly to 68 where I called for my TL to get the doctors, nothing seemed to happen, I called more insistently where the doctors arrived when the MAP was 32. Things were chaotic, however, I must say, I was amazed that I managed to not only be of help, but initiate and anticipate in this nightmarish situation. I had previously felt a lot less experienced than many of my peers ... I don't any more.*
>
> *This patient was reopened in the Unit, transported to theatre, her cardiac tamponade resolved, resulting in a successful recovery.*

Anne-Marie's narrative encompassed multiple aspects involved in learning in her workplace and provides an example of how she learnt informally to respond to the demands in critical care. This knowledge building included seizing the opportunities to strengthen her critical thinking and decision-making skills by working with other senior nurses, in the care of their patients. She revealed that Senior nurses, such as Heather, in this example, also wrote and shared handouts to enhance Nurses' learning on the job. Anne-Marie demonstrated problem-solving skills in handling difficulties and obtaining prompt medical action for the patient. On reflection, she

realised her own ability in managing critical situations. This example represents some of the complexities of informal learning revealed and explored in this research. This chapter describes the background to the study, presents the research question and the theory of learning underpinning this study. Additionally, the context in which the study took place is explained in detail, so that the reader is able to compare or contrast the environment with other intensive care units. This is followed by an outline of the thesis.

Background

This study was undertaken in the Adult and Paediatric Critical Care Unit (referred to as the 'Unit') of a large, public general hospital located in the metropolitan area of an Australian city with a population of less than two million. The acute care hospital was designated as a major trauma centre for the southern area of the city and country, which provided private and public services to patients. The Unit serviced the needs of the hospital by providing up to twenty-four critical care beds, cardiac arrest and medical emergency retrieval teams, as well as some nursing and medical management of limited specific procedures for patients from other wards within the hospital.

People admitted to the Unit during this study ranged in age from six months to over ninety years of age. There was no upper age limit for admission to the Unit, but babies aged less than six months were usually not admitted. People with severe chronic or acute medical illness, trauma injuries or undergoing surgical procedures requiring critical care post-operatively were admitted.

The Critical Care Nurses working in the Unit under study needed to have a sound knowledge of patients with critical cardiac, neurological, renal, hepatic, gastric, orthopaedic disease or injury and to be multi-skilled in managing the patients. These specific nurses will be referred to throughout this study as 'Nurses'. The increase in the types of procedures that were undertaken, the complexity of the patients' conditions, as well as the medical equipment, placed increasing demands on the Nurses to maintain an expanding bank of knowledge and skills. Additional and

changing surgical procedures and treatments such as cardiac bypass surgery, liver transplants, and an additional trauma load undertaken within the hospital increased the complexity of the nursing interventions and decision-making. The medical equipment used by the Nurses was frequently changed or updated, often without consultation with the Nurses who managed it while caring for their patients. There was some formal work-based education. However, most learning was ad hoc, informal, often urgent, sometimes just in time and superficial.

New developments in health, medical treatments and technology offer the possibility of longer survival. Sometimes, complete recovery is attained through limited interventions over the short term. For other patients, longer survival requires ongoing treatments and frequent admissions to critical care units for management of acute episodes of chronic illnesses. The cost of health care rises with the new developments in treatment, equipment, medicines and procedures. Critical Care Nurses are confronted with expanding roles due to the increasing complexity of patient care in an environment of limited health funds. Changing work practices and technology in health care impose challenges for nurses to learn and acquire knowledge in any health setting. In critical care units, the complexity of technology and the critical nature of patients, sometimes with multiple conditions, place additional demands on the Critical Care Nurses' abilities to acquire knowledge and skill. In large critical care units, organisational support for over one hundred nurses on shifts who need to be continuously updating their knowledge and skills may be limited.

Statement of the problem

There have been ever-increasing demands to gain knowledge to keep up with changes applicable to critical care units, whether they are specialised or general units. The reason for undertaking this study was to explore the challenges involved in retaining knowledge and expertise to enable Critical Care Nurses to respond rapidly, not only to the current workplace demands, but also to the changes in equipment, the large diversity of patients' needs and diagnoses, plus changing procedures that occur with great frequency.

Research question

The question that this research sought to answer was: 'How can Critical Care Nurses' understandings of their informal learning in the Critical Care Unit enable them to implement effective informal learning strategies to enhance their professional practice?'

In the process of examining this question, the research aimed to identify the informal learning strategies used by Nurses in the Unit. These data would provide the opportunity for all participants to develop a deeper understanding of the way in which they and their nursing colleagues learn informally. The researcher and participants were also interested in examining ways informal learning could be achieved more effectively. The research team shared their findings and collaborated with other Nurses in the Unit to examine informal learning practice.

In this study, the workplace provided limited organisational support for ongoing education. The Nurses attempted to meet their learning needs informally through a variety of means. Hence, it was appropriate to explore ways in which the Nurses could enhance their informal learning skills to meet the needs within a changing workplace. The framework of learning used to examine the processes employed by the participants of this research drew on Knud Illeris' (2002) theory of the Three Dimensions of Learning. The first version of this learning theory was published in Scandinavia in 1999 and translated into English in 2002. Since that time Illeris (2004: 2003a &b) has continued to extend his theory, particularly in relation to its application to adult education and workplace learning.

Theorising learning

In workplaces where the focus is on technical skills, rapid decision making, and interactions between staff for urgent information, learning is very much operational in nature and understood from the cognitive, emotional and social perspectives. Illeris (2002: 18) proposed that learning could be viewed as having these three dimensions. The cognitive element related to content and comprises the acquisition and application of knowledge and skills. Illeris (2003a: 399) described this emerging

cognitive learning as a process 'to construct *meaning* and *ability* to deal with the challenges of practical life and thereby develop an overall *functionality'*.

The emotional component was described by Illeris as the psychological energy that drives and influences learning through individual 'feelings, emotions, attitudes and motivations' (2002: 18). This dimension established *mental balance* and *sensibility* concurrently (Illeris, 2003a: 399). Learning is greatly influenced by motivational and emotional factors (Illeris, 2002: 63). The emotional component becomes apparent when one begins to understand what those matters mean to the learner or to others. The emotional influence is less conscious in assimilation than in accommodation. It is when the learner is accommodating the knowledge to the surrounding environment that the emotional component becomes apparent to the learner (Illeris, 2002: 71). He claimed that motivation, as the emotional component, could influence retention of new knowledge and the transfer of that learning into different contexts and to further understanding.

The social dimension was seen as a combination of the social interpersonal interactions, the societal context underpinning and affecting the nature of the interaction, and the individual engagement. The social level of interaction is at an interpersonal level, while the societal level influences the character of the interaction and the contributions of individuals. He argued that the social level of learning had its background in modern capitalism. The societal level is the socialisation in which 'the individual acquires societal norms and structures' (Illeris, 2002: 144). Meaning and identity were developed from social learning. Illeris (2002: 203) indicated that the interaction of individuals within the social and societal context of their environment produced more complex motivations than traditional 'biologically rooted motives'. He has identified that the social element always reflected current social conditions (Illeris 2002: 227).

To Illeris (2002: 227) these cognitive, emotional and social dimensions were interwoven and co-existed to form a whole. By viewing learning as a consequence of survival of the species he built on Piagets' theory that individuals continuously adapt to their surroundings in order to maintain equilibrium (Illeris, (2002: 28). This adaptation occurs through assimilation and accommodation. Individuals thus

assimilate understandings of the environment in the process of acquiring new knowledge or extending it. Accommodation is the process in which new information can be integrated into an individual's existing understanding. Hence the individual must dissociate and reconstruct in order to adapt to the altered schemes in the environment thus transcending prior limitations (Illeris 2002: 35). Accommodation can be rapid or evolve slowly as problems are solved.

Two other levels of learning, cumulative and transformative, were described in 2003. The cumulative level accounted for information 'where one must learn something with no context of meaning or personal importance, for example a telephone number or pin code number' (Illeris 2003a: 402). Transformative learning accounts for those situations that impact on identity. He defined it as:

> characterized by simultaneous restructuring in the cognitive, the emotional and the social-societal dimensions, a break of orientation that typically occurs as the result of a crisis-like situation caused by challenges experienced as urgent and unavoidable, making it necessary to change oneself in order to get any further. (Illeris 2003a: 402)

Illeris (2004: 436) defined work identity as 'concerned with our experience of ourselves as working individuals and as parts of a working fellowship.' He argues that the workplace was recognised within organisational structures by staff and theoretically, as an environment which strongly influenced the conditions for learning and the type of learning that took place (Illeris 2002: 197). This acknowledged that adults drew on past knowledge and experience to learn. They make meaningful choices about their learning, develop strategies to achieve their goals, which are usually clear to the learner, and decide how much responsibility they will take for their learning (Illeris, 2002: 219). These characteristics of adult learners are highly relevant to this workplace study, as Nurses attempt to keep up with change.

Change

The pace of change has increased in society and in workplaces requiring flexibility to accommodate new knowledges (Illeris, 2002: 35). These processes involved

change in the individual's cognitive skills actively adapting to the environment, as well as changes in behaviour, that through reflexivity, lead to personal development (Illeris, 2002: 35, 221). Reflection is an after thought about an incident. Reflexivity, or, self-reflection, is an individual's experience, evaluated through the learner's personal identity as the focus for comparison (Illeris 2002: 46). Additionally, change in modern society placed technical and academic demands on adults requiring intense accommodative learning through reflexive processes. He argued that many adults were unaccustomed to such demands which they must meet in response to important changes in life conditions.

Nurses in Critical Care Units, are balancing not only technological changes, but also limited and changing funding of health care, which influences the way in which patient needs can be met. The concept of learning as presented in Illeris' theory, suggests that a means of coping with change is through forms of learning which are complex and transformative. Illeris, (2002: 197) has identified that 'work as a space for learning has a strong influence on both the learning conditions and the learning that takes place'. Within the context of this study, in response to rapid change, the Nurses worked out ways to learn on the job and continued learning to stay informed about new procedures and new equipment. The environment in which the Nurses gained knowledge in this study is described below.

Setting the scene

There is inconsistency in the naming and function of critical care units worldwide. They may be called Intensive Care Units (ICUs) or Critical Care Units (CCUs), or may be named in accordance with the role of the Unit. Many critical care units have designated specialties in particular fields of medicine (Carmel 2006). For example, in some hospitals there may be an intensive care unit specialising only in cardiac conditions, often called the Coronary Care Unit (CCU), or Neurology/ Neurosurgical Intensive Care (NICU) or Medical Intensive Care. The nurses who work in these units are also generally called Critical Care Nurses, but build specialised skills and knowledge in relation to the role and function of the unit. However, in this study the Nurses in the Unit required a broad knowledge of all aspects of critical care nursing.

They were working in a general adult and paediatric critical care unit and were expected to respond to a multiple range of medical conditions as across the lifespan. They needed to have expertise and extensive knowledge and skills in all aspects of critical care nursing.

Situating self as researcher

As a Nurse in the Unit at the time of the study, I was a participant researcher with preconceived views about learning in the Unit. I had worked in critical care units for seventeen years. My perceptions and experiences in the Unit were that as Nurses we were increasingly confronted with procedures undertaken infrequently plus new procedures and equipment without adequate familiarisation or training. We needed to respond rapidly and hence acquire knowledge urgently. This study worked from a base where perspectives were socially constructed. These could be reconstructed through interpretation of the actions being explored through research leading to knowledge building (Gadamer, 1975).

My perspective was that some Nurses were able to learn quickly enough to manage alterations in their clinical practice effectively, while others found it more difficult to keep up with the pace of change. It seemed to me that there was not and would not be institutional support for the ongoing on-the-job learning so we needed to explore ways of acquiring the knowledge ourselves. My Master's thesis was a phenomenological study of expertise in critical care nursing and through this process participants demonstrated their ability to reflect on practice (Dew, 1994). I was keen to provide my colleagues with the opportunity to be actively involved in exploring their practice with a view to making change which they could influence.

By being in the clinical setting for so many years, I was aware that Nurses felt isolated from opportunities to explore practice in terms of understanding research. Many of my colleagues had commented that they were not clever enough to do research. A participatory action research approach provided the Nurses with the opportunity to control the extent to which they participated and influenced the process (Stringer & Genat, 2004). As an insider, I was able to understand the

environment from the position in which I was situated and was able to reconstruct my initial position.

Environmental layout

Critical care was provided in a fifteen bed unit arranged in a circle with two central parallel benches grouping desk space and computers. This central section was usually called the nurses' station, although the doctors and ward clerks also used the station. The circle enabled Nurses to see all the other beds, except one that diverged out of the loop. All but three beds were separated only by dividing walls half the length of the bays, plus curtains used to provide privacy for the patient during some procedures. There were many alarms set on equipment to give warnings of changes in the patients' conditions. Consequently, the Unit of fifteen patients, with at least as many staff and visiting relatives, was always very noisy.

The Unit did not have windows to the outside and this in conjunction with their illness, medications and an environment that was busy day and night, increased the likelihood of confusion for recovering patients. When patients were confused, they were more likely to be restless, with potential to pull out drains and lines, thus delaying their recovery. Also, they needed to be watched and attended closely so that potential problems were avoided.

An overflow area was located two corridors away from the main Unit, which accommodated up to ten patients with minimal space between beds. The constant noise in the overflow area had a similar disorienting effect on the patients.

There was a separate equipment room off a corridor outside the Unit, where equipment was cleaned and refurbished or packaged and checked. Additional connections and reusable items were held in this room. It was also used intermittently as a teaching space for small groups of Nurses and Patient Service Assistants. Supplies were kept in the patient area, in corridor cupboards which backed onto the main area. Compactors in another room contained the equipment for retrievals. The staff tea room was located past the supply cupboards inside the Unit. Most Nurses used the tea room for meals and tea breaks, but occasionally some ate

outside or walked outside after the meals. The meeting room for medical rounds, nursing handover and larger teaching sessions, was located in an area adjacent to the Unit.

Unit staff

The Unit was staffed by Nurses, medical, paramedical and ancillary staff. During any shift, if all beds were occupied, there were twenty to twenty-five Nurses in the Unit and approximately ten other medical and paramedical and ancillary staff. An overview of the role of each of these groups is presented below. The nursing positions are described in detail, as this group were the primary focus of the study.

The Nurse Manager was located in an office in division administration, on a different level from the Unit. The Nurse Manager, in conjunction with the Clinical Nurse Consultant, supervised the five Clinical Nurses, and approximately100 Critical Care Nurses who worked various shifts within the Unit. The Nurse Manager's responsibility was staffing, staff management, rostering of staff and the ordering and management of adequate supplies.

Clinical Nurse Consultant

The Clinical Nurse Consultant was responsible for the operational management of the Unit. Learning packages were developed by the Clinical Nurse Consultant and a number of other Nurses, but time to update the packages was rare. During the researcher's time working in the Unit it was noted that some enthusiastic Nurses prepared or updated learning packages as a means of revision. Updating the packages was a prescribed part of the Clinical Nurses' portfolios, but was rarely identified as a priority.

Clinical Nurses

The roles of the Clinical Nurses comprised performance of the duties of the Clinical Nurse Consultant after hours, being a role model, a resource for clinical information and a facilitator of learning for Nurses in the Unit. For the majority of their time, these duties were performed as necessary in addition to a normal clinical workload.

At the time of this study, the Clinical Nurses had a full patient load and were expected to provide guidance and teach when Nurses needed assistance or when there was spare time. They were preceptors for a group of twenty-five Nurses and were usually allocated one day off per month to undertake staff assessment and training for their group. Although Clinical Nurses were called preceptors by the Nurses in the Unit, the term was often also used for any nurse who was allocated to guide and assist a new worker with learning. In either case, the preceptor was likely to have her or his own workload which restricted the potential for guiding and teaching.

Base Grade Nurses

The majority of Nurses were Registered Nurses. Enrolled Nurses, who undertook patient care, comprised less than three percent of the staff on roster. Registered Nurses who were on the same shift as Enrolled Nurses performed those nursing interventions that were outside the Enrolled Nurse's responsibility. Registered Nurses who were new to the Unit had the responsibility of providing direct nursing care to one or occasionally two patients. This represented the basic grade for Registered Nurses in the Unit and was called Grade A. They could generally call on a more experienced Nurse for advice and assistance in the care of their patients.

Team Leader

The next level of responsibility for Nurses comprised an extension of skills from patient care to a Team Leader role. Qualifications to upgrade to this position called Grade B were obtained through completion of a Team Leader workshop. This Nurse provided assistance to other Nurses on patient care, guided junior Nurses and on some shifts had responsibility for checking and management of patients' equipment, such as mechanical ventilators. At this level the Nurse also formed part of the team attending cardiac or respiratory arrests within other wards of the hospital. These Nurses and the senior Nurses could also form part of the team retrieving patients from out-of-hospital accidents or from other hospitals.

Shift Coordinator

The third level, C Grade, the role of the shift coordinator, comprised allocation of staff to be Team Leader or patient care Nurse, and allocation of Nurses to patients. The shift coordinator considered a number of elements when allocating staff to their role for the shift. These included: the level of expertise of the Nurse, the educational and experiential needs of the staff and the patient acuity, which was based on the complexity of the patient's condition. For example, a beginning Nurse would be allocated a low acuity patient. Within the limitations of each Nurse's experiences and knowledge, the shift coordinators aimed to vary the types of illnesses thus extending the skills that Nurses developed through their learning experiences.

In an endeavour to maintain best practice, the shift coordinators were required to know the capability of the available staff. This included knowing whether the Nurses were on a critical care course or needed experience related to recent learning in workshops. The gender of the Nurse allocated to a patient was occasionally taken into consideration for a variety of reasons, such as cultural considerations, or the intimacy of the nursing care required. The extent of support needed by the patient's relatives and the perceived suitability of the Nurse to manage sensitive matters would also influence the coordinator's decisions. For example, ideally an experienced nurse would be allocated to a patient who was unlikely to survive and was being considered for organ transplant. A calm, confident nurse might be allocated to support patients or relatives who were very anxious or angry. The shift coordinator also assisted with direct care nursing as needed.

The shift coordinator allocated a Team Leader or occasionally a Nurse on patient care to retrievals and in-hospital emergencies. When these events arose, the other Nurses on the shift shared the work load. The Nurses only attended retrievals and in-hospital emergencies if they had participated in the relevant mini-courses such as the Team Leader Workshop conducted by nurses within the Unit. In addition to the workshops, the Nurses developed their practical skills for these events when they were preparing a critically ill patient to be transferred to various departments for treatment or diagnostic tests. Diagnostic scans, for example, could only be performed in radiography and required at least two Nurses, usually the patient's Nurse and the

Team Leader, in addition to a Patient Service Assistant and occasionally a doctor for transport to the department. The Nurses needed to disconnect all equipment to run on battery and replace some with portable equipment while continuing to monitor the patient closely.

The skills that the Nurses required in the move to other departments were akin to those needed for retrieval of a patient from an accident or country hospital. The preparation and observation skills were comparable, but during the retrieval of a patient, via ambulance or helicopter from the site of injury or from a country hospital, there was limited backup. Usually only one Registrar and one Nurse from the Unit attended retrievals. Hence, the skills learned by the Nurse as a Team Leader in the Unit were those that had to be displayed before attending retrievals.

The shift coordinator also attended the morning medical round which commenced in the meeting room where patients' X-Rays could be viewed. The round then moved on to visit each patient in the Unit and decisions for treatment or transfer were made. The shift coordinator passed on any additional information to the patient care Nurse. Plans were developed by the shift coordinator, in conjunction with the Ward Clerk, and hospital bed manager, for those patients being transferred to other wards in the hospital.

Shifts

The shifts for Nurses were generally of eight hours' or twelve hours' duration. Some Nurses worked a combination of seven, eight, nine or twelve hour shifts. The timing of the commencement or end of the shift was variable depending on the number of hours that the Nurses were allocated. At the time of the study, there were many options. For example, a nurse could work twelve hour day shifts and eight hour night shifts. Nurses who elected not to work twelve hour shifts usually worked nine hour night shifts, but the length of the day shift depended on the number of hours the nurse needed to work in the month.

Handover

When a Nurse commenced the shift he or she received a handover of a patient and checked the patient, medications and equipment. The Team Leaders and the Shift Senior received a handover of all the patients in the Unit. Handover was the process of passing on information about the patient that the Nurse who was taking over on the next shift needed to know. This was an opportunity for learning and teaching that may or may not be used. During this study, the handover was at the bedside for the patient care Nurses and in the same room for the Team Leaders and shift coordinator.

Other Unit staff

There were more than twelve doctors employed in the Unit on weekly shifts. They included Consultants who were specialists in critical care medicine and Registrars who were studying to be specialists in anaesthesia or critical care medicine. The Consultants were on rotation to intensive care units in a number of other hospitals. There was one Consultant per week and a number of Registrars rostered on day or night shifts. In this thesis they have been called doctors unless their knowledge, skills or position had particular relevance to an understanding of learning in the Unit.

Two Ward Clerks managed the administration of patients' records and administrative transfer of patients to and from the Unit during office hours. For admissions or transfers after hours, the shift coordinator managed the administration aspects.

Patient Service Assistants performed multiple tasks fulfilling positions that in the past were designated as orderly, cleaner, equipment assistant and catering. In their role they frequently had to make decisions on adjustment of their priorities to meet the changing needs in the Unit. Their tasks included assisting the Nurses to transport the patients for tests and scans in other departments. Along with the Nurses, Patient Service Assistants needed to ensure that the patient was safely moved from the bed with all lines, tubes and drains intact to the table, for the procedure. The patients were moved on their beds and one of the responsibilities of the Patient Service Assistant, for example, was to ensure there would be an adequate portable oxygen supply. Another priority for the Patient Service Assistant was taking and picking up

urgent specimens and medications when the pneumatic transportation tubes between departments were unsuitable or out of order. Patient Service Assistants were integrated into the functioning of the Unit and were often able to identify in advance when their assistance might be needed.

Formal work-based learning opportunities

Orientation, the critical care course and the workshops described below represent the formal work-based education and training conducted within the Unit. All nurses new to the Unit had an orientation of three days. This encompassed such matters as the Unit routines, an overview of the diseases and conditions most commonly seen in the Unit, nursing procedures that the new Registered Nurses would be expected to perform and general patient care. The effects on the patient and relatives of admission to any critical care unit were also discussed. Specific sessions were conducted on equipment unique to the Unit. Some weeks later, the initial orientation was followed by another day on more complex nursing care and assessment and use of the related technical equipment.

Those Nurses who had worked in the Unit for twelve months were eligible to apply for the critical care course. It was usually conducted annually with eight to twelve national and international students. There was a substantial clinical component in the course as it was conducted internally. The students generally had full-time or at least thirty-two hours per week employment over twelve months in the Unit. They also had an option to complete an additional year of theoretical study with an allied university. The practical assessments were held within the Unit. The critical care course incorporated the content of the workshops described below so that over the twelve months, the undergraduate progressed through the roles of Team Leader and Shift Senior. Nurses applied for the course to enable them to underpin their nursing interventions with sound knowledge and to improve patient safety. At the time of this study, the course did not result in an increase in income or promotion, but did involve greater responsibility and accountability. Once the students graduated, their progress was influenced by many factors that emerged from the study, such as

choosing to work part-time and shift co-ordinators' perceptions of their ability to undertake more senior roles and will be discussed later.

Workshops were conducted for Nurses who were seeking more responsibility in nursing care and day to day functional, operational and administrative management. These workshops were independent of the critical care course and were aimed at those Nurses who either had not undertaken the course or had completed a course many years ago. This enabled the Nurses to advance to Team Leader or Shift Coordinator within the Unit. The workshops comprised written learning packages to be completed in the Nurse's own time, prior to a series of two to three days of workshops. These typically consisted of short lectures and practical training, covering the roles of each higher duty position. For example, the Team Leader workshop included procedures for teams attending cardiac and respiratory arrest in any clinical areas of the hospital, organisational skills for supporting nursing staff caring for individual patients, and changing and checking equipment used for patients.

There was also a trauma mini-course conducted for Nurses in conjunction with one of the doctors. This was established by the doctor in response to the increasing numbers of retrievals undertaken by the staff in the Unit. It aimed to ensure that Nurses who went on retrievals, understood the protocols and specific nursing requirements in an unfamiliar environment. However, in general the workshops were conducted by a Clinical Nurse, with some input from the Clinical Nurse Consultant and the Critical Care Nurse Educator from the School of Nursing within the hospital.

New technologies and procedures

In an environment where advances in technology and medical procedures were continuously changing, it was vital that the Nurses kept up to date. Sales representatives occasionally provided information on new equipment, in the form of a lecture and demonstration during in-service time. The sessions on new equipment or medical supplies were conducted for 20 to 30 minutes during the overlap of Nurses' shifts. There was limited time for demonstration and no time for Nurses to

practice with the equipment. The sessions were held within the Unit or at a patient's bedside with up to ten Nurses crowded around. The noise and activity surrounding the group was often prominent. Nurses might be called away during the sessions to attend to a patient or assist others with their patients during the training. Those on night shift rarely have face-to-face contact with the sales representatives who were most familiar with the equipment.

A Nurse may not have an opportunity to practice the new knowledge that had been taught until days or weeks later. The next time the Nurse had access to the equipment might be when she or he was responding to a patient on whom it was being used. The potential problems that were covered in the sessions conducted by the sales representatives might not be the problems that arose when the equipment was used for patients. If problems occurred, the Nurse had to determine whether the condition of the patient was affected by an apparent equipment malfunction, or whether the settings might have to be adjusted to meet the particular individual's needs.

Informal learning

The training and the updating of nursing skills required to accommodate changes were limited by the time and funding available for formal workplace learning. Many Nurses who were not involved in formal training had limited knowledge of new procedures and technology. If they had not recently participated in workshops or the critical care course, they could miss out on important new learning because there were no processes in place to ensure that all nurses had access to updates on the changes. Alternatively, opportunities for informal means of learning included handover, either one-to-one at the bedside or between shift coordinators and Team Leaders. Short in-service teaching sessions were held during the overlap of shifts. Self-directed learning packages, manuals and presentations by sales representatives were other sources of informal learning.

The success of in-service sessions on nursing procedures depended on the workload and the time that any Nurses had to prepare presentations. Prior to this study, there had been many attempts to recommence regular in-service sessions following very

busy periods, but the success typically depended on the persistence of a few enthusiastic Nurses in arranging opportunities for staff to attend.

Nurses reported that it was difficult for them to recall patient care procedures that had not been undertaken for long periods. As there was no time allocated for regular revision and if procedures were not performed often it was likely that the Nurses lost some proficiency in the procedure. At these times, the Nurses had to seek out the information, by any means, as best they could. Nurses would refer to a procedure manual which may not be up to date or try to find any available nurse who was familiar with the procedure. This interrupted or delayed the work of a colleague who had to engage in showing, teaching or alternatively doing the procedure her or himself because it was quicker. Revision at these times was informal and acquired as quickly as possible. The Nurses indicated that it was also stressful to have to frequently ask for help and guidance because it delayed their work, they might have to interrupt a colleague for help or felt that they should know and remember all the procedures.

With variable shifts, it was difficult for Nurses to attend in-service sessions when they were presented. There was very little in-service training for permanent night staff who were required to work one month of day shift per year to achieve the mandatory occupational health and safety requirements plus a number of competencies such as cardio-pulmonary resuscitation defibrillation and testing blood gases. The workshops were not conducted at night so most of their ongoing learning was achieved informally. This was through other Nurses who had some experience in the procedure, from manuals or by trial-and-error. This was not a satisfactory method of learning in a critical care unit, because the consequences of errors are often, either delayed recovery or death.

Learning packages in the form of booklets were produced by motivated Nurses over a number of years, but needed to be updated whenever there was time. These booklets consisted of a series of readings and questions that could be answered within the package and forwarded to that Clinical Nurse who was the Nurse's preceptor for feedback. There were also Unit manuals that were a ready reference for basic nursing care as well as procedure manuals outlining nursing procedures that

were specific to critical care nursing. Some Nurses taught themselves directly from the manual and were willing to share their knowledge with others but the manual guidelines did not accommodate the complexities of performing nursing procedures for critically ill patients. Many of these patients had an acute illness as well as more than one chronic condition or had multiple injuries.

The term 'preceptor' was used for Clinical Nurses. It was also used to describe any nurse who was allocated to be a facilitator to new Nurses during orientation, and the following one or two days when the new Nurses commenced patient care. The role of the preceptors was to guide and assist Nurses with learning as needed. Preceptors of the new Nurses aimed to ensure that there was appropriate patient allocation to enable scaffolding of knowledge and gradual development as a Nurse. The preceptor attempted to find time to catch up with the beginner as often as possible and ideally if working the same shift aimed to have a patient in close proximity to the new Nurse. This would facilitate assessment and feedback on the beginner's progress. However, the role of the preceptor was often challenged as it was limited by the possibility of changing to the Team Leader or Shift Senior role during half to two thirds of the shifts.

Part-time Nurses in the Unit had a workshop day allocated once a year to revise and update their knowledge. The sessions were conducted by the Clinical Nurse Consultant. When the workshops were initiated, all those attending were required to request the day off to participate. Over time, the value of these sessions was recognised and the Nurses were able to attend the workshops as paid staff development days.

In the Unit, knowledge acquisition was rarely about ways of learning in a comfortable, supportive environment. The opportunity to learn was influenced by the pressures under which Nurses had to draw on their memory and prior knowledge, manipulate interactions, plus social and political inter-relationships to achieve outcomes that might be urgent, even with life or death outcomes. Knowing how to relate to and care for patients and patient's relatives was not covered during in-service training within the Unit. Rather, it was learnt by using experience from nursing in other environments, watching others, by trial-and-error, or from

experienced Nurses' narratives and advice during care that involved both Nurses. These issues prompted the researcher's investigation into ways Nurses could effectively learn and maintain skills and knowledge in their workplace and how these approaches could be enhanced for the benefit of all Nurses, as expressed in the research question.

The research process

A participatory action research approach enabled the Nurses and me to identify our learning needs and determine how they might be met. It provided the overarching framework, and in conjunction with focus groups, enabled Nurses to investigate ways of compensating for inadequacies in support for ongoing learning, in a rapidly changing and complex workplace. The study reports on how their findings and strategies could be used to enhance and share effective informal learning skills with colleagues. The participants in this study were those involved in the focus group discussions about learning and planning the data gathering, those who contributed data through their written and oral descriptions of learning, plus others who experienced learning strategies that were developed and trialled during the study.

I as the researcher, in addition to planning the study and collecting and analysing the data, facilitated the first focus group. At subsequent focus groups I presented the findings to the participants for discussion and planning of the next stage. This approach was guided by which Stringer and Genat's methodology (2004:10) in which they argued:

> The most powerful action research process emerge[s] when all participants become researchers in their own right, gaining the skills and insights that enable them to systematically investigate issues in their own lives.

The uniqueness of this study lay in the commitment of the Nurses to report on their own experiences of learning in the workplace. Their narratives placed the reader in the context of a specific environment. Their narratives made clear the productive learning experiences involved and the convoluted pathways through which they had to manoeuvre to gain information urgently. Sometimes the information gained was the bare minimum needed and acquired under less than satisfactory conditions.

Outline of thesis

In Chapter One, Illeris' theory of learning, which underpinned this study, has been presented. Also, the background to the study has been described in detail, because this environment informed all subsequent chapters in the thesis. Included in the background were the particulars of the environment where the study was conducted and the reasons for examining informal learning in this workplace. It was anticipated that the research would contribute to the effectiveness of the participants' practice and to colleagues in similar positions.

In Chapter Two, a review of the literature related to informal learning in the workplace is presented. This includes the discourse surrounding the unique and at times unforeseeable learning experiences acquired through real work. The influence of change, necessitating continuous learning and re-evaluation of understandings individually and within the social and political context of the workplace, will be discussed. The role, expectations and support for those who facilitate learning in the workplace have been found to be varied. These facilitators have been described in the literature as trainers, mentors, preceptors or guides. Their influence on learners and the context, including the facilitation of the transfer of learning from formal settings to the workplace, is reviewed.

Chapter Three reviews the literature on learners in the workplace and the ways that they access and engage with learning opportunities in an environment of rapid change. Intuition and expertise in relation to decision-making skills and clinical judgement are reviewed. The influence of gender on affordances for learning in the literature is discussed as it pertains to the concept of nursing as women's work. Finally, studies on learning in nursing and critical care in particular are reviewed. It will be argued that there is limited evidence of studies on informal learning in critical care where new equipment or procedures are continuously introduced in a constantly changing environment.

The principles of participatory action research and the use of focus groups in conjunction with this method are described in Chapter Four. This is followed by a detailed explanation of the specific processes as applied in this study including the

choice of data collection. The three cycles of the participatory action research are reported. The actions within each differed from the previous cycle as the study evolved. A thematic analysis based on Somerville's (2007; 2003a) postmodern emergence approach, of identifying and grouping phrases from the discussions, is detailed. A macro analysis of five selected examples was undertaken and these were also included in a micro analysis of written examples form which categories and subcategories about learning and challenges to learning emerged. The findings of the study are presented in Chapters Five, Six and Seven.

Chapter Five is a macro-analysis of five selected written examples. These written examples of Nurses' experiences of their workplace learning revealed the connectedness of multiple nursing and learning events that occurred in a single experience. They were selected because each gave a particularly pertinent and rich illustration of the extent of understanding across participants. Each story focussed on one component of the Nurse's shift and as a whole, set the scene for the two subsequent chapters in which multiple facets of learning are grouped and analysed.

Chapters Six and Seven present data from all written examples, with some supporting material from the focus groups and interviews and ad hoc discussions about the participants' perceptions of learning. The categories that developed in Chapter Six represent effective ways that Nurses gained knowledge in the Unit. These themes are presented as *types of learning,* identified through the Nurses' descriptions, *teaching and learning through teaching* and *individual engagement with learning*. These reveal the means by which the Nurses worked together to gain information. In Chapter Seven, the challenges that Nurses faced to gain knowledge are presented. The themes that emerged were: *position and gender*, *position, power and workflow, threat to patient safety/patient care,* and *changing and complex technologies and procedures.*

Chapter Eight integrates the reflective narratives of the Nurses' learning experiences in the clinical setting and the dialogue generated from the focus groups; discusses the sources of knowledge for Critical Care Nurses and the influences on gaining access to these sources; presents the Nurses' attributes and the challenges they must overcome, such as how to manage fluctuations and unpredictability, to gain essential

knowledge and skills urgently to provide safe, quality nursing care; and reveals the extent to which Nurses reflected on, and made explicit their understandings of informal learning.

Chapter Nine concludes the thesis by explicating my model, which provides an overview of the complexity of Critical Care Nurses' work. The operational nature of learning in this setting is linked with the reality of the urgency and complexity within which the Nurses function. The implications of this research are elicited and recommendations are made based on these outcomes. Conclusions are drawn from the research and the relevance of these findings for other intensive care units and workplaces in general are discussed. Recommendations for future research are also made.

Chapter Two

Informal Learning and Facilitating Learning in the Workplace A Review of the Literature

The literature review in this thesis is spread across two chapters. The reason for writing the literature review in two chapters was to initially review workplace learning studies and developments in workplaces other than nursing, as there were very few specific studies on nurses' informal workplace learning and new knowledge acquisition in any hospital settings. In the past there has been a tendency to limit nursing research within its own domain, thus viewing the nursing context as unique and not scrutinising vocational and other professional workplace learning. The review of studies across diverse workplace learning environments aimed to identify practices applicable to this study.

This chapter explores informal learning and focuses on current research understandings of workplace learning. It begins with an overview of informal or incidental learning that is out of the worker's control. The value of informal learning is outlined, and the changes to understandings of the concept of informal learning and its contested nature are discussed. A growing awareness of the influence of continuing rapid change in the workplace and in society is made evident. The concept of learning organisations in change and the way in which this reflected affordances offered within an informal learning context is reviewed. The role and influence of workplace trainers and mentors is then explored, together with a discussion of the strategies they used either as delegated trainers or similar to facilitators in conjunction with their own workloads. Finally, formal learning and the transfer of learning is addressed.

Informal learning

Informal learning and incidental learning were described in depth through studies by Marsick and Watkins (1990) of workplace learning in business and the professions, and amongst community action groups. They defined informal learning as predominantly 'experiential, non-institutional, unstructured, self-directed and the outcome is not predictable' (Marsick & Watkins, 1990: 7). In contrast to formal learning, Svensson and Kjellberg (2001) argued that informal learning occurred daily in conditions that were not routine. Workers were confronted with unique situations and were required to cope with changes in which their normal routine response to the problem had failed (Marsick & Watkins, 1990; Svensson & Kjellberg, 2001). The action an individual took depended on that individual's requisite skills and 'a belief in having the authority to act' (Watkins, 1998: 2).

Barnett (1999: 35) suggested that unlike informal learning, 'formal learning undertaken in the company of others brings elements of self-disclosure and status uncertainty'. However, this was also seen in informal learning, which could be experienced in the company of others. He also argued that the learner would retain the cognitive reconstructions of the work if the outcome was observed, thus making meaning of the learning experience. Hager (1998: 34) claimed that the learning was likely to be implicit, not recognised by the learner and highly contextual, and referred to the unstructured nature of informal learning. In the absence of any formal training, the close relationship to the individual learners' workplace made it specific to that context and hence 'unquantifiable' and undervalued because it did not conform to industry standards (Billett, 1994a; Hager, 1998; Harris, Willis, Simons, & Underwood, 1998).

Informal learning has different meanings for different researchers. Marsick and Watkins' (1990) terms 'informal' and 'incidental' learning have been questioned as contested concepts. Billett (2002a: 58) argued that the use of 'informal' to describe learning that was not structured was incorrect because it implied the negative premise that unless the learning was structured it was likely to be 'weak, ad hoc, concrete and incidental'. He defined workplace learning as 'the acquisition of knowledge and skills as individuals attempt authentic vocational tasks supported by

more skilled peers or experts' (Billett, 1994b: para 11). Billett did not include organised learning activities that occurred in training rooms on site, in which learners were not participating in the authentic work during the learning activity. Participation was described as authentic work in situated learning by providing an environment in which the learner was able to observe, participate, and be guided by experts within the culture as practised in the workplace (Billett, 1994b).

According to Billett (2000), learners in skills-based work were most likely to benefit from seeing the tasks being performed and practising skills as they built on their techniques and understandings. He recommended pathways of learning activities that take the form of planned orientation and planned stages of increased responsibility, particularly in apprenticeships. These pathways also have a place for experienced workers who were learning new skills. In Billett's (2000) studies on apprentices, their vocational training was a combination of classes and application of their practice in stages in the workplace. This differed from the ongoing workplace learning in professional practice in that it took place after the academic education and most likely many years after completing formal education.

The relevance to these emerging and evolving understandings in vocational training lay in the intensely skills-related work in clinical nursing. Many aspects of workplace learning identified through studies in apprenticeships could be applied to professional practice. In the current health environment of rapid technological change and ongoing advances in health research, the associated informed decision-making in responses to the changes usually also required the development of new physical skills.

Billett (2002a) argued that the co-participation between those who provided the opportunities to learn or the types of affordances in the workplace, and the agentic action of the learner are independent of the perceived formal or informal structure of the learning opportunity. Whether or not the learner engaged in the type of learning that was offered depended on its suitability for that individual at the time. In his summary of the research on learning in the workplace, Billett (2002b: 460) showed that workplace factors influenced the distribution of learning opportunities. Some workers experienced limitations while others gained access to learning opportunities.

In much of the literature, however, the consequences of the limitations in distribution to individuals have not been made visible. For such workers, the learning experience is likely to be unplanned or ad hoc. A gap in the learning has the potential to carry negative and sometimes irretrievable or fatal outcomes in the context of critical care.

Incidental learning

Incidental learning has been described in different ways by different researchers. Marsick and Watkins (1990) described it as a sub-category of informal learning that included trial-and-error, learning from mistakes, or learning by testing the limits with another. However, Dodge (1998: para 15) saw it as a 'by-product of another activity' not of a 'conscious decision', and, as the assumptions and actions were implicit, the learner could draw the wrong conclusions. Dodge used the term 'unintentional learning' when there was no reflection on the outcomes. He argued that lack of reflection on the experience led to a learning outcome that was wrong. This was in contrast to Jarvis' (1987: 13) claim that lack of reflection had the potential for non-learning responses to situations such that there was no knowledge gain. When workers were in fear of making mistakes learning opportunities were blocked and the potential to break new ground was restricted (Marsick & Watkins, 1999).

Where workplace training was inadequate, there was potential for unsafe practices and shortcuts (Billett, 2000; Dodge, 1998). Dodge suggested (1998) that when unintentional learning processes were in place, a lack of critical reflection could reinforce inappropriate practices without considering the consequences of the actions. Harris and Simons (2001: 131) recognised that the 'overriding concern is to get the job done', such that the 'work network' predominates over the 'learning network'. Training and corporate policy often contradicted the expectations placed on the employee. Dodge (1998) argued that managers carried responsibility for the unintentional learning that was detrimental to workplace practices. Without appropriate formal training, the conceptual knowledge underlying the practice that the worker was learning was not being developed.

Alternatively, Billett (2000: 272) argued that everyday participation in the workplace made the strongest contribution to learning. He also found that guided learning through mentoring augmented this learning and assisted learners to avoid inappropriate or dangerous practices (Billett, 2000: 283-284). When an unsupervised beginner noticed shortcuts made by experienced workers, that beginner was unlikely to have a concept of the hidden knowledge and rationale used by the experienced worker in making choices about practices. The underpinnings of the experienced worker's practices were only likely to be made clear to the beginner through guided learning over time.

Billett (2001d: 93-94) outlined a study in progress being undertaken with Boud in which they proposed a model of workplace learning. Their model comprised three 'planes' viewed as interdependent and essential for workers to fully engage in learning. The first was 'everyday participation at work'; the second was 'guided learning for work' by trainers and coaches using strategies aimed at building knowledge and limiting incorrect techniques that might otherwise result from observation of peers within the work community; and the third was 'guided learning for transfer', which focussed on enabling workers to apply their knowledge and skills to different situations and circumstances. Within the workplace, the learner is motivated to transfer learning into different contexts through the process of accommodation thus adapting to the new environment (Illeris, 2002: 73).

Interrelation of formal and informal learning

The workplace was not a learning environment that was conducive to developing conceptual knowledge. Sometimes inappropriate workplace practices and shortcuts were learnt (Billett, 2000; Dodge, 1998). Without the conceptual knowledge, learners had difficulty transferring knowledge to new situations and being innovative in responding to the evolving 'demands and challenges that workers confront' in most enterprises (Billett, 2000: 273). Harris and Simons (2001: 133) argued that the combination of off-the-job and on-the-job training was the most effective way to learn. However, if employers in small business determined the training needs, these might suit their company's needs but not necessarily national needs (Keep &

Mayhew, 1999: 133). Harris and Simon (2001) found that there was little liaison between workplace trainees and external formal training by education providers. A number of studies on the transfer of knowledge and the relationship between formal and informal learning in the workplace found that the transfer of learning was largely informal. In these reports, strategies were offered for more effective integration into workplace practices of knowledge gained in a formal setting. Gerber, Lankshear, Larsson and Svensson (1995) described informal workplace learning as a successful approach that allowed workers to effectively access and utilize informal learning skills to meet their particular learning needs. Evans (1994: 37) analysed the informal learning processes so that they could be best utilised in the classroom or at work. Dymock and Gerber (1999: 84), in a study of the transfer of learning from the classroom to the workplace, also found that the new employees' learning was 'predominantly informal', even though they did transfer formal learning from the classroom.

Gerber et al. (1995) suggested that informal workplace learning was more useful than formal learning, which they considered to have less relevance in the workplace. However, they did find that reflection on practice and learning was evident in formal training because the workers had more time for these processes than when they were on the job. Their research focussed on formal training that was undertaken externally by workers who then integrated the knowledge into their workplace environment. Gerber et al. (1995) recommended that formal learning should be redeveloped with an emphasis on meeting the workers' needs.

Value of informal learning in the workplace

Many studies have shown that the workplace offered benefits that could not be attained in formal courses (Billett, 1994a; Candy & Matthews, 1999; Evans, 1994; Probert, 1999). These studies suggested that it was not possible to predict or reproduce the uniqueness of the real life context, that is, the expertise and infrastructure, in a classroom setting. Beckett (2001: 91) argued that both 'informal and incidental learning have emerged as significant concepts in the further development of workplace learning'. Garrick (1998: 1) recognised the rich sources

of learning in the workplace and that 'what is learned from experience is dynamic and open to multiple configurations'. This acknowledged that learners were able to build on their experiences in many types of different situations.

The motivation to actively learn new information, according to Daley (1999: 140), depended on what the employee needed to know and on the urgency of the situation. Marsick and Watkins (1999), in their descriptions of a number of learning organisations, revealed the value of incidental learning and learning from mistakes if these experiences became sources of reflective learning and were shared within the organisation. Day (1998) identified that seventy percent of learning in the workplace occurs informally, outside of formal organisational programs or classrooms, and argued that an environment should be created within the workplace that facilitated this approach to learning. This would include the opportunity for employees to congregate to discuss and resolve their problems, as well as airing their mistakes. This was unlikely to develop in employment where workers' experience and skills were not valued and there was high staff turnover.

The interaction or co-participation between the individual and the other workers in the community determined the effectiveness of the learning that took place (Billett, 2001a: 460). He claimed that the learning was influenced by the affordances offered in the workplace and whether or not individuals elected to engage in them.

Situated learning theory placed learning within, and was constructed from the practice of work in the cultural, social, political and organisational context (Culligan, 2005; Fenwick, 2005; Gieselman, Stark, & Farruggia, 2000), where the learner participated in a community of practice. Billett (2001b: 65) identified that everyday work activity did not ensure that the learning was appropriate or extensive, and relied on the individual's ability to access learning opportunities. He argued that guidance through pathways of increasing complexity and the willingness of co-workers to guide learners was essential.

Change in the workplace

Most studies of informal workplace learning have been undertaken in organisations with a workplace learning culture that was undergoing substantial change. Sandberg (2000:63) argued that changes in the understanding of an individual's work was essential for the development of competence, and this depended on the appropriate design and implementation of activities in the workplace. The learning had to be actively provided with specific aims and for this to be effective it was important to stimulate workers' reflection on the ways they understand their work (Sandberg, 2000:64). O'Connor (2000: 173) claimed development of skills alone was a distraction from genuine cultural change and therefore advocated the empowerment of workers to shape their own learning. He argued that skills acquisition should be viewed as a multidimensional, holistic, complex set of related processes (O'Connor, 2000:171). The team environment, motivation and cultural change were reported as empowering workers towards innovative and productive change (O'Connor, 2000:173), but few studies were found on how effective teams were built from collectives.

Sandberg (2000: 65) claimed that experienced workers developed a shared set of symbols that were sustained or changed through their communications. These constituted a collective competence in which the individual's skills became embedded (Sandberg, 2000: 46). He argued that the workers came to a problem with their own experiences and stories of similar challenges. By sharing their stories to generate a possible solution, the workers produced a new set of insights, which led to another possible solution. If they solved the problem, they had a new story that was part of the collective competence and their story could be told to others. However, Sandberg (2000) recognised that if there was an unexpected result, the workers would need to change their shared understanding of the work. Such an example is provided by Edstrom's study (1989 cited in Sandberg, 2000: 67) of an airline in which the focus of the employees, all with technical expertise, was on technical quality and safety. When the new managers with backgrounds in business and travel took over, the employees had to change the way they understood their work from an aircraft-centred business to a customer-centred service. The aircraft was no longer the central focus but became a stage in the focusing on the customer's experience

when travelling. Programs were initiated to change the meaning of the way employees understood their work. In the process, it also opened communication between employees, and suggestions for improvement and change at all levels.

Encouraging learning and building learning organisations produced a competitive edge in the workplace. This had the potential to be beneficial to the organisation and the employees if, as argued by Marsick and Watkins (1999), it was not used to provide initial profit within the organisation while placing increasing pressure on employees. Sleiba's study (cited in Marsick & Watkins, 1999: 2) revealed the pressure on professionals to be frequently changing positions within and between organisations for their survival. Some workers were learning and contributing within their position and acquiring advancement, while the workers who supported them had less time and opportunity to learn, little chance of promotion, remained in their positions and had little recognition for their contribution.

Learning organisations

Processes such as 'empowerment, working collaboratively, trust in people, and dialogue' were cited as central to effective learning organisations but rarely visible (Marsick & Watkins, 1999: 204). These qualities contrasted with the ethos of the nineties of competitiveness and success measured by promotion or an increase in salary. Marsick and Watkins (1999: 52) claimed that 'empowerment, team learning and systems to capture and share learning' were rated lower by those managers who remained in the era of command and control leadership. Change was ineffective for them because they found that their role was threatened (Marsick & Watkins, 1999: 123). This revealed that all workers needed assistance in making transitions to new practices, by ensuring that everyone had the opportunity to participate was often difficult.

A company studied by O'Connor was undergoing change without consultation with the workforce. O'Connor (2000: 167) argued that the changes widened the gap between the 'official' and 'unofficial' discourses, thus reinforcing and entrenching problem areas. He referred to the 'borderland discourse', which was the discourse that straddled the contradictions between the official line and the reality of the

workplace. Such contradictions led to conflicting expectations and tensions, which were rationalised through borderline discourses created by the workers. These provided the means for communication and interactions that enabled the workers to continue performing their work.

O'Connor also found that the participants in his study submitted the suggestions, options and strategies they had produced to the management, but consideration was only given to those matters that were within budget and not controversial. The participants argued that the new approaches could not be adopted because management would not let go of the entrenched culture. Collaboration and consultation was not allowed, although it was the rhetoric of management and ended in the traditional negotiation (O'Connor, 2000: 167). Senior and middle management were not capable of making change because senior management needed to maintain control and be able to manipulate the management process (O'Connor, 2000: 174). If change were effected, middle managers might have found their role removed, or that opportunities had been opened for promoting other employees over them.

In the context of change, educationists needed to develop the skill to enable workers to determine their own learning needs rather than the employers' perception of these (O'Connor, 2000:170). The empowerment of workers to shape their formal and workplace learning required an holistic, multi-dimensional approach to skills acquisition (O'Connor, 2000: 171). Therefore, rather than simplifying and standardising workplace training, O'Connor (2000:169) advocated an ethnographic approach to 'education and work'. Although it created problems, it enabled a creative and collaborative approach to the complexities of the workplace, and allowed the workplace participants to develop new strategies for learning in the workplace. Even when individuals were learning task-related skills, Mezirow (1991a; 1991b) stated that they learnt best when they understood the political and social forces that shaped their meanings. However, learning tasks could not be separated from personal growth. The social meanings, even of technical knowledge, had to be critically assessed and not accepted as consensual norms without question (Mezirow cited in Boud & Walker, 1991: 86-87). This self-reflective process was seen as emancipatory in that it was the critical reflection that allowed individuals to

understand the distortions of their reality and hence decide their actions for change (Boud & Walker, 1991: 87; Carr & Kemmis, 1986: 136).

Facilitators of learning

This section explores the role of trainers or facilitators in learning, the ways that they provide training in the workplace and the context in which they work. The function of trainers in supporting learning in the workplace had some aspects in common with facilitators, preceptors or mentors for informal learning. It will be seen that for some, the responsibility of training was in addition to the normal workload. In some organisations, the role of trainer had been immersed in the employee's normal workload. The training role was intermittent and informal, and more closely related to that of a facilitator of learning and knowledge acquisition.

Dual roles in workplace training

Studies on training in small business revealed that trainers usually had their own workload in addition to their role as trainers (Gerber & Lankshear, 2000; Harris & Simons, 2001). The trainers could be the employers, peers or supervisors (Harris & Simons, 2001: 119). It was also found that few had instruction in workplace training (Harris & Simons, 2001: 124), although they adopted many of the strategies used by appointed trainers. When trainers were also workers there were limitations on the time devoted to the facilitation of skills and knowledge building, as they had to juggle training with other responsibilities.

Bechtel and Davidhizar (2000) recommended choosing the most suitable person to become the teacher/trainer. The choice was based on the trainer's knowledge, or the way that the person could present the new information most effectively. Harris and Simons (2001: 130-131) identified a complex relationship between learning and work, and that trainers needed different sets of skills in different workplaces. These skills were needed to facilitate learning in unique environments and to promote self-direction in learning. The workers, including those who were trainers, were all engaging in lifelong learning.

Workers in Gerber et al.'s study (1995: 31) recognised that they learnt by trying to improve both their own performance as well as each other's. They evaluated each other's teaching performance or presentations and some emphasised the importance of seeking feedback from those who 'see things very differently from themselves ... so that they may improve the learning'.

Harris and Simons (2001: 131) observed that 'workplace trainers' ways of helping people learn' were quite different from 'formal approach training'. They referred to 'helping people learn' rather than training on-the-job or teaching, and made the distinction between training and facilitating learning (Harris & Simons, 2001). Trainers used any opportunity, on or off the job, to talk to the learners about their work, and used anecdotes of work experiences and worked out ways to include the learner in the trainer's tasks. Harris & Simons (2001: 132) also recognised the role not only of the designated trainer, but also of fellow workers in helping others learn. However, this depended on the capability and availability of other workers. Individuals who were asked to work with a new or less experienced worker, and who were not necessarily designated trainers, may or may not have altered their pattern of work.

The trainers also built networks for the learners so they could access additional opportunities to extend their knowledge (Harris & Simons, 2001: 124). The trainers were 'promoting independence and self-direction' (Harris & Simons, 2001: 127) by encouraging learners to evaluate their own workplace performance through reflective practice. They 'challenged' learners to solve problems themselves and encouraged the 'sharing of expertise' between workers. The trainers continued to follow the learners' progress and guide them to new experiences and challenges when the learner seemed ready.

Billett (1994b: paras 14-21) suggested several methods that could be used to enable learners to become skilled practitioners, including *modelling,* in which the learner observed and the expert described the processes; *coaching* the learner in skills and giving feedback; and *scaffolding,* in which the learner built on the skills with support from the expert until the guide was no longer needed (*fading*). Thorpe (2001: 227) identified that Nurse Managers viewed learning as a lifelong process and believed

that part of their role was to 'provide teaching and learning opportunities in the workplace'. They offered staff experience in more senior positions, assessed their staff's learning needs and actively aimed to address these.

Communication

Trainers have placed great importance on communication skills and 'fostering an environment conducive to learning' (Harris & Simons, 2001: 123). For example, Bechtel and Davidhizar (2000) identified the value of humour in putting learners at their ease, motivating staff to learn and in enhancing recall. The first line managers in Thorpe's (2001: 227) research also recognised the importance of communication with colleagues and other health care professionals. These first line managers were learners but also managers, and sought to find learning and advancement opportunities for their staff. This motivated learning for both managers and staff.

In the initial stages of his study on literacy communication practices in the food processing industry, O'Connor (2000: 163) found no evidence that workers passed on intuitive knowing to new workers, based on their experience. The workers' initial responses, described from data gathered during the researcher's workplace tours and questionnaires, represented the organisational line. Over time, the researchers developed a trust with the employees, which resulted in changes to their communicative cultures and practices (O'Connor, 2000: 164). It was further argued by O'Connor that much prior research had not recognised the complex nature of the meaning of events and processes in the workplace. Consequently, the complexity of 'being in' the workplace was not made explicit when examining the 'communicative requirements of workers' (O'Connor, 2000: 166). Part of the communicative practice required that workers know how to 'engage, ignore or resist' the practices. O'Connor also suggested that the workers he observed often moved between identities, some of which were community discourses that contradicted their workplace environment.

Trainers' strategies

Harris and Simons (2001: 123) found that in small business '[w]orkplace trainers manipulated the structure of work to accommodate learning in quite deliberate ways'. They stressed that the learning that took place was enmeshed with the

trainers' primary role. 'The nature and structure' of the trainer's work was critical in shaping the learning. Hence, the trainers manipulated this to enable the learners to get experience and also worked towards helping the learner to learn to understand the 'pattern of work'. Retention was enhanced by staff involvement in this form of reflection and experiential learning. Staff also decided what was useful to the learner, but while the trainer aimed to get the task done, the training slowed the rate at which the trainer would normally work, and some less essential tasks were omitted altogether. The trainer had to determine how long the learner might take to do the task and whether there was time. Hence, the trainers preferred jobs that did not have particularly tight timetables.

Mentors

Mentoring was seen as a more formal means of providing training in the workplace. Billett (2000: 281) identified that mentoring required these individuals to prepare a formalised structure that led to reflection on their practice. Dymock (1999: 312) studied the effectiveness of 'structured mentoring' as one component of a leadership development program being conducted in a call centre. All mentors and mentees were employees in the company and volunteered to participate in the program. While effective mentoring required that the mentors were 'willing to spend the time necessary to transfer the skills' (Dymock, 1999: 316), the limitation for trainers or mentors was their availability and accessibility to the learner. This study (1999: 315) revealed that both mentors and mentees felt they should have met more frequently than monthly. Although not highlighted in the study discussed here, such meetings would be particularly difficult for shift workers not working in the same teams, with different shifts spanning days or even weeks. Infrequent meetings had the potential to severely limit the mentoring process (Billett, 2000: 281).

In the studies described by Beckett (1999) and Dymock (1999), the organisational interests were central to the mentoring process. The emphasis was not on building skills directly related to their day-to-day work, but on matters such as 'increased productivity', 'retention of the right people' and 'development of a learning organisation' (Dymock, 1999: 312-313). An alternative mentoring approach was one in which the mentor and mentee agreed initially that they would pursue a counselling

rather than a coaching approach (Beckett, 1999: 87-88). They decided to meet for half an hour each a fortnight, use note keeping and identify some tasks to follow up. The basis for their discussions was the work being done at the time and they kept in mind its overall significance to the organisation. Beckett argued that through this type of mentoring the new employee should be able to demonstrate problem-solving, communication and team membership skills.

Billett's (2000) study extended the role of mentoring to the development of on-the-job skills in day-to-day work. He emphasised the importance of developing the workers' skills and knowledge so that they could respond to the evolving tasks and demands and claimed that this could be achieved through guided learning or mentoring by an experienced worker of a less skilled worker. Billett (2000: 280), held that mentoring was a means of 'formalising a learning process that already occurs informally'. Dymock (1999: 316) identified that informal mentoring occurred throughout workplaces and at all levels, when specific problems or the need to learn arose. Co-workers were likely to guide and assist beginners, but planned mentoring should facilitate accurate and sequential development of skills for the learner. The learner needs to know the level of proficiency required and feel confident that it can be achieved.

Benefits for mentors

Gerber et al. (1995: 29-30) found that some workers encouraged others to teach in the workplace, either informally, or formally in the classroom, to develop training materials or to mentor others. These approaches were reported to contribute to 'leadership development where the workers learn by training others' (Gerber et al., 1995: 29). Qualities of effective mentors, such as 'a willingness to share experience', being prepared to 'take risks' and a 'desire to help', emerged from Dymock's study (1999: 316). As the teachers were learning through the process of sharing their understandings they were enhancing their own job performance (Bechtel & Davidhizar, 2000).

Workplace manuals and teaching

In many workplaces, manuals for new procedures or equipment were written to fit the reality of the workplace, and were maintained and updated for the specific environment. Specific directions or guidelines might be produced for attachment to the relevant machinery and refined as workers used the equipment. O'Connor (2000: 162) identified the limitations of manuals and of the training in their use, in that they 'isolate specific skills ignoring their real place and function in the work carried out in the workplace'. When operating manuals were produced collaboratively within the workplace O'Connor (2000) argued that these manuals were not always accurate. New employees were initially taught in accordance with the operating manuals, but once the learners were in the workplace, experienced workers would explain the deficits in the manuals and 'then proceed to demonstrate how things were actually done'.

Similarly, Billett (1994a: 5) identified that workers who learnt technological skills via a manual were frustrated when they encountered problems that were not addressed in the manual. In contrast, Gerber et al. (1995) found that workers who wrote manuals not only learnt about the subject but also developed teaching skills, and that by working out different strategies to use in teaching, the trainer learnt more about the topic being taught, which enhanced his/her teaching and leadership skills.

Transfer of learning from formal training

Formal training was generally perceived as institutional or as a responsibility of Human Resource Developers within organisations. Gerber et al. (1995: 29) showed how formal training enabled workers to adopt learning strategies in the workplace. Workers felt that their formal training assisted them in problem solving by accessing the resources available to them and by running simulations that were taught in the formal training. In their study, workers described group learning as passing information from one person who had some formal training, to another, who then passed it on to others. However, this had the potential for changes in the information that was passed from one to another. If one passed on the wrong information, there was a flow on effect. Gerber et. al's (1995) concept of group learning was in contrast

to learning in a group as described by Harris and Simons (2001: 212), who found that in many organisations trainers would bring groups of workers together for learning opportunities that were not structured but which emerged from the daily work. For example, people would be brought together to solve problems with machinery.

In a study on workplace learning involving six companies producing electronic equipment, researchers observed learning in the workplace and conducted focus group discussions on how employees did their jobs (Day, 1998). The study was initiated by the high cost of taking employees off the job for formal training. Their findings indicated that the cafeteria provided an environment for learning by brainstorming about work-related problems that had not been anticipated. Consequently, managers placed tools that employees normally work with, in the cafeteria, to make the most of the learning opportunity. They encouraged impromptu meetings by placing high round tables in the working areas so that small groups of employees could congregate to discuss mistakes and solve problems. Working in teams, sending notes and the overlap time during shift changes were also found to be rich areas of informal learning. The researchers did not claim a resulting increase in productivity, but did claim a reduction in the cost of employees taking time off the job to learn.

In her study on Nurse Managers, Thorpe (2001: 229) recognised the participants' efforts to learn as best they could, while not commenting on the success of their informal learning skills. She emphasised the role of organisational learning in producing a coordinated approach to the Nurse Managers' formal and informal learning (Thorpe, 2001: 230). This supported recognition of, and assistance with formal training, participation in workshops and establishment of mentorship and coaching relationships with senior health administrators.

In contrast to the health facilities, Harris and Simons (2001: 121), in their study of workplace trainers, found a structured organisational approach to training. It included the support of workers in accessing 'external training agents', as well as in-house training provided by 'in-house trainers and assessors, who were responsible for on-going job assessment and recognition of workers' current competencies'.

Within the company, learning opportunities in the form of seminars and training programs with an outside organisation were made known to staff (Harris & Simons, 2001: 122).

Conclusion

This literature review has sought to understand the discourse that related to learning in the workplace. The concepts of formal, informal and incidental workplace learning and the changing views of the appropriateness of the workplace environment have been presented. The essential contribution of informal learning in the workplace has been discussed in the uniqueness and unpredictability of the real work context and the variety of sources of learning that cannot be replicated in theory or in a classroom setting. Additionally, the research suggested that the type of affordances offered and the ability of the worker to access these can only be learned in the workplace.

The effects of substantial and on-going change in the workplace has been shown from the literature to influence the extent of dependence on informal learning by workers to continue to work effectively in the pressures of a changing environment.

Research into training and those guiding the learning in the workplace revealed that much of the training, coaching and mentoring that occurred in the workplace was in addition to their normal workloads and was provided by workers who were not trained or qualified in this role. This review has highlighted the variety of ways in which these workers managed to provide support to others, and the circumstances under which workers learnt in a new workplace or learnt new skills in their established workplace. Productivity and efficiency were seen to take priority over workplace learning and support for learning. The onus was increasingly placed on the workers to meet their own learning needs as well as the influences of rapid change in work and society.

The discussion of transfer of learning from educational institutions to workplace practice and the effects of change on workplace learning in relation to workplaces in

general has set the scene for a comparison with the nursing environment. Chapter Three highlights factors influencing learning and concentrates on workplace issues relevant to working and learning in critical care nursing.

Chapter Three

Learners in the Workplace and in Critical Care Nursing A Review of the Literature

This chapter provides a review of the experiences learners in general in the workplace have in gaining knowledge and practical skills. Particular reference is made to nursing, where these examples were available. This is followed by an overview of the discourse of power and manipulation by the worker and the employer and transformation their discourse as they engage with learning in the workplace. It incorporates the effects of change in the workplace and reveals that to cope with these changes some individuals reinvent their sense of self and identity. There is an overview of the development of expertise and intuition, or tacit knowing, in the work environment. The affordances and appropriation of learning are addressed as they relate to this study of socially perceived women's work. The final section looks closely at other factors that impact on learning in critical care nursing.

Learners

There has been an increasing emphasis in education on the learner's experience and on the learner reflecting on his /her experience (Burns, 1995: 185). Learning was defined by Pratt (1993: 17) as 'an interactive process of interpretation, integration and transformation of one's experiential world'. Billett (1994b) identified activities afforded in the workplace, such as observation, participation and being guided by experts that were means by which learning could be interpreted and integrated. Transformation through learning depended on the relationship or correlation between the values and practices of the workplace and the learner (Billett, 2001a: 213).

Learners in the workplace have been found to develop their own learning strategies, with varying success when dealing with unexpected difficulties. The outcome of a task that is indicative of learning was likely to be highly contextual, serving an immediate need and taking place in the working environment (Dymock & Gerber,

1999: 97-99). Learners had to be able to identify their own learning needs, and the ease of learning often related to an individual's past experience. Some participants in Dymock and Gerber's (1999) study described having a special interest in a related field.

Continual learning

While opportunities for continual learning may not be clearly identifiable or structured, individuals need to be at least partly responsible for making their own opportunities. For example, Thorpe's (2001: 229) study of formal and informal learning opportunities for first line managers identified that Nurse Managers' learning methods were isolated and uncoordinated, with no specific formal program for them to develop their new role. However, nurses who were undertaking post-graduate studies while working believed that they complemented each other (Thorpe, 2001: 227), and one participant used further studies as a means of staying current by 'thinking about how to make things better'. The Nurse Managers saw post-graduate studies as a 'stimulus for personal and professional growth'. Some staff had to be 'internally motivated' and find their goal or vision within. They needed to be self-motivated to do library searches, and made constant reference to books, journals, personal observations and other sources of new information that led to workplace outcomes.

Similarly, Gerber et al. (1995: 28) described one participant in their study who felt that whatever he learnt through reading would be useful on the job at some stage. They observed that self-discipline was essential to learning and to improving one's level of performance, with some workers describing learning as a lifelong experience (Gerber et al., 1995: 29).

Motivation was critical to learning and at its greatest when staff recognised a need to learn, believing that it would 'optimize productivity and enhance care' (Bechtel & Davidhizar, 2000). Experienced workers were assumed to be more self-sufficient and able to map out their learning needs. They were likely to be prepared for greater responsibility sooner than was usually required of a new worker.

Billett (2001a: 213) identified and acknowledged workplace inequities in opportunities for learning through work, but placed some responsibility on the individual for benefiting from the affordances. Learning may be afforded but the individual may not choose to take it up and there was the potential to shape what constituted an invitation to participate in learning.

Self-directed learning

Individual learners have a tendency to learn in different ways, at different times, for different reasons. Therefore, while one-to-one learning was associated with formalised mentoring, it was also encouraged as less formal, self-directed learning driven by the learner (Harris & Simons, 2001: 122). Brookfield (2005: 84) stated that '[f]or many learners and educators, the image of self-direction is of a self-contained, internally driven, capable adult learner working to achieve her or his goal in splendid isolation'. However, he argued that adults should learn in a collaborative environment in which the roles of those who were teaching and those who were learning should overlap.

Participants in Thorpe's (2001: 228) study discussed budgets and their computing skills and revealed that the expectations were beyond their computing capability. The Nurse Managers were able to identify their learning needs, which for them were skills in computing, negotiation, finance and budgets. They did not have the knowledge and were not provided with the training to do their own budgets and provide spreadsheets for discussion when they moved from the role of Nurse Clinician to Nurse Manager. They were expected to pick up computer skills because they were provided with a computer. All the knowledge they needed to undertake the task of Nurse Manager was attainable only through formal study or through continual informal learning, including reading to keep up to date with daily issues, reading relevant texts, and communicating with colleagues within their own institution and outside.

Learning from others

Experienced managers perceived that 'time and demanding work loads often prohibited collegial collaboration' (Thorpe, 2001: 227). However, new managers reported that they were learning by modelling from the experienced managers around them. The aspect of gaining knowledge through talking and watching others, plus how learning is embodied, follows.

Talking to others

Not only novices but also experienced trainers reported the informal learning opportunities offered by talking with others (Gerber et al., 1995: 28). Talking to someone with expertise in the workplace was often preferred to reading a manual, or to trial-and-error. It was seen as a quicker solution and learning was accelerated by shared discourse (Gerber et al., 1995: 28). The effectiveness depended on whether the listener or less experienced worker was discerning enough to assess the accuracy of the information. It worked well in an environment in which workers were able to develop a network of experts and access them for advice, and was enhanced when the experts were willing to mentor less experienced workers (Gerber et al., 1995: 28). One worker observed that he would learn a lot by talking to people for '10 or 15 minutes' (Gerber et al., 1995: 28). Brookfield (2005: 197-198) also commented that 'critical reflection is a social learning process in which we depend on others to be critical mirrors reflecting back to us aspects of our assumptive clusters we are unable to see'.

Another important aspect of talking with others was the impact of reflections that emerged from professional stories. This was suggested by Gerber et al. (1995) and Sandberg (2000), as discussed in Chapter Two, and by Schön (1983), as discussed later in this chapter. Amulya, O'Campbell, Edoh and McDowell (2003: para 1), in a study of transformative learning in five organisations, identified how reflection was 'used to drive a learning process that examined and extended that knowledge and potentially transforms the thinking about those actions'. Their research identified four components of reflection: stories; dialogue; questions; and insights. Stories led to questions and dialogue, which provided the means to examine and link experiences, problem solving and outcomes. Questions were used to orient the

exploration and created a framework for the study. Dialogue across the group took understanding to a deeper level and provided new ways of comparing past procedures with new options, leading on to organisational and practice insights. These insights enabled tacit learning and the complex nature of the workplace to become visible.

Watching others

Further insight was gained by Somerville's (2003c: para 8) study of aged care workers, which revealed the broad range of learning strategies they used while learning on the job. These included learning by asking questions, by making mistakes and by critical reflection. The strategies they used had to fit their needs and the means available at the time. Watching more experienced workers perform a task or solve a problem and observing the smooth flow of the skilled practitioner provided new workers with an opportunity to learn, or to change their practice more quickly than by either working it out for themselves or through trial-and-error (Gerber et al.,1995; Harris & Simons, 2001). A student in hospitality reported that 'having something demonstrated to you is much easier than having to sit down and imagine what it is going to be like' (Dymock & Gerber, 1999: 87).

Embodied learning

The emphasis on embodied learning was identified by Somerville (2003c) in the descriptions of the aged care workers' learning experiences. The staff described learning about the intimate care of residents, including care after death. The carers also saw the relatives as bodies to care for in terms of their need to be reassured about the residents' welfare. An account by a trainee in aged care made explicit the numerous processes which the carer had to negotiate with others to get a resident out of bed safely (for the patient and staff). In addition to those challenges, her account revealed that she was also concerned about the stress on the resident's wife of seeing him left in bed (Somerville, 2004: 180).

Individuals learnt most effectively when they had control of the learning situation, were able to have input into the program and strategies for learning, and could influence the timing of the session. On busy days, Bechtel and Davidhizar (2000)

recommended that the training be rescheduled. The most suitable time of day was unique to each workplace and learner, but in general, if the staff were stressed and tired they were less likely to learn. Thus, the timing needed to meet the individual's personal and career goals, and the learner needed to be mentally and emotionally ready to integrate new knowledge. The process was likely to be more effective if the learner had a positive attitude to learning and to the training.

Engagement in learning

O'Connor's (2000) study, as described in Chapter Two, reported the effects of change on a group of workers as a whole in one organisation. In comparison, Billett and Pavlova (2005: 208) reported a study in which they followed five workers who described the relevance of their working lives and their lives outside work during change in the workplace. The changes in their working environment, their subjectivity and their decision-making were observed by Billett and Pavlova who found that early in the study the workers described their lives outside work as the most important while their work was a means of achieving that life. However, for some, as changes in the working environment occurred that provided the potential to achieve goals in their work, their commitment to work took priority over their out-of-work lives. Billett and Pavlova (2005: 208) argued that the sense of self was a product of identity and subjectivity, and identified the importance of 'being themselves' both at work and outside work.

Subjectivity

Subjectivity 'refers to the individual's conscious and unconscious thoughts and emotions that shapes their relations with the world' (Weedon, 1997 cited in Billett & Pavlova, 2005: 196). Billett and Pavlova (2005: 200) believed that 'being oneself' could only be seen in terms of that encountered within a socially transient environment. There was ongoing reconstruction of the sense of self as it was negotiated between the individual and the workplace. For others, their agentic action – the extent to which a worker engages in learning in the workplace – depended on whether the individual's values were met by the learning that was afforded in the workplace.

O'Connor (2000: 155) claimed that the workers' collective identities must also be acknowledged. He suggested that a worker was more than the 'job designation'. For example, in the workplace a cleaner was more than a cleaner, by bringing life experience and knowledge to the job, contributing more than that learnt as a cleaner. Employees in the workplace might or might not see each other's 'multiple identities', but their life experiences to some extent become incorporated into the education and training in the workplace.

Individuals have 'socially derived personal histories (ontogenies) with their values and ways of knowing' (Billett, 2001a: 213) that shape the way the workers engage in the social practice of the workplace. If agentic action were to be engaged, the worker would need to see the opportunities and use them to learn in the workplace. Billett (2001a: 213) claimed that such agentic action would depend on a match between the individual's values and practices, and those represented in the workplace. Billet and Somerville (2004: 313) contended that thinking, acting and learning at work are simultaneous and form a working identity. They stated that involvement in such experiences, including the psycho-social aspects, transformed the learning, and was shaped by and shaped individual identities.

Affordances

Workplace affordances have been described by Billett and Pavlova (2005: 200) as negotiated between the individual and the workplace, and 'contested' and 'highly relational'. The worker's sense of self is likely to evolve and be transformed within the socially derived constraints of their work (Billett & Pavlova, 2005: 200). While appropriation or engagement with the affordances in the workplace require the worker's interest and intentionality for willing engagement in learning (Billett & Pavlova, 2005: 197), the influences that constitute meaningful work to an individual may or may not be within the workplace. Billett and Pavlova (2005: 199) have suggested that the work might be merely a means of exercising a sense of self and identity in life outside work.

Billett (2001a: 209) claimed that the worker's participation in learning at work depended on the opportunities afforded and the worker's choice to engage in the

learning activities provided. He referred to this interaction as 'co-participation' and argued that unless the activities and support provided in the workplace met the individual workers' needs, then they would not commit to learning that builds expertise. In relation to learning organisations, Billett (2001a: 211) referred to Wertsch's (1998) distinction between mastery and appropriation to support his discussion on the individual's choices for engagement in workplace learning. Mastery was described as knowledge that was constructed to perform the task without enthusiastic commitment to the learning. Appropriation was constructing knowledge that reflected the worker's interests and beliefs so that there was active engagement in learning, thus building the worker's expertise (Billett, 2001a). He recognised that mastery and appropriation were 'central' to an understanding of the influences on learning and hence the outcome of the worker's encounter with workplace affordances. He argued that if there were an environment in which the norms and practices provide opportunities for, and support of learning, then everyday activities and intentional interventions would lead to 'rich learning outcomes' (Billett, 2001a: 209-210).

Opportunities to participate in learning were not uniformly distributed. Billett (2001a: 210) identified that 'how individuals access both familiar and new work tasks and interact with co-workers, particularly more experienced workers, shapes the quality of the learning outcomes'. Those workers who were able to access support from others or who were offered support were afforded greater opportunities to learn than those who were, or who felt marginalised. Affordances depended on such matters as employment status, perceptions of individual competence, gender, personal relations, workplace cliques and affiliations (Billett, 2001a: 210). These aspects have relevance in this thesis study in terms of affordances in women's fields of work, perceived preparedness for increased responsibility in a complex working environment and the large number of part-time workers. Billett described the workplace as a contested environment, in which some workers are established and offered opportunities, and some are more confident in accessing learning opportunities.

A sense of self grew for trainees in aged care, as their identity was transformed by their new work as carers, experiencing a 'growing passion and commitment to their

work'(Billett & Somerville, 2004: 314), with one carer reporting that she felt 'entwined' in her work and thinking about it at home. Billett and Somerville (2004: 314) argued that as the care work moulded the carers' identity, their engagement with work practices increased, deepening and enhancing their learning in the workplace. Somerville (2004: 178) described the complexities involved in getting a nursing home resident out of bed: every step, every person (shape, size, ability), the inadequate equipment and environment, the need to provide evidence of the problems, the finances, the gatekeepers and the organisational systems in place that hindered change, were all barriers the carers had to overcome to provide basic care for their residents. The carer's description of her efforts to overcome these revealed her determination and resilience, especially as a beginner, in persevering to provide appropriate care for the resident. It reflected her engagement with the workplace practices, but also the inter-relational dependence in which the carer influenced change in the workplace.

Intuition and expertise

This section explores intuition as a way of knowing, and expertise. Eraut (2000) claimed that learning is a process that is explicit or implicit, and the outcome is the acquisition of knowledge. The individual is conscious of explicit learning but unaware of implicit learning. Tacit knowing is 'knowledge that cannot be described or explained' (Eraut, 2000: 256). It can be acquired explicitly, as one learns to ride a bicycle, or implicitly, as in Eraut's example of repeated encounters with an individual without deliberately getting to know the person. Amulya et al. (2003) also identified tacit knowledge and theory as operating at a level beneath what was being practiced.

Intuition was described in the *The New Oxford Dictionary of English* (Pearsall, 1998: 959) as 'the ability to understand immediately without the need for conscious reasoning'. Benner, Hooper-Kyriakidis and Stannard (1999: 568) added that it occurred 'without conscious deliberation, awareness or articulation', and that 'intuitive grasp is based on an experiential background of similar and dissimilar situations'. Eraut (2000) explained that implicit learning contributes tacit knowledge

that can only be used intuitively because it is implicit, that is, the learner is unaware of the knowledge. He claimed that when the learner is conscious of the knowledge and using knowledge rationally, with reasoning, it is explicit and therefore not tacit. However, Eraut (2000: 257) also argued that individuals report examples of explicit learning from intuitive insights by describing the connections they have made that lead to an explicit understanding of a situation. An experienced nurse is likely to intuitively recognise a change in the patient's condition and seek further appropriate information prior to a critical event or rapid deterioration (Benner, 1984).

Miller and Rew (1989: 85) revealed the distinctions between male and female knowing. While the analytical linear reasoning with the focus on rights, independence and separateness has influenced academic disciplines and theories, the intuitive knowing associated with women grows from the focus of relationship, connectedness, experiencing, integrating and responsibility. They claimed that female knowledge is holistic, male knowledge is reductionist, and intuitive thinking is encouraged by providing an environment for reflection or creative problem-solving, thereby making connections which lead to understanding rather than a 'right answer' (Miller & Rew, 1989: 86).

Expertise is 'the ability to function fluently and flexibly in complex domains without being able to describe or theorize one's expertise' (Claxton, 2000: 50). It is not used consciously during rapid decision-making that is largely intuitive, drawing on tacit knowledge (Eraut, 2000: 258). Schön (1983: 49) suggested that knowing-in-action was more appropriate terminology than expertise. In his theory, phenomena were recognised in expert practice without a clear description of their components, and skills were displayed without conscious use of the rules or stages in the procedures. He referred to the practice of thinking about this at the time of the action as 'reflection-in-action' (Schön, 1983: 54).

Billett (2001c: 43) claimed that those who are recognised as having expertise in the workplace are the ones who can solve new problems, based on their tacit knowledge and previous experience, and who are sought out by other employees to help do so. Although Billett has described the events, he has not elaborated on whether these experts have reflected on their practice and can explain how they made their

decisions or took the appropriate actions. Benner (1983: 40) discussed the concept of personal knowledge in which prior knowledge in relation to a new clinical situation creates a change in understanding. She stressed the importance of recognising and documenting the altered perceptions and clinical judgements associated with the acquisition of new nursing skills.

In stating that 'experience is a requisite for expertise', Benner, (1983:37) claimed that experience 'results when preconceived notions and expectations are engaged, redefined or disconfirmed by the actual situation'. Benner et al. (1999: 24) explained that experienced nurses were able to sense the difference between having a good clinical grasp of a situation, and being puzzled and 'having a lack of grasp'. They argued that it was the loss of grasp that initiated problem-solving and information gathering, as a good clinical grasp required theoretical knowledge, 'experiential learning', being able to identify subtle changes and problem-solving (Benner et al., 1999: 27).

Expertise develops when the clinician tests these expectations, as the knowledge embedded in clinical nursing cannot be captured in the components comprising the decision, but in the description of the meanings and outcomes. Gerber and Lankshear (2000: 89) also argued that excellent theoretical knowledge is essential for expertise, however it cannot stand alone, as evidenced by a participant in O'Connor's study (O'Connor, 2000:162), who described listening, smelling, sensing and anticipating what is happening, 'which often involves simultaneously taking in a whole lot of information from many sources and making sense of it ... Experienced workers ... can read the situation well enough to avoid emergencies'.

It has been noted that experts learn through negative as well as positive experiences. It may be that a negative experience, in which a nurse has not performed well, has a profound effect on that nurse, expanding her/his expertise. Billett (2000: 273) acknowledged the value of learning 'tricks of the trade'; 'heuristics' which were passed on to novices through condensed procedures and experiential stories, anecdotes or narratives. He argued that if the novice is to learn these short cuts, the experienced worker still needs to guide the novice past the potential pitfalls.

The value of accessing expertise was stressed in O'Connor's (2000: 162) study, in which the employees acknowledged the competence of tapping into, and referring to the expertise and know-how of experienced operators in relation to the machinery. Gerber (2000: 75), in referring to Kegan (1994), argued that experienced workers consciously take responsibility for what happens to them and so influence the way people interact in the workplace. Those who were recognised as experts in the workplace were being motivated not only to perform tasks highly effectively, but also to organise others to achieve their plans (Gerber, 2000: 89).

The question of developing expertise was discussed by Garrick (1998: 16), who made the distinction between learning from experience that 'happens in everyday contexts and is rarely recognized', and experiential learning. Knowles (1990: 57-62) argued that adults need to have a reason for learning in real life situations; they need to take responsibility for their decisions, they bring experience to their learning and there is immediacy in their learning. Billett (2001c: 43) argued that the development of expertise should be the goal in workplace learning, and that expertise is identified by the ability to respond effectively to new, non-routine, unanticipated tasks. The reward to the employee is promotion or portability, and hence the expertise is lost from that workplace. However, the reward organisationally is flexibility and the ability to respond to environmental changes that affect the organisation (Billett, 2001c: 43). In the following section the impact of gender issues on the expertise developed by workers will be discussed.

Gender in the workplace

Part-time workers

In 2004, the percentage of women in work who were employed part-time was forty-six percent and, according to Pocock and Masterman-Smith (2005: 127), comprised seventy-one percent of all part-time employees in Australia. Probert (1999: 109-110) claimed that when women chose to work part-time, their careers came to a halt. She argued that women in the part-time workforce were 'aware of the lack of career opportunities and the lack of financial return on training', and so did not pursue training (1999: 107). Part-time workers, most of whom were in casual employment,

were often denied opportunities to participate in training or to act in higher level positions.

Global pattern

Watkins (1986 cited in Garrick, 1998: 40) revealed the segmented and increasingly polarised nature of the labour market, and how, even in advanced technological workplaces, there was a de-skilling process. There is a global pattern of women's work being less skilled and hence less well paid in service-related industries (Butler, 1999:135). Full-time work continued to be seen as central to the organisation. Part-time or casual workers were described as peripheral to the organisation and marginalised. Skills associated with 'the feminine' service industries such as communication, team-work and cooperation were devalued as low and poorly paid (Butler, 1999: 135). Probert (1999) discussed research which suggested that women choose to put their families before their careers and hence prefer part-time work. She argued that assumptions were made about women's attitudes to work and hence their attitudes to learning such that there would be less return on workplace learning opportunities in comparison to men (Probert, 1999: 100). The flexibility of shift work in nursing enables both female and male nurses to work part-time and juggle shifts, such that they place priority on family commitments, but they find that they must forego promotion. Additionally, nurses on permanent night shift are disadvantaged in accessing seminars and workshops as well as training from medical/surgical company sales representatives. Bruegel (1996:176) argued that part-time work was not voluntary, and that increasing numbers of women would prefer a full-time job.

Power

The distinction between men's and women's work is not only about the difference between genders but also about power (Game & Pringle, 1983:16). In referring to the gender difference in nursing and medicine, Halford, Savage and Witz (1997: 242) described the 'strategies of sexualisation', in which they identified that medical Consultants and Registrars showed more respect for male nurses. They reported that this created tensions for female Registrars in a field in which 'the work place authority relations were overlaid by patterns of male power and female

subordination' (Halford et al., 1997: 242). The female Registrars played a male role in the doctor/nurse relationship in terms of the power of the medical staff and the subordination of the nurses, but this was blurred by the real gender differences.

Prescott, Dennis and Jacox (1987) explored the difference between doctors' and nurses' views in nurses' clinical decision-making, and revealed the way in which the hierarchy can prevent nurses from developing expertise in decision-making. According to Prescott et al. (1987: 61), doctors control the level of decision-making according to their opinion of an individual nurse's expertise. Based on this opinion, the doctor will decide whether to set rigid or more flexible guidelines for nursing options in relation to the patient's condition. Hence, the opportunity for nurses to develop decision-making skills is limited. Bucknall and Thomas (1996: 576-577) identified that critical care nurses prefer to have autonomy in decisions relating to nursing interventions and this autonomy contributes to satisfaction in their nursing activities.

Benner et al. (1999: 412) reported on a level of expertise in nurses' communication. When nurses needed interventions for the patients from the physicians, without conflict, they generally achieved this by indirect patterns of communication. However, from their ethnographic study, Benner et al. (1999) identified increasing evidence of a trend towards greater assertiveness by Critical Care Nurses when advocating for their patients. Effective communication appears to be the core of collaboration between nurses and physicians.

The 'Gender inclusive practices' of the company, Amerco, were reported by Hochschild as 'family-friendly'(Hochschild, 1997 cited in Probert, 1999: 103), but Probert argued that women had to behave 'even more like men in relation to family responsibilities', and delay or avoid having children to be valued within the company (Probert, 1999: 104-105). According to Probert, women in the middle classes usually pursue 'occupational' careers but with 'subordinate professional niches'. In senior positions of organisational power and authority, women continued to be actively excluded. However, within 'occupational' careers that remain feminised, such as nursing, women were required to prove competence through external study. Women were required to do more than men within working hours to prove competence.

Those women who had acquired credentials through external study still did not, unlike the men, 'move up within the organisation' (Probert, 1999: 105).

Wallace (2000: 273) identified that in several feminised industries, 'professional managerial and supervisory workers' received more training than workers at lower levels where women were more strongly represented. In an overview of one vocational education organisation, Somerville (2002b: 54) reported that staff development related to managerial positions was offered to fifty percent of the teachers, with only ten percent being offered to part-time teachers who formed the majority of the staff. There was an assumption on the part of employers that part-time teachers would not aspire to, or be given the opportunity to undertake managerial positions.

Cleveland, Stockdale and Murphy (2000: 254) questioned what constitutes a career, that is, whether it is the opportunity for upward movement or a profession. Halford et al. (1997: 103) argued that nurses 'endorse professional competencies over managerial ones'. However, Nurse Managers are much less involved in managing nursing and patient care than 'managing the delivery of packages of care and the budgets' (Halford et al., 1997: 103). For nurses, the majority of promotions depended on movement out of nursing and into management. There are very limited opportunities for nurses to advance to Clinical Nurse Specialist and Nurse Practitioner with recognition of nursing expertise, autonomy in decision-making and being an influential advocate for the patient. Women have abandoned the attempt to have successful careers in large corporations and are tending to either run their own or be involved in small business (Probert, 1999: 105).

Devalued workplace skills

In establishing a system of equity, individuals have become localised and enclosed within a marginalised homogenous group (Butler, 1999: 137). Solomon (1999 p125) claimed that recognition of prior learning 'provides the opportunity to acknowledge and value the individual's diverse knowledge, experiences and skills'. However, this prior experience has the potential to be regarded as non-legitimate if it does not fit the categories within the established workplace culture. The emphasis is on

similarity rather than difference, so individuals become stereotyped and the diversity of the individual's experience is lost.

Somerville (2000: 51) questioned whether the feminisation of the workforce means 'increased opportunities for learning, training and career advancement', or whether the 'taken for granted, low valued skills' of female workers would be seen as an opportunity for low wages and minimal training. Women's attributes were not seen in organisations as valued skills:

> [C]ritical elements of women's work involves capacities that can be defined as feminine (such as patience, communication or negotiation skills and so on), these are dismissed as natural female attributes rather than valuable work place skills and go unrewarded. (Poynton, 1993, cited in Probert, 1999: 85-86.)

In the feminised service industries such as nursing, productivity and profit are not clearly assessable or attainable. Productivity could be measured by the number of patients moved through the operating theatre, most number of patients for minimal admission period, or early discharge of patients. Alternatively, productivity could be measured by the quality of care during admission, the supports needed or outcomes on discharge, or the number of readmissions. Halford et al. (1997:104) recognised the possibility of a 'new source of authority' for nurses, but questioned who would be the consumer. In a 'user-driven' service rather than a 'provider-driven' service, is the user the health authority purchasing the health service or is it the patient whose care is being funded by the health authority?

Solomon (1999: 128-129) argued for reflection on one's own cultural understanding within the context of an analysis of the workplace culture. The individual's experience can be valued by recognising the potential for 'generating new knowledge and practices', bringing diversity and the generation of new ideas that are critical to the survival of organisations. Unlike the traditional managerial communication that is 'goal directed and intervention driven' in career development, Carter (2002: para 5) found that mid career women's communication was transformative and that it 'led to a significant shift in their values, beliefs and perspectives'.

Informal learning in nursing

A number of studies undertaken on informal learning in nursing have employed a phenomenological approach (Menard, 1993; Rossi, 1995; Troyan, 1996). In these studies, nurses were interviewed about their informal and incidental learning experiences. Findings from the interviews led to recommendations for enhancing informal learning, such as encouraging peer coaching, mentoring, physician coaches, and reflective journaling. Follow-up studies on the implementation of these recommendations have been limited, and no studies were found in which nurses participated collaboratively in exploring and implementing strategies for informal learning in their workplace.

Workplace learning in critical care units

Specific studies on workplace learning in critical care nursing appear to have been under-reported in the literature. Research into ongoing learning that has occurred in critical care units has been extrapolated from some studies pertaining to staffing levels in terms of the role of technology in critical care units (Kiekkas, Karga, Poulopoulou, Karpouhtsi, Papadoulas & Koutsojannis, 2006), nurse/patient ratios (Moreno & Miranda, 1998), patient outcomes, complication rates (Dang, Johantgen, Provonost, Jenckes, & Bass, 2002) and mortality rates (Ball & McElligot, 2003; Tarnow-Mordi, Hua, Warden, & Shearer, 2000). The workplace learning that became evident in these studies is discussed.

Technology and Critical Care Nurses

The impact of the increasing availability and use of technology was prominent in many recent studies on technology and nursing (Currey & Botti, 2003; Endacott, Scholes, Freeman, & Cooper, 2003; Kiekkas et al., 2006). Most of these studies explored the perceived value of equipment in relation to the patient's recovery, but the introduction of new technology in critical care units, its management and problem-solving were not addressed. Kiekkas et al. (2006) found that there was inadequate education on new technology and recommended continuing education in the workplace.

Endacott et al. (2003) addressed the influence of technology on the learning experiences of critical care students. Although the research did not cover ongoing learning of new procedures and technology for Critical Care Nurses at all levels of experience, it highlighted the impact of the complexity of care and technology in this context. The students reported being initially overwhelmed by the lines and equipment, but gradually became familiar with them. Evidence of the effect on experienced Critical Care Nurses when initially confronted with new equipment without adequate prior introduction appeared to be limited.

Many Critical Care Nurses expressed the view that technical awareness was worthwhile knowledge (Dew, 1994). When Kiekkas et al. (2006: 183) investigated Critical Care Nurses' views of the opinion and image others might have of their prestige in relation to their profession, they reported that fifty percent of participants felt that the use of machines did not increase nurses' prestige. They did not indicate whether or not the participants felt their prestige within the critical care unit was enhanced by technological expertise. Kiekkas et al. (2006: 184) suggested that the nurses' perceptions were based on a sense of reduced autonomy due to their reliance on the technology in decision-making, thus technology would not increase their prestige.

Tasks, workloads and staffing ratios

The context in which nursing care was delivered played a primary role in the outcomes or recovery of the critically ill patient (Ball & McElligot, 2003). It was found by Ball and McElligot (2003) that the emphasis of previous studies on staffing levels had been on workload tools to measure the minimum staff to patient ratios that could be achieved in critical care units. For example, Moreno and Miranda (1998) studied nursing staff to patient ratios in critical care units with workloads based on types and numbers of tasks and aimed at minimising nursing staff levels. Such studies did not address the skill mix of the nurses. The workload measures that were used assumed equal capability for all Critical Care Nurses regardless of knowledge and experience, and were based on nursing tasks that could be quantified. Ball and McElligot (2003: 227-228) argued that this would not ensure the skill mix of nurses to provide adequate outcomes for the patients.

Ball and McElligot (2003) also identified that studies on staff shortages revealed an increasing potential for complications, slower recovery rates and higher mortality rates. Their research aimed to show how Critical Care Nurses achieved their goals in aiding recovery, and addressed the difference these nurses made, rather than producing a list of tasks performed. Consequently, they argued that an understanding of the relevance of the nursing care of critically-ill patients should be determined by the effect the nurses had on the patient's recovery.

Patient outcomes

Another finding from Ball and McElligot's study (2003: 232) was that patients who no longer required intensive support via vasoactive drugs or equipment did not necessarily need less time or a less experienced nurse. Ball and McElligot highlighted the potential complications and time consuming events that accompanied a recovering critical care patient. In rating patient needs in critical care units, these patients were labelled as level two, so that the ratio of patients to nurses was raised from two to one. Ball and McElligot (2003) explained that these patients were often more agitated, still very weak and needing assistance with mobilising and rehabilitation, and needing nurses who were experienced in managing distressed and confused patients. They also highlighted the potential for critical care patients to have complications when they were no longer on respiratory support, the likelihood of dislocation of lines and drains, and frequency of diarrhoea. While this information has a particular relevance to critical care nursing, it is rarely documented in studies on workloads.

Skill mix

The skill mix represented the nurses' range of knowledge and experience amongst the staff rostered on a particular shift. Those who were less experienced needed guidance and support to learn from their senior colleagues. Ball and McElligot (2003: 229) emphasised that their definition of skill mix did not just address psychomotor skills but also theoretical knowledge, knowledge of the individual patient, experience in critical care and exposure to real situations. They argued that the effectiveness of nurses depended on theoretical knowledge as well as awareness of the unique needs of individual patients. As nurses gained more exposure to

different situations with their patients, treatments and nursing interventions, they were able to anticipate and respond to changes and adapt more effectively to a crisis. Ball and McElligot (2003) argued that the skill mix should match the true patient dependency.

Impact of other factors

Individual learning needs

Billett (1994a) acknowledged the different rates at which the learners must become independent in different workplaces. Early independence for Registered Nurses who have begun working in a critical care unit would be such an example. To become skilled practitioners, workers needed to have acquired the theoretical (propositional) and technical (procedural) knowledge, as well as a cognitive picture of the social and cultural practices in the workplace (Billett, 1994b). While he held that the development of these skills in the workplace needed guidance, which implied some planning in implementing the provision of coaching and mentoring by peers or experts, Billett (1994b) also identified some limitations such as invisible processes and tasks where the learner must develop a feel for the task. An example would be inserting a needle into a blood vessel and feeling the point where the needle has passed through tissue and entered the blood vessel fluid.

Geographical layout

The influence on patient outcomes of geographical layout was identified by Ball and McElligot (2003: 231). In units where patients were in separate rooms, senior nurses struggled to support inexperienced staff. These geographical separations evolved as demands on critical care rose and space had to be found for increasing numbers of patients. The most stable patients were moved to these areas with the less experienced nurses who were then distanced from the support of experienced nurses. Ball and McElligot (2003: 227) emphasised that the risk to critically ill patients when not in direct observation must be considered. With reduced staff/patient ratios, it was more likely that one patient would not be in direct observation while the nurse was providing direct care to another patient. Less experienced nurses were also less likely to anticipate potential problems.

Attributes of Critical Care Nurses

Experienced nurses in critical care need some of the following attributes to enable them to minimise complications and contribute to patient recovery, as identified by Ball and McElligot (2003: 232). Attributes included 'proactive management', 'vigilance', 'coping with the unpredictable' and 'providing emotional support'. Development of these attributes depended on theoretical knowledge, and evolved as the nurses gained experience and exposure to a variety of events. Proactive management depended on vigilance such that the nurses knew the potential complications, were able to anticipate the signs, knew how to prevent deterioration and would take appropriate action. The Critical Care Nurse's ability to anticipate problems and manage them also depended on thorough handover by the surgeon of potential complications for each individual patient. Proactive management contributed towards recovery, and was dependent on the nurse having the experience to assess the patient's condition, set reasonable goals that could be achieved, and make judgements about how and when to reach the outcomes (Ball & McElligot, 2003: 232). For example, the nurse must know how to manipulate the parameters on the ventilator so that the patient gradually became independent of mechanical breathing.

The nursing handover

Most studies on nursing handover focussed on ritual, hierarchy, and the social and political processes involved (Manias & Street, 2000; McKenna, 1997; Strange, 1996; Webster, 1999; Williams, 1998). In their study on nursing handover, Manias and Street (2000) investigated the role and influence of both global handover and bedside handover from the social and political perspective. They stated that the function of handover was to 'ensure the continuity of patient care by communication of pertinent information to nurses on the on-coming shift' (Manias & Street, 2000: 373). Although this appeared to be an uncomplicated process, they recognised the complex context in which handover took place. Global handover focussed on all patients in the ward or unit, and included all nurses on the on-coming shift or alternatively the shift coordinators and the Team Leaders only. Bedside handover occurred between the nurse ending the old shift and the nurse commencing the new shift. This

handover was restricted to those specific patients who would be managed by the on-coming nurse.

The location of handover and the nurses who attended influenced the extent of each nurse's participation and the information conveyed (Manias & Street, 2000: 374). Also, the language and way information was communicated was determined by the makeup of the nurses attending. In their study of rituals in nursing, Manias and Street (2000: 375-376) found that during global handover the communication was predominantly between the coordinators of each shift. The handover comprised the information needed for the shift coordinators to undertake their role. Each coordinator's knowledge about the patients depended on the amount of attention the patient had received from the coordinator during the shift and this was variable.

Details of past history, specific clinical care and the patient's individual needs that the other nurses attending needed to know were limited. These nurses were not given the opportunity to ask questions about the patients and clarify information (Manias & Street, 2000). Strange (1996: 111) identified that nurses conveyed a great deal through handover using a shared knowledge in language that appeared cryptic to outsiders. Nurses who were new to the ward or unit were also likely to misunderstand the information. Viewing the patients beforehand was discouraged and this contributed to their reluctance to discuss patients at global handover. In wards and units where allocation of staff to patients was completed after the global handover, the potential for nurses who had not yet been allocated their patients to be interactive in the global handover was even less likely (Manias & Street, 2000; Strange, 1996). During the one-to-one bedside handover (Manias & Street, 2000: 377), the nurses reported being anxious about being seen to have completed all the work correctly and were in fear of critique of their care. Manias and Street (2000: 381) claimed that nurses scrutinised and normalised each others' activities during nursing handover.

Although the potential for learning in global or bedside handover was not the focus of their study, Manias and Street (2000) did recommend that the interests of the bedside nurse should be acknowledged during global handover, and all nurses should be encouraged to question and discuss patient care. They also recommended that the

nurses have the opportunity to examine taken-for-granted practices used during handover, such as scrutinising power relationships. Manias and Street (2000: 382) argued that 'an appreciation of difference among nurses will help facilitate more supportive and collaborative communication'. Edwards and Carey (2005: 8) also emphasised the importance of collaborative relationships with others to generate new knowledge. They described moving forward as the participants in their study became aware of their combined rather than individual knowledge. Those involved in the project found that in times of chaos the relationships they had built were crucial. Learning together built respect and the confidence to question and reveal one's lack of knowledge, as well as sharing knowledge.

In the studies described above, the length of time for handover, making handover more efficient and content with greater detail relevant to the patient were also explored (Manias & Street, 2000; McKenna, 1997; Strange, 1996; Webster, 1999; Williams, 1998). However, no reports were identified that investigated handovers that took place during shifts when nurses went to meal breaks, leaving their patient in the care of another nurse. Also, there was limited consideration of the potential for learning and teaching during nursing handover.

Conclusion

In this chapter the literature review explored strategies learners in general, and nurses specifically, used to achieve their learning goals and the means by which they gained support. The predominant factor in the literature on workplace learning reviewed here was the inter-relational dependence between the individual and the workplace in offering learning opportunities, and their appropriation by the worker. An understanding of these relationships and an awareness of those elements that marginalise or restrict access of some workers to workplace learning had the potential to promote the development of a broad variety of affordances.

The changing political environment affecting workplace issues have been shown to have had profound effects on feminised service industries such as nursing, and hence on the learning opportunities within these industries. The role of intuition and

expertise for learning in the workplace was shown to be important, but very much dependent on the workplace environment and the willingness of experienced individuals to share their knowledge. It also depended on less experienced individuals having the confidence to seek access to others' prior learning.

It can be seen that there were a limited number of studies that examined directly the way in which learning took place in critical care units. Much of the evidence of learning was hidden in studies on technology, staffing levels and cost cutting. The push to increase efficiency and scrutinise nurse/patient ratios produced a number of studies on nursing handover. However, the learning potential in nursing handovers appeared to have been lost in the push to reduce staffing numbers and increase efficiencies.

Overall, in this and the previous chapter, research into the manner in which Critical Care Nurses acquired skills and knowledge focussed on specific technology or direct nursing care. However, studies on how nurses continuously acquire new knowledge and maintain skills in the workplace, on the job and in a timely manner were limited. Chapter Four details how a participatory action research approach was adapted to the specific culture and context of the Critical Care Unit where I worked. This methodology enabled to me to facilitate participants to examine and share their informal learning practices, plus investigating new strategies.

Chapter Four

Method

This chapter describes the background to the study, the principles and processes of participatory action research and focus groups, and the rationale for choosing participatory action research with focus groups as the method for this study. It also provides detailed explanations of the study research process, including a summary model of this process, and considers both the relevance and limitations of this approach in investigating learning practices within a busy hospital critical care unit. The information obtained and data analyses are presented in Chapters Five to Eight.

Background

The motivation for this project was a growing awareness that Critical Care Nurses in my workplace were using a range of practices to learn informally on the job. As a researcher and a colleague my concern was to enable the Nurses to engage in reflection with peers and, as a consequence, to extend their skills through a process of shared understanding (Kemmis & McTaggart, 2003; Whyte, Greenwood, & Lazes, 2001).

Prior to the study, workplace training to update nursing procedures and equipment knowledge in the Unit was limited by such factors as time and funding. This included funding to relieve Nurses from roster to participate in training and revision. Due to the time and budgetary constraints, increasing pressure of work and new technologies, medical supplies and procedures, there was a gap between training provided and optimal learning for Nurses. This gap was filled in the Unit by informal learning that occurred principally through trial-and-error, incidentally, and just-in-time from manuals or colleagues. As identified in the literature review, informal learning has been shown to compensate for shortfalls in formal training (Beckett, 2001; Garrick, 1998; Gerber et al., 1995).

This study sought to answer the following question: 'How can Critical Care Nurses' understandings of their informal learning in the Critical Care Unit enable them to implement effective informal learning strategies to enhance their professional practice?'

Participatory action research (PAR) was chosen as the overarching methodology to achieve the study's aims of identifying informal learning by Nurses in the Critical Care Unit of a major metropolitan hospital; developing a deeper understanding of the way in which Nurses learn informally; examining ways informal learning can be achieved more effectively; collaborating with the Nurses in optimising informal learning strategies; and spreading awareness of a range of approaches used by Nurses to learn informally in the Unit, with the objective being modification of workplace practices based on data analysis and shared information. This approach was adopted with the awareness that the outcomes would be unpredictable (Gibbon, 2002).

Data were derived primarily from focus groups, Nurses' written stories of their experiences, and individual interviews.

Data analysis consisted of the researcher manually examining all forms of data for recurring themes. Analysis was ongoing throughout the three cycles of the research, with each phase informing the next. Due to this ongoing nature of analysis, it is couched within the descriptions of each research cycle (see Figure 1, pp. 77-78). Only the final, in-depth analysis that was undertaken at completion of the project is described separately.

Participatory action research and rationale for its use in this study

My research into participatory action research, presented below, led me to believe that it was the best method for my study, as it would allow participants to reflect on their understanding of informal learning, and, in stages, to modify their practices.

Like Bolton (2006: 203), I was interested in identifying how:

> Practitioners can gain greater observational powers and sense of authority over their work, and more of a grasp of its inherently complex political, social and cultural impact.

I also viewed the identified cyclical process of peer planning, observing, acting and reflecting (Elliott, 1991; Kemmis & McTaggart 2003; Lewin 1948) as an effective base from which to develop my own model of 'Critical Care Participatory Action Research Cycles' (see Figure1on pages 73-74), specific to investigating and further developing the learning practices used in the Critical Care Unit.

The development of action research has been credited to educators such as John Dewey, who, through the study of educational practices using scientific methods (Hodgkinson, 1957 cited in Kemmis, 1988: 31), emphasised the need for continuity of research inquiry for change and growth (Kemmis, 1988: 31). However, it was Corey (1953 cited in Kemmis, 1988) who identified the key principle of participatory action research in Collier's:

> action-evoked, action-serving, integrative and layman-participating way of research [which] is incomparably more productive of social results ... it makes discoveries more central, more universal, more functional and more true. (Collier, 1945 cited in Kemmis, 1988: 30)

This inclusion of the 'layman' participant reflected the stakeholders' needs alongside the cyclical nature of the participatory action research process.

Wong, Loke, Wong and Tse (1997: 3) emphasised the importance of collective participation, describing action research as a 'collective, reflective inquiry that aims at gaining a fuller understanding of a practice situation and improving the quality of a social situation'. This approach was highly relevant to my study, as it would enable the Nurses to explore and evaluate the issues surrounding their learning in the workplace, to participate in decision-making and to trial new strategies.

Kemmis and McTaggart (2003: 373) claimed that in participatory action research, the participants develop the skills to explore their social world and extend this to 'change themselves, their understandings, their practices or their constitution of their

settings'. They argued that people want to think critically and reflect on ways of making change. By reflecting on their social practices and how these have developed, people are able to explore possibilities for change:

> This process of making the familiar unfamiliar (and making the unfamiliar familiar) involves treading a fine line between taking an attitude toward the situation that aims to "uncover" or "unmask" hidden forces at work in the situation (the attitude of the outsider who claims special insight into the setting) and illuminating and clarifying interconnections and tensions between elements of a setting in terms that participants themselves regard as authentic (which may include giving more weight to relationships participants had previously discounted or devalued in their deliberations). (Kemmis & McTaggart, 2003: 373)

Kemmis and McTaggart (2003) also explained that in critical reasoning, the researchers regard those involved in the research as co-participants, working together to make change. As both a Nurse and researcher, this was the most relevant research situation for my study. The researchers 'treat practice as discursively, socially and historically constructed' although they are aware that practice is effected through the individual's 'intentional actions'. Neither is the practice solely the product of the co-participants who 'enter practices that are partly preformed by discourses, social relationships and the histories of the settings they inhabit' (Kemmis & McTaggart, 2003: 365). Changing practice requires changes in individual behaviour or intentional action in practice settings. These settings bring some uniqueness to critical research and hence must be made explicit. Using participatory action research, it has been one of my intentions in this study to explicate the practice settings experienced by Nurses in a particular critical care unit.

Similarly, Whyte et al. (2001: 371) advocated the use of participatory action research to construct new theories and practices to explain how people work and learn in organisations. In referring to cases from their own studies, they suggested that this form of research has revealed the following benefits:

> [T]he participatory research process not only can achieve results of current benefit to the organizations but can lead to a rethinking and restructuring of relations so that the impact of the process can carry far into the future. They also show that advances in thinking about how organizations work and learn are possible through PAR. (Whyte et al., 2001: 371)

I believed this approach would enable the participants and myself, as researcher, to develop an understanding of the situation in our specific working environment, within our organisation. Specific to the health context, Stringer and Genat (2004: 1) reported on how participatory action research could be used to:

> extend the professional capacities of health practitioners, providing methods that improve the effectiveness of interventions and augment professional practice in ways that enhance outcomes for clients.

They also recognised the transformational impact that participation in an action research process could have on these practitioners through:

> new concepts, ideas, explanations or interpretation that enable them to see the world in a new way and therefore to do things in a different, hopefully better way. (Stringer & Genat 2004: 1)

Both Gibbon (2002) and Robertson (2000) focussed on the researcher. Gibbon (2002: 555) identified that:

> [o]ften, there is a beginning and a vision of an end point, but the researcher has no idea of how the research will unfold.

Robertson (2000: 321) argued that researchers in participatory action research are:

> constantly being transformed through keeping diaries of reflections, sifting through the data, re-reading the literature to make new decisions as to the next action ... becoming more aware of ... the processes they are utilising.

Gibbon (2002) also questioned whose priorities should be paramount: the researcher's; the university's (for example deadlines); or those of the community of participants? While participants needed to be able to explore and consider all facets of their social practices without imposition of the researcher's perspective, Robertson recognised that she was inside the research and cited Lather's (1991 in Robertson, 2000: 321) argument for 'self-reflexivity ...on how the researcher['s] values permeate inquiry', adding that participants needed to be aware of the researcher's predispositions. This was particularly pertinent to my study, as by researching with my colleagues in my own workplace it was clear that it would not be possible to remain external to the study.

Participatory action research process

The participatory action research process is difficult to define. Trying to explain separately each of the myriad of interlinked processes is 'like trying to get chewing gum out of long hair' (Bowden, 2007, pers. comm 12 Dec.), separating each strand of the process, only to find that it is still joined to other strands. Many proponents of action research and participatory action research, such as Greenwood and Levin (1998), and McNiff and Whitehead (2003) recognised that theoretical models alone do not reflect the multitude of situations to which this research method may be applied. They observed that it took its own course each time new practices were initiated, similar to Gibbon's (2002) contention that the way in which the process evolves is unpredictable, as is the pace at which the research progresses.

The process of action research requires the outcomes of each cycle to inform the subsequent cycle. McNiff and Whitehead (2003: 57) argued that the way in which the models informed the progress of the action research could be shown best through the model makers' stories of their own experience of action research. The models were seen as guidelines only and were not imposed on practice (McNiff & Whitehead, 2003: 52). The reporting in this study was similar to Whyte et al. (2001: 371) who outlined a process in which:

> [W]e start by discovering the problems existing in the organization. Only as we work with members of the organization, diagnosing those problems, do we draw upon the research literature as well as our own past experience.

Lewin (1948: 205-206) proposed that the process involved a spiral of identifying an idea, fact finding, planning, action, evaluation and reflection. Kemmis and McTaggart (2003: 381) expanded on Lewin's work, recognising that movement between five phases – reconnaissance, planning, action, collection and reflection – would rarely be smooth:

> The stages overlap, and initial plans quickly become obsolete in the light of learning from experience. In reality, the process is likely to be more fluid, open, and responsive.

Whyte et al.'s (2002) process, Lewin's model (1948), Kemmis and McTaggart's (2003) expansion of this, as well as Elliott's (1991) discussion of Lewin's model, his comments on another model by Kemmis (1980) and his development of a 'Revised

Version of Lewin's Model of Action Research' provided guidelines (McNiff & Whitehead, 2003) for the process undertaken in my research. As the research progressed, my own process model of 'Critical Care Participatory Action Research Cycles' developed, specific to the Critical Care Unit setting (see Figure 1, pp. 77-78) This research process is presented in the section titled 'Study method/process'.

Outcomes of participatory action research

Meyer (2000: 179) argued the need to report action in 'its rich contextual detail' so that the reader could understand the environment in which a study was undertaken and relate it to other situations. Change that emanated from the research and the extent of the change should not be the sole indicator of success, which 'can often be viewed in relation to what has been learnt from the experience of undertaking the work' (Meyer, 2000: 180). Solutions were likely to grow from the process.

Kemmis and McTaggart's (2003: 381) views on successful outcomes also emphasised learning from the experience of participating:

> The criterion of success is not whether participants have followed the steps faithfully, but whether they have a strong and authentic sense of development and evolution in their practices, their understandings of their practices, and the situations in which they practice.

Finally, in the clinical context, Stringer and Genat (2004: 9) described the outcomes of the participatory action research process as follows:

> The participatory processes encompassed by action research enable health professionals to modify the sometimes-alienating procedures of clinical work and move toward a more inclusive process of inquiry ... not only provid(ing) the technical means for enacting sound health practices, but also developing a sense of community ... to bring people together in a dialogic and productive relationship, enabling the development of a sense of community through the sharing of perspectives, the negotiation of meaning, and the development of collaboratively produced activities, programs and projects.

Focus groups

Focus groups were described by Grudens-Schuck, Allen and Larson (2004: paras 7 & 8) as group interviews where the meaning is revealed through the 'emotions, ironies, contradictions and tensions' of the participants within the context under study. They are used to create natural social interaction between participants to facilitate their responses to questions and provide a means of generating data through communication (Grudens-Schuck et al., 2004; Kitzinger, 1999: 20; Krueger, 1994). The primary purpose is to gather information whereby the focus is maintained by the moderator during the discussions, and generalisations are avoided as far as possible (Grudens-Schuck et al., 2004; Krueger, 1998: 70).

Morgan (1998: 13) warned that focus groups must be used appropriately to determine what is most important to the participants and to 'listen for opportunities to enhance the existing way of doing things'. Krueger (1994: 87) argued that 'focus groups require a flexible design' and added that:

> It is important to keep in mind that the intent of focus groups is not to infer but to understand, not to generalise but to determine the range, not to make statements about the population but to provide insights about how people perceive a situation.

Rationale for using focus groups in this study

The use of focus groups in participatory action research was chosen with the working environment of the Critical Care Unit in mind. It was open, both physically and socially. Most activity and interaction in the Unit was visible and audible. As the research topic was not sensitive, participants were encouraged to talk about the discussions outside of the focus groups so that a broader spectrum of the Unit staff had the opportunity to know about the research, to potentially become involved in the collaboration and to share the outcomes.

The focus groups enabled participants to discuss and make explicit the taken-for-granted and unrecognised learning that occurred in the workplace. It was also in this setting that the Nurses made choices about the ways in which they presented their experiences. In other words, focus groups provided Nurses in the Unit with the

opportunity to devise the means by which they could explore their informal learning skills. The groups also enabled me to listen to, and discuss with the Nurses ways of enhancing these skills (Morgan, 1998). They provided me with the opportunity to gain insight into how the nursing population of the Unit perceived their situation (Krueger, 1994). I noted the importance of following guidelines to gather in-depth information about the Nurses' views and experiences of informal learning – how they learnt and why they needed to learn in particular ways in the Unit (Morgan, 1998).

Avoiding exclusion

As a colleague as well as researcher, I was concerned that nurses who were not directly involved with the study might feel excluded if the focus groups were perceived as secretive when confidentiality was not a necessary component of this study. With this in mind, the participants were encouraged to minimise any sense of exclusion by those nurses who were not directly involved in the research by talking about the discussions from the focus groups and sharing ideas about learning with peers. This helped 'create natural social interaction' (Grudens-Schuck et al., 2004; Kitzinger, 1999: 20; Krueger, 1994) not only among participants but also among all members of the Unit. The culture of the work environment also facilitated this.

Study method/process

This section describes all phases of the three-cycle research process: gaining approval for the research; identification and recruitment of participants; preparation for the focus groups; the methods used in collecting and analysing the data within each of the three cycles that evolved as the study progressed; an overview of the outcomes from each cycle and how this led to the next cycle of the research; and a summary model outlining the process of investigation for the three-year period over which the research took place (see Figure 1, pp. 77-78). This section is followed by a discussion of the limitations of this participatory action research, particularly the focus groups.

In this study, in which the Nurses were looking at the current learning issues in their workplace, the process of participatory action research was influenced by the Nurses' actions, as well as the environment in which they worked. In accordance with Gibbon (2002), the pace and direction of the study was influenced by the participants and their workloads, which were affected by the fluctuating pace and intensity of work in the Unit. Thus, the demands of day-to-day nursing in a busy hospital unit created ongoing challenges to the research process, and, as identified by McNiff and Whitehead (2003), the models that informed my research method provided guidelines only, and were not imposed on practice. As we explored the issues of learning in the Unit, the literature informed us (Whyte et al., 2001) on clinical issues pertaining to new knowledge and managing change, and gaps in the literature and problems made explicit were identified.

As the research progressed and each cycle informed the next, I found that, similar to Kemmis and McTaggart's (2003: 381) statement about overlapping phases, the process uncovered interactions affecting the learning that initially had not been expected to influence the findings. Also, there were periods during the study when it seemed necessary to refocus the participants on the research through feedback on progress, sometimes with additional ideas. I was aware that this had the potential to influence the direction of the research (Lather, 1991 in Robertson, 2000), but it was essential to stimulate the ongoing engagement of participants.

The 'Model of Critical Care Participatory Action Research Cycles' (Figure 1) that evolved as this study progressed is presented on the next two pages to enable the reader to have an overview of the process before reading the full description.

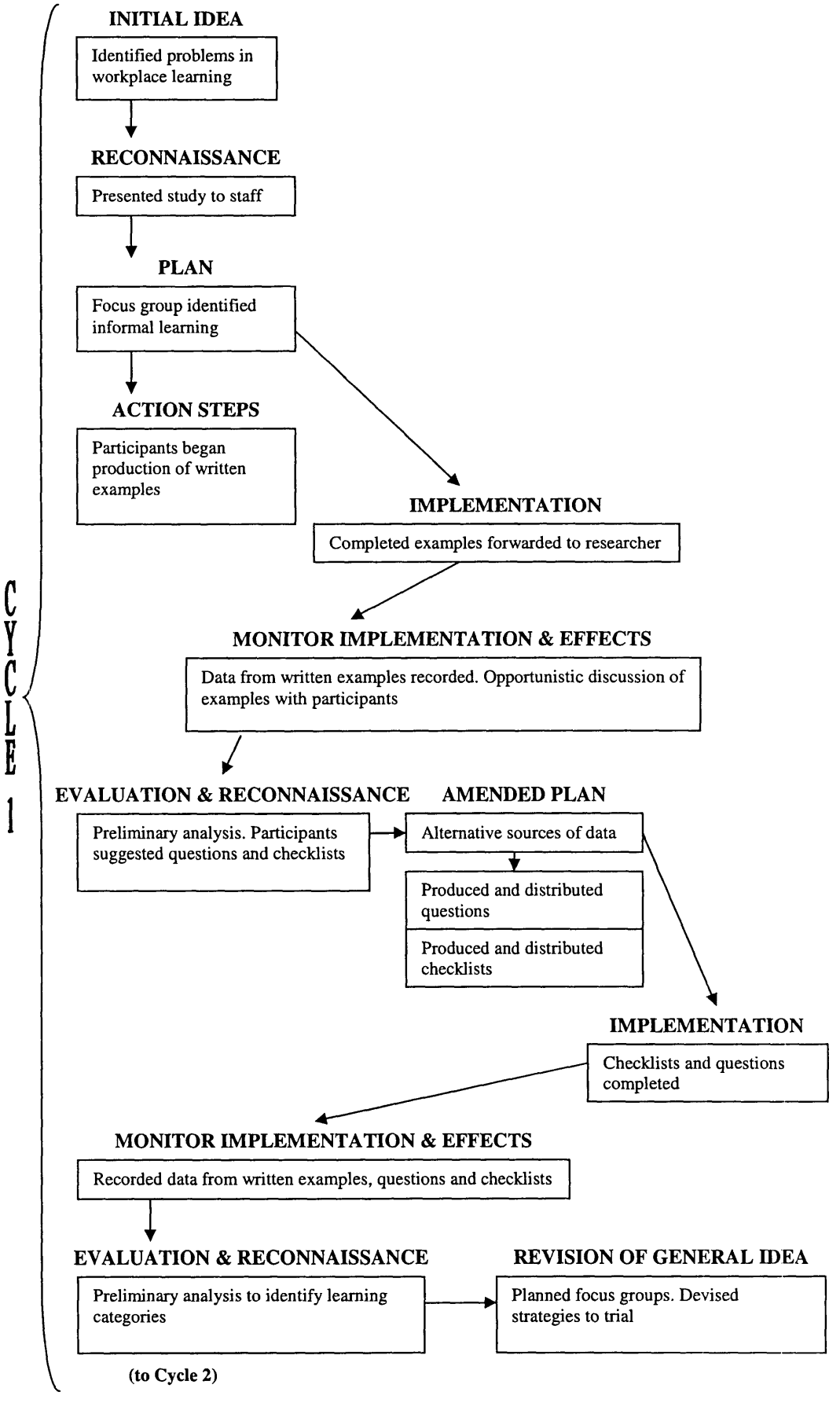
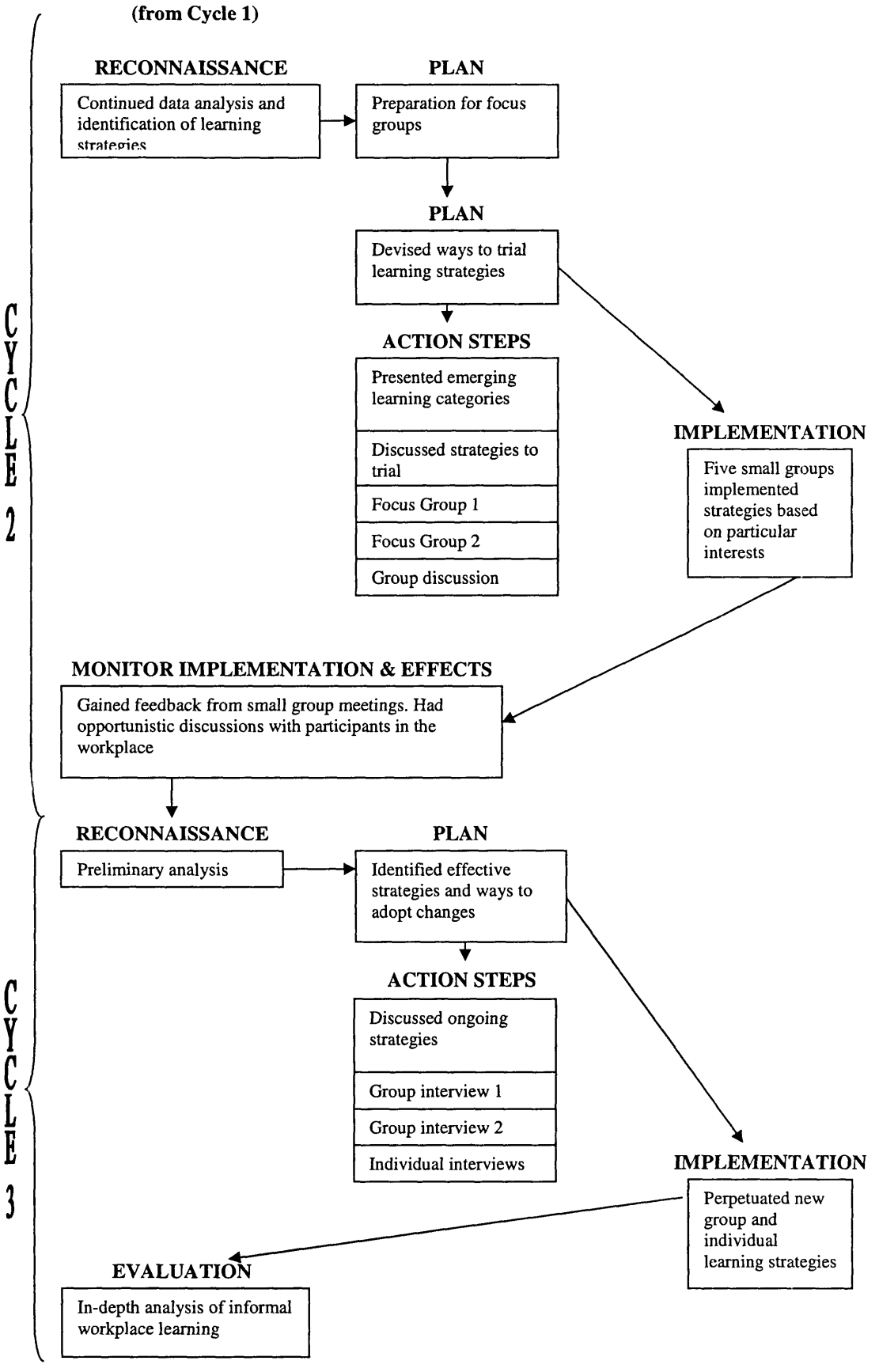


Figure 1: Model of Critical Care Participatory Action Research Cycles

Figure 1 continued



Approval for research

Application was made to the University of New England Research Ethics Committee to undertake the study and approval was given. Approval for research was sought from the Clinical Nurse Consultant, the Director of the Critical Care Unit and the Clinical Investigations Committee of the hospital at which the research was to take place. Approval from the hospital Ethics Committee (no. 2000/25) was made on the basis that the focus groups be conducted without additional cost to cover the staffing of nurses in the unit. A copy of the approval has been included (Appendix One), but information identifying the hospital has been omitted for ethical reasons.

Ethical considerations

All participants were advised of their rights in relation to this research in the information sheet and signed consent form (see Appendix Two). Some participants were happy to have their names included, but where discussions involved sensitive issues, the researcher has changed the names. Other participants did not put their names on any of their written examples as they wished to remain anonymous.

Due to the conditions for approval, focus groups had to be scheduled during shift overlaps. A range of options for the nurses to attend the focus groups was discussed with the Nurse Manager, as nurses' ability to participate depended on the workloads at the time and these were unpredictable. The Nurse Manager believed that I would get most of the people who had indicated they wanted to participate if they were rostered on shift, as she assumed that few staff would come in on their day off.

Criteria for sample selection

All participants were Nurses from the selected Critical Care Unit of a major general hospital, employed either part-time or full-time in the Unit, and having at least a minimum of six months' experience in the Unit or elsewhere in critical care nursing. Nurses who had worked in critical care nursing for less than six months were excluded because the purpose of the study was to understand how Critical Care Nurses continuously learned informally, and staff who were new to critical care nursing had only structured, formal and recent experiences of learning in the Unit, as

they were engaged in formal workshops within their first six months of employment, Hence, their experiences were distinct from the ongoing learning occurring among the other Critical Care Nurses who had been in the Unit for more than the initial six month period. Other nurses in the Unit, who were interested in participating in the data gathering but not in the focus groups, were also welcomed to be involved.

As focus groups were to be a major data collection method, a requirement was that the participants were Nurses who worked in the Unit. Many, but not all of them had interchangeable levels of leadership and responsibility, depending on their shift allocation. This criterion was in response to Morgan and Scannell's (1998: 59-60) finding that focus groups were most effective when participants were equal and not in fear of potential consequences if they spoke freely. One exception was made, however, to optimise administrative support for any strategies the research participants might be keen to try. Participants in one focus group only, were to include a Nurse Manager, a Clinical Nurse Consultant a Research Nurse, all of whom were administrative staff, and a Nurse Practitioner.

Recruitment of sample through presentations

Nurses from the Critical Care Unit of a major general hospital were invited to participate. A project information sheet (Appendix Two) was placed on notice boards in the Unit. This sheet included a request for any Critical Care Nurses who were interested in participating to approach me for a more detailed explanation of the study. It was during this process that I determined whether nurses met the criteria for selection.

The research project was explained to staff during the overlap of the two day-shifts. The time during this overlap enabled Nurses to handover the condition and treatment of each patient to assist with the care process, but also was frequently used for teaching, presentations or meetings, aspects referred to as 'in-service sessions'. The topics for in-service sessions were written in the staff allocation book that was viewed by all Nurses at the beginning of their shift. During these in-service sessions in the Unit, I gave three presentations with an overview of the objectives and the process of action research. I explained how the focus groups would operate and

outlined current understandings of informal learning in the workplace. By the end of the month of the three presentations there were twenty-one Nurses recruited as participants. Attendance was achieved by reminding the Nurses that the presentation was commencing. It is important to state here that events within the Unit took priority over Nurses' attendance at any recruitment in-service sessions, and later in the project over participants' attendance at the focus groups. While this may appear to be a limitation of the study, it also had positive ramifications, as it gave real insight into how the Unit worked and how this affected the Nurses' informal learning experiences.

Research sample

With the fluctuation of participants over and between different stages, thirty-two Nurses participated in the research, comprising approximately thirty percent of the Critical Care Nurses on staff in the Unit. This was the maximum number of participants I could mentor throughout the research process.

Participants were primarily of Anglo-Australian background, ranging in age from 21 to 63 years, with approximately twenty-five percent male and seventy-five percent female. The participants' experience of working in a critical care unit ranged from six months to thirty years. All nurses are required to show proof that they are regulated and legislated and have a responsibility to self declare their competence to practice. This group reflected the range of levels, length of experience and working backgrounds of the Nurses in the critical care unit.

Participants moved in and out of the study. The extent of their involvement varied due to shifts and workloads. A core group of seventeen Nurses who were actively involved in the study saw participation as a means of achieving personal and professional goals in teaching and learning. This mirrored Edwards and Carey (2005), and Greenwood and Levin's (1998: 40) experiences, where core participants remained throughout the project and drove the action research, in contrast to others in the workplace who had more limited involvement. As with the studies cited above, the participants in this study shared insights with those who were unable to attend all of the focus groups and also with the extended learning community. A

section of the Unit nursing staff who were not amongst the original participants became involved with strategies for learning and volunteered written examples of their learning experiences as the study progressed.

Structure of the focus groups

The average number of participants in the focus groups was ten. Processes followed in the focus groups are explained in the focus group sections of each cycle. It must be noted here, however, that after the first focus group (Cycle 1), subsequent focus groups were run during bedside handover in order to work within the constraints of essential nursing activities being performed.

First cycle

The Nurses who chose to participate were asked to sign a consent form (Appendix Two) in the days leading up to the first focus group. The consent included permission to collect data during the focus group discussions, to audio-tape and transcribe the information, and to act and reflect on it throughout the study. An information package about action research involving focus groups was distributed to all participants in the days leading up to the session. An information note was also placed in the Unit communication book requesting two volunteers, who would not be participants in the focus groups, to take written records of the groups.

First focus group

There was only one focus group held in the first cycle. This first focus group was planned to occupy approximately an hour and a half timeframe, and to begin by mapping the different types of learning that occurred in the Unit, followed by exploring informal learning. When I arrived at the Unit, however, the time allocated had been cut short for a farewell afternoon tea. Also, the Unit was busy in the morning and the Shift Senior and participants had not thought about making time for the focus group, which was conducted within the hospital, but in another wing dedicated to laboratories and classrooms for ongoing education of hospital staff.

Ten Nurses participated and registered their attendance on a sheet of paper as they arrived. I placed two displays on butcher's paper in the focus group meeting room (Appendix Three). One was a list of guidelines for focus groups. I gave a quick, verbal overview of these. The other included the headings for the three phases of the research. I used these displays during the first and second cycles of focus groups, but not in the third cycle in which the groups were smaller and the displays were familiar to participants.

At the beginning of the session I asked for two volunteers to keep track of the time, and two volunteers to write down any softly spoken comments and information communicated non-verbally. These volunteers were also participants and some of their notes provided a different perspective from mine as a moderator. Such information allowed me to cross-check the data through triangulation. Note papers and pens were provided for all participants. I explained to the group that I would audio-tape their discussions and transcribe them, and pointed out the location of the microphones.

At this first focus group, information was gathered about the participants' perceptions of informal workplace learning. To achieve flexibility, as suggested by Krueger (1994), the focus group began with a general question about how the Nurses believed they learnt informally in the Unit. The discussion followed the course of the conversations between the Nurses where they revealed their own views on the ways they learnt in the Unit. Their memories were stimulated by fellow group members' stories.

The original plan to discuss how we were learning in the Unit in general, was excluded, as there was less time available for the focus group than anticipated and we went straight to an examination of informal learning. The session began with a discussion where participants articulated experiences of how they learnt knowledge, other than that gained in formal settings. The group talked primarily about the ways they participated in ongoing learning in the Unit and the means by which they could make their learning experiences explicit. Informal learning emerged as being all the learning that occurred in the Unit, including those in-service sessions that were not workshops or mini-courses.

As moderator, I used the blackboard to write comments from the group. The two participants, who were taking notes, had some information that was additional to the discussions that I summarised on the board. At the end of the session the information on the board was recorded. I used both sources of information in conjunction with the audio-tapes when writing the guidelines for the next phase.

Next we discussed how we could look at what was happening in the Unit. I suggested options such as checklists, which would be quick when the participants were busy, or writing descriptions of their own examples of learning experiences. Participants initiated and participated in strategies to enhance their learning in the workplace (Carr & Kemmis, 1986; Greenwood & Levin, 1998; Kemmis & McTaggart, 2003; Whyte et al., 2001). In this focus group, they decided they would explore the informal learning process through writing down and sharing examples of their informal learning experiences. A list of prompts was provided as a guide for their examples (Appendix Four).

Data collection – gathering examples of informal learning

Posters were displayed in the bays, which are individual bed areas, to remind people about the study. Often when I was working with participants during our shifts they would ask me how the study was going. We would talk about it and this often led to another written example of learning at work. A small, locked, blue box was provided on a shelf near the tea room to collect the written examples.

Some participants followed the prompts rigidly whilst others used the note pads or any accessible paper to write whatever they wanted to tell me. The types of topics explored are indicated in the analysis chapters that follow this one. The note pads were moved about in the Unit and at times were found hung on the notice board. Some examples were placed in the blue box, some were put in an internal envelope and placed in my pigeonhole, and others were handed to me. The written contributions became less frequent, until I caught up with the participants again. The reality of shift work meant that Nurses might not see each other for a week or more. It was more difficult to maintain contact with participants who were part-time.

Drawing on different perspectives

To encourage more Nurses to write about their experiences I produced a more detailed prompt sheet (Appendix Five). Copies were given to all Nurses who had agreed to participate. Initially, all four questions were presented on one page and given to five people. These participants wrote their responses in the available space between each question, which limited the detail. The remainder of the participants were provided with a separate sheet for each of the four questions and they wrote longer, more complex examples of their learning. Most examples provided a description of an event. Some, however, reflected on the learning experience and wrote about how they might have done things differently in hindsight.

Some months later I wrote a letter to remind everyone to submit more stories before commencement of the next phase. Most participants contributed one example of an informal learning experience, whilst several wrote two or three examples over the period.

An additional means of data collection consisted of A4 size checklists, which were placed at the back of the note pads and occasionally handed to participants when I was on shift (Appendix Six). This method resulted in a limited response. Some of these checklists were completed and posted in the blue box, but always with additional written examples. The checklists given directly to staff tended to be completed based on their work on that shift and handed back to me on the same day. The checklists provided some additional insight into the written examples.

Data collection and analysis

The data in this study comprised the Nurses' written examples of informal learning in the Unit, focus group discussions and individual interviews that were audio-taped and transcribed, and will be called 'transcripts'. While individual interviews were not originally part of the intended research process, due to reduced time for participants to attend focus groups during the third research cycle, I took opportunities to interview individuals as these arose.

Data analysis was guided by Somerville's (2003a) description of manually analysing a body of data that was accumulated through semi-structured interviews as part of her study. She emphasised that by describing it as 'a body of data', it represented a whole, although there were different parts within the entity. The aim of her analysis was to 'be able to say what the whole was about' (Somerville, 2003a: para 4) and has been articulated more recently as an emergence leading to a transformation in understanding (Somerville, 2007) Similarly, I aimed to gain an understanding of what the whole situation was about in relation to Nurses' informal learning in the Unit. Somerville (2003a: para 11) identified that the workplace was 'an inherently dangerous place' and could be analysed 'through the telling of accident stories'. My analysis was of Nurses' stories about informal learning.

The first stage in Somerville's analysis was to number each story transcript and then allocate a second number to each new topic identified within the transcripts. As she read through the data, Somerville (2003a: para 10) described being conscious of:

> an overall story line that permeated much of the data that I felt was being presented as the context in which all of the analysis was to be understood.

Major clusters of analytical categories were then developed. The validity of the categories was evident through similar numbers of entries in each category. Major categories with considerably larger numbers of entries were broken down into subcategories. Categories in relation to the research questions were readjusted as additional issues emerged and as it became evident that some categories needed to be analysed further. Further formations of subcategories and adjustments were made to create a written presentation of the data from which conclusions could be drawn (Somerville, 2003a).

Transcription and analysis of focus groups

I transcribed the first focus group from the audio-tape. As I did so, I found that I had driven the group discussion less than I thought. The participants talked to each other more than I recalled. Apart from this realisation, the advantage of transcribing tapes personally was an awareness of the tone of voice or meaning in identifying terminology that was unique to the participants. However, due to time constraints, I

employed a research assistant to transcribe the material from subsequent focus groups prior to analysis.

The process for data transcription and analysis was repeated throughout each of the three research cycles. Therefore, in describing the process for Cycle 1, I am also generally describing the analytical process for the other two cycles.

The focus group analysis was guided in part by Grudens-Schuck et al's (2004: para 16) statement that words are the key to focus groups and therefore the analysis needed to reveal patterns that had evolved from the discussions, and which indicated the participants' perspectives or themes. I used quotations from the focus groups to produce a rich description of the perspectives emerging from the group.

Grudens-Schuck et al. (2004) argued that silences highlighted those issues that were not discussed or were brushed over, and revealed the participants' 'values and networks'. In light of this, I assumed the silences in my research focus groups indicated issues central to the group, but which might not reveal the full picture of the context in which the Nurses were functioning.

The analysis of the data from the focus groups was also based in part on Somerville's (2007; 2003a) postmodern emergence approach, as described earlier, by identifying and grouping phrases from the discussions. Somerville (2007: 228) described a point of transformation in the research process. She described 'times of transformation and times of stability in research' (Somerville, 2007: 232). For me there was an awareness of the technology and complexity controlling and manipulating nurses' work and leaning. Although there was discussion about informal learning in the focus groups, the data were predominantly about discussion of the study's findings leading up to each focus group, and making group decisions and plans for the next stage of the research. Hence, the analysis was based heavily on the Nurses' written examples of workplace learning.

Preliminary analysis of the written examples

In keeping with Somerville (2003a), each of the written examples was allocated a number, with a second number representing each topic that was based on the exact words in the written example or in the transcript. I referred back to the transcripts on discussions about learning to confirm or contradict the written narratives. The particular phrases that represented aspects of informal learning were noted down the side of the transcripts. These phrases were grouped into 13 categories: 1) asking; 2) handover; 3) experience; 4) why ask?; 5) why not an alternative asking?; 6) tea room stories; 7) disadvantages; 8) self-directed; 9) communication folder; 10) listening; 11) benefits of informal learning; 12) learning from mistakes; and 13) resource specialist knowledge. In focus group one, for example, the comments *You ask some one who knows*; *Asking around the Unit who knows;* and *Looking for those who will know* were made during the discussions. In conjunction with other phrases, these fitted category 1, *ASKING* (see Appendix Seven).

This preliminary analysis was based on the examples accumulated during the first cycle. As mentioned above, I numbered the written examples as I received them (Somerville, 2003a), but they may have been written a few days before I collected them. Some participants included the date and their name in their examples.

In subsequent cycles, as I read the examples, the phrases of learning were recorded alongside each example and similar phrases were clustered into groups. For example, *showed* and *demonstrated* appeared in the examples numbered 1, 17, 18, 21 and 28. The strategies that the Nurses used to learn emerged from this analysis.

Comparison of focus group narratives and written examples

Analysis of the first cycle's written examples of learning and those from the first focus group was used to plan the second cycle of focus groups. A summary of the information gained from the first cycle was given to all participants. This outlined the first cycle's outcomes, and the strategies that had been identified as useful learning tools for gaining the information needed. A note alerting anyone interested in participating in future parts of the study was placed in the Unit communication folder.

Second cycle

The intention in the second cycle was to discuss in more detail the strategies identified in the first cycle and to explore ways of enhancing them. In order to engage with the maximum number of participants, three focus groups were organised. This provided greater opportunities for participants to attend at least one of them. The sessions began by reminding everyone of the guidelines for focus groups (see Appendix Three). The progress of the project was also reviewed. The participants were asked how they felt about the first phase.

First focus group of the second cycle

The first focus group in the second cycle was the biggest, involving thirteen participants. In addition, the Nurse Manager, Clinical Nurse Consultant, a Nurse Practitioner (all administrative staff) and a research Clinical Nurse were invited to attend this session, and did so. As stated earlier, this was done in the hope that their participation would optimise administrative support for strategies the research participants might be keen to try.

Discussion centred on the difficulty of finding time to write about something immediately after it had occurred. Due to these constraints, participants reported that they tended to lose the momentum to detail their experiences. The group suggested the trial of checklists or printed question sheets being distributed when I was working the same shift. They also agreed to trial writing about their experiences and returning this writing to me before the end a particular shift.

We talked about the strategies that came from the first cycle – motivation, and preceptoring the new graduates in nursing and clinical teaching skills. It was then clarified that the aim was to determine whether they were interested in selecting a strategy to implement or revisit in small groups. We also discussed how it might be possible to keep these strategies going even when the Unit was very busy.

Two additional strategies that had not emerged from my analysis – specialist study groups and peer coaching – were suggested in a casual conversation during a shift

and were included in this focus group discussion. The first of these was taken up by two groups to explore a Midwifery specialist group and a Neurology specialist group. Two participants decided to explore the return of a handover with all on-coming Nurses attending.

Second focus group of the second cycle

I posted up some further guidelines on working in groups for the participants to keep in mind (Appendix Eight). There were six participants at this focus group. We went through these guidelines and the participants suggested that I give a copy out to them.

During this second focus group of the second cycle there was a discussion about finding time for workplace learning and fitting in the strategies that they planned to undertake. They decided that they would form specialist groups and then work out how to keep me informed of what they were doing Participants decided that writing about their progress was not an option due to the additional time it would take, which led to a discussion about *time management.* The group decided that I should put a summary of their plans in the communication book, so that if people were interested in any of the specialist groups, they could join those (Appendix Nine).

As specialist groups formed during the second cycle of exploring strategies for learning, it became more difficult to keep in touch with their plans and actions, as they were diverse groups and met at various times. Sometimes, their plans to meet did not eventuate due to workloads and shift arrangements. Therefore, my strategy of keeping track through interviews, or by attending and audio-taping meetings of their specialist groups itself became very time-consuming.

Third focus group of the second cycle

The third focus group of the second cycle had to be cancelled because three senior Nurses were on sick leave and two of the participants were in handover because they had assumed the roles of Team Leader and Shift Senior, who then had an Occupational Health meeting. After chatting with one of the Nurses, I decided to have a ten minute group discussion with the three who were available about the

outcomes of the two previous focus groups in the second cycle. The discussion in fact lasted for thirty minutes.

Third cycle

Due to workloads, the third cycle took the form of three opportunistic, small group interviews of three to four people and four opportunistic audio-taped individual interviews with participants about the effects of the study on their perceptions of informal learning in the workplace and their ability to practice effectively in the workplace.

One advantage of the small groups was that because I had identified Nurses with similar views, they could explore their views openly and thus have deeper discussions about the learning opportunities without fear of being silenced. This gave voice to those participants who might tend to withhold their opinion in the presence of more forceful participants, as identified by Morgan and Scannell (1998: 65-66). They argued that segmentation had advantages and used an example in which people with differences of opinion were separated so that the decisions that had potential to alienate some individuals could be identified and avoided.

In these small groups and individual interviews, we had intensive discussions about political issues in the Unit that were believed to have an influence on the learning environment and the outcomes of the strategies for learning that the participants had developed.

The participants initiated some further group learning strategies, for example case study presentations, clinical teaching skills/bedside teaching, education group, specialist study groups, return of full handover, short briefs, in-service education sessions and time management, which engaged other nurses from the Unit who had not been involved in this study.

Project completion

As recognised by Greenwood (Greenwood & Levin, 1998), it was difficult to bring the action research to an end or to decide when to leave it. There was a point where it was necessary to end the study to keep the data to a manageable size. A summary was forwarded to all participants at the stage when the strategies initiated by small core groups had ceased, were maintained successfully or had transformed (Appendix Ten). The summary also referred to the individual interviews that were conducted towards the end of the third cycle.

Final, in-depth analysis

A final analysis of the accumulated written examples of informal learning that were submitted to the researcher throughout the study was made at the completion of the project. This analysis followed Somerville's guidelines for analysing a body of qualitative data (Somerville, 2007: 2002a).

Each example was numbered and phrases that indicated topics of informal learning within each example were written in the margins or highlighted within the text. Each example was photocopied. As many copies were made as there were topics within each example. The copies were then cut so that each topic could be separated and similar topics placed into groups to form categories. This was done by spreading out examples in groups across several tables set out in a U shape, then clustering and re-clustering examples to make meaning of the participants' learning experiences. This process continued until categories could be clearly delineated and named. The categories were then written spatially on a white board, with groupings of subcategories and links leading to the emergence of major categories.

This spatial, manual analysis was then presented to two critical friends and following discussions, explanations and some variations, the major categories were verified.

The need to undertake analysis of some examples as a whole became evident, based on their realistic, stark, rich representation of the learning experience in critical care, encompassing the complexities of the setting. Each one of these whole examples was

analysed using the process described above, in conjunction with the rest of the focus group and written examples. These whole examples contained many of the subcategories already identified, and made explicit the complexity of learning and gaining knowledge in critical care nursing. These whole examples formed a separate chapter (Chapter Five) and were analysed in more depth during the writing up.

This final, in-depth analysis of the data from the whole collection of narratives revealed two major themes: 1) learning and 2) challenges to learning. Analysis of these major themes is presented in Chapters Six and Seven.

As part of this analysis, I was able to identify some of the participants and locate the individual within the experience being described. This was made possible through some participants writing their name and the date on their examples of learning. Identification of the participant assisted with the analysis because I knew of the Nurse's level of experience and training. This finding, as well as discussion of other outcomes from the analysis, will be discussed in Chapter Eight.

Limitations of the research method

Participatory action research is always contextualised, thus, although the means of exploring issues and the findings can be generalised or related to other nursing environments, particularly critical care units, this study is limited in that: it is representative of one critical care unit only; participants were not selected randomly; the focus was on looking at ways of learning more effectively in that specific workplace; and only approximately thirty percent of the Critical Care Nurses on staff in the Unit volunteered to participate.

This study explored the phenomenon of learning within one critical care unit. The participants were 'information rich' and could illuminate the experience of learning it the Unit. The aim of this study is not to generalise but to learn and understand the phenomenon in depth. This can be achieved through purposeful sampling, as described by Patton (2002: 563):

> Purposeful sampling involves studying information rich cases in depth and detail to understand and illuminate important cases rather than generalising from a sample to a population.

Information rich participants focus on those issues that are of central importance to the research (Patton, 2002: 46). The Nurses who worked in the Unit had the potential to report a broad range of learning experiences. The strategy for purposefully selecting information rich cases was opportunistic or emergent sampling. This design offered the option of having the flexibility to follow new leads and to take advantage of unforseen circumstances. The study began with an initial sample group but additional samples could emerge as the research unfolded (Patton, 2002: 240). Decisions that could not have been made in advance about activities to be undertaken, and when and how to collect the data, were made during the study. Also, the participants themselves moved in and out of active involvement in the study.

Focus group limitations

Whilst Grudens-Schuck et al. (2004) argued that focus groups encouraged innovative ideas; they also warned that their use in gaining consensus in decision-making was inappropriate as it inhibited diversity. In this study, there was potential for divergent views to be restricted by the group process, however, with the constraints of shift work, handovers were the only periods when a number of Nurses were able to be together. This enforced time limitation meant that focus groups were seen as the most efficient means of participation in the research, even though the inability of all participants to attend all focus groups led to participants not always being aware of all aspects of the discussions and the detailed evolution of the study as it proceeded.

The difficulty of planning focus groups in an organisation without any additional cost in undertaking the study placed its own limitations on the study. This situation meant that names of the participants had to be shared with the Nurse Manager to enable arrangement of rosters to maximise the number of participants in the first focus group. As many of the participants as possible were rostered on eight hour shifts, with half on an early and half on late, providing a two-hour overlap. The problem with loading the shifts with participants on focus group days was that if there were procedures requiring the Nurses on both shifts for a patient, the

participant could not attend. Time for handover of the on-coming Nurses' patients reduced the period for the focus groups to an hour and a half, which impinged on the free flow of discussion. In the first focus group, for example, there was an attendance of ten, but one of the Nurses on the late shift brought the mobile phone in case staff needed to return to the Unit sooner.

While Krueger (1994: 111) recommended the taking of written notes by an assistant moderator who should aim to accurately record the participants' comments as fully as possible so that the researcher and participants are not distracted from the discussions, all who attended the focus groups in this study also participated in the discussions. The notes taken were recorded by two participants, but were limited to the main discussion points. Another limitation was the effect on the focus groups' audio-tape of background noise and acoustics in the rooms, which meant that some words or sentences were lost. In spite of this, the data remained a rich source of information.

Limitations of focus groups consisting of acquaintances

My role as both colleague and moderator in the focus groups was also a potential limitation to gaining accurate data, totally free from my influence. There was the possibility that the participants would not make all aspects of their discussions explicit because they made assumptions about my contextual knowledge in the Unit. Also, there was the potential for participants to leave out the taken-for-granted knowledge that was specific to critical care. As a moderator, I addressed these issues by working through the discussions and descriptions to envisage the events in the environment in which the examples occurred, and inserted written explanations into the thesis which were essential for an understanding of the situation. In addition, external readers who were not nurses assisted in identifying the gaps in the information that became apparent in this thesis.

Having identified the above issues as possible limitations, I realised that this situation could also be beneficial. In this dual role, I was conscious of Krueger's (1994: 88) warning that the subtleties of communication between colleagues who have worked together and know each other well could be misinterpreted by an

external moderator. Thus, from my position as the moderator and also a colleague, there was less likelihood of misinterpretation.

Conclusion

This chapter has described the theoretical underpinnings of the method and process used in this study to enable Critical Care Nurses to make explicit their approaches to informal learning in the workplace and to explore ways to enhance their future learning. The method has been described in detail, and although aspects of the method are unique to this Unit, the description has highlighted the difficulties of undertaking participatory action research with focus groups within a hospital environment. An awareness of the pitfalls and the need for flexibility would assist future researchers to explore workplace learning in dynamic, busy workplaces.

The use of participatory action research in this study enabled the Nurses to influence the way in which they explored their workplace learning and to propose strategies that would impact on their knowledge base. Focus groups were an effective means of providing as many participants as possible with an opportunity to voice their views and identify ways in which they preferred to participate in the study. By giving the participants such control, as appropriate in participatory action research, the Nurses demonstrated ownership of the process.

This study reflects the difficulties of undertaking research in a specific working environment of rapid and continuing change with large numbers of nursing staff who must all be multi-skilled in critical care nursing. For this reason, the method has been detailed to show the strategies that were undertaken so that researchers exploring learning in other workplaces can consider or modify similar means of gathering information.

Chapter Five, that follows, presents an analysis of five written examples that illustrate the complex nature of the Nurses' learning and working environment. Chapters Six and Seven present data from other written examples, focus groups and interviews about the participants' perceptions of learning and the obstacles to them

broadening their knowledge base further. Not all of the Nurses' written examples have been included in the analysis chapters due to saturation of the data. Those that have been included represented the best illustrations of the perspectives arising from the examples.

Chapter Five

Selected Examples of Critical Care Nurses' Learning Experiences

This chapter presents an analysis of selected, whole written examples of the Nurses' experiences of their workplace learning that show the connectedness of multiple nursing and learning events that occurred in a single experience. The five examples, provided by four of the participants in this study, were selected because each gives a particularly pertinent and rich illustration of the extent of understanding across participants. It also provides an opportunity to reveal the depth of meaning of the experience and the complexity of the process of addressing the needs of the critically ill patient, whilst keeping pace with changes incurred by new knowledge, medications and equipment in the Unit. Through analysis of the full story, interpretations surfaced of the Nurses' understandings and actions related to particular aspects of caring for patients. Two stories were chosen from one participant's examples because they revealed her reflection on learning over many years, in different nursing environments, and how this influenced learning and teaching in the Unit. Each story focussed on one component of the Nurse's shift. These stories, as a whole, set the scene for the two subsequent chapters in which multiple facets of learning are grouped and analysed.

These examples were generated over a period of eighteen months following the first focus group with the Nurses when they made a decision to explore their informal learning by writing about their learning experiences in the Unit. Each learning experience introduces the writer, and is then followed by the story presented as it was written, the analysis and discussion. An explanation of the terminology and events within the context of the Unit is provided at the end of each example. The specific reason for each selection is explained after the example. The interpretation of the nursing actions and decisions is presented within the circumstances in which the learning took place, which leads into the analysis of the workplace learning.

Learning experiences

1. Dave: 'No one tells you that'

Dave had worked in the Unit for several years. He managed patients with critical and complex conditions as well as undertaking Team Leader roles. Dave's level of experience enabled him to undertake the roles of both individual patient care and/or Team Leader. He could be allocated to either role from one shift to another. This example was the last of the narratives gathered from Dave when he and I were on night shift in the Overflow Unit. I wrote it down and read it back to him to confirm his description of his observation.

Dave: *No one tells you that*
One thing I've found with cardiac patients is the Propofol and SNP [Sodium Nitroprusside].

The first thing is you put SNP on 'cos it's sky high and then the BP [Blood pressure] plummets and then I found that if you put the Propofol on, while you're getting yourself sorted out, it's better but no one tells you that.

Dave's example was chosen because it demonstrated the importance of insider knowledge of medical terminology and the detailed nursing management required for effective critical care of a person returning from surgery. It was necessary to interpret this example to make sense of the learning experience described because it was written in the Nurse's language. The Nurses themselves were not always aware that they manipulated these medications and, as with Dave, they may have learnt through personal experience without making their knowledge explicit.

Discussion

Dave's example had particular relevance to workplace learning because it made the steps in the medication process explicit and not all Nurses had worked these out. This was valuable knowledge to pass on to others because fluctuating blood pressure and restlessness might have had detrimental effects on the patient's recovery.

This example showed how Dave made decisions that seemed to be the most effective for the patient and the Nurse. He was motivated by the desire to keep the patient stable while he attended to the other interventions that had to be undertaken post-

operatively. He negotiated the relationship between his patient and 'sorting himself out'. He had learnt this through his observations and experience, as well as reflection on his practice through critical thinking and problem solving, much of which was based on self-directed learning. Dave made decisions based on his observation skills, assessment of the patient and understanding of the way medications worked. He was able to articulate his tacit knowledge of nursing a patient who had had cardiac surgery.

No one tells you that was a critical statement. That the knowledge Dave had gained about the choice of Propofol or Sodium Nitroprusside through his experience had not been communicated to him during the orientation of Nurses to the Unit reflected a barrier to learning. Also, while a diagram of rectangles and arrows – a guideline for decision-making in the nursing of patients who had had cardiac surgery – was provided in a manual for each bay, these manuals became rare items as they were often stolen. To add to the lack of information, even in those manuals that were not stolen, the guideline did not make clear the choice between Propofol and Sodium Nitroprusside – an important oversight as each patient would be different. Thus, the practice that was successful for Dave's patients may not have applied to all patients, emphasising that each Nurse needs to understand the full picture of the patient's condition.

In his role as a Nurse, Dave had knowledge of the relevant medications and the nursing management of a person who had had cardiac surgery. He had embodied knowledge of observation of his patient, recognition of signs of changes and communication with a person who was drowsy, anxious, possibly in pain, confused and unable to talk. In relation to the patient's specific surgery or condition, these additional requirements to the skilled nursing actions Dave had developed posed extra challenges. Whilst the doctors prescribed medications such as Sodium Nitroprusside and Propofol on the patient's chart, the decision about administration was made by the Nurse, based on the observations described above. Dave had identified a routine or sequence of events, and had the knowledge and experience to recognise the reasons for changes and to make clinical decisions about the appropriate response to those changes.

Dave's narrative was comparable to another Nurse's recent comment that *receiving cardiac patients is easy.* This reflected the embodied knowledge of experienced Nurses, and their ability to manage and make decisions about the diverse recovery of individual patients undergoing seemingly similar surgery. Dave's example revealed the complexity of the Nurse's knowledge of the patient and treatment, and effective decision-making in clinical nursing care.

Explanation of terminology and events

The complexity of this example was revealed by examining the insider knowledge required to understand this story. The cardiac patients were those people who have coronary artery bypass grafts or valve replacements. The Nurse had to maintain the patient's blood pressure below a certain level for 24 hours, or the vessel could bleed at the site of the graft and the patient would have to return to surgery to stop the bleeding.

The Nurses receiving the patient were required to know the type of surgery, as in which vessels had been used, the location of the grafts and whether the grafts were friable so that he/she was aware of the effect that a period of high blood pressure would have on the patient.

'Sodium nitroprusside' lowered blood pressure but small amounts could produce large changes. 'Propofol' was a sedative that relaxed muscles and reduced anxiety, so the patient's blood pressure dropped. As a patient began to wake, possibly accompanied by anxiety, the blood pressure had the potential to increase. However, gradual warming to normal temperature post-operatively tended to decrease blood pressure as peripheral vessels in the legs and arms dilated. The Nurse needed to work out whether the patient was waking and anxious or cold such that the blood pressure would drop with warming, or whether the blood pressure would increase because the patient's blood pressure had been unusually high prior to the surgery and was returning to that state.

In Dave's experience, he had found that if he administered some Propofol the patient was sedated and calm, and the blood pressure was more stable whilst he was organising other aspects of care.

Dave's phrase *getting yourself sorted out* related to the actions that a Nurse would undertake when the patient was received directly from surgery. The Nurse would assess the patient immediately, ventilation parameters would be set and checked, haemodynamic lines would be untangled, and the monitor and alarms would be set. During this time, the Nurse would watch for signs that the patient was waking, and needing reassurance and explanations. The patient's blood pressure, oxygen saturation, cardiac rate and rhythm, and respiratory status would be constantly observed and monitored. Intravenous medicines would be started or checked, bloods taken and the cardiac drains set up with low pressure suction. The patient would be warmed but this would often lead to a drop in blood pressure, so the medications would be titrated to maintain a steady blood pressure. Towards the end of this time the relatives would be brought in to see the patient, and the Nurse would explain the patient's progress and attempt to ease the relatives' anxiety. All these actions would often occur within half an hour of the patient's return from surgery.

2. Jill: 'I learned by my mistakes'

Jill was a senior Nurse who worked part-time in the Unit during this study. She was expected to manage complex patients as well as undertake Team Leader and Shift Senior roles. Two of Jill's contributions have been used in this chapter because they reflected her learning experiences in different stages of her career. The first reflected an experience as a student in the Critical Care Course and the second reflected her views as an experienced Registered Nurse in a High Dependency Unit, prior to undertaking Critical Care Course. Both of the examples she presented were from her experiences many years before this study, but they had a lasting and transforming effect on her work and engagement with learning. Her part-time position made it difficult to keep up with changes but she was expected to do this somehow. The events she described in her first example occurred several years earlier when she was a student nurse in the critical care course.

Jill: *I learned by my mistakes the need to monitor CO_2 levels in muscular dystrophy several years ago.*

I was bluffed by a 20 year old lad I was caring for. He refused his Bipap all night & the cough machine & I opted to let him sleep. I didn't even do a gas as his sats were OK. Well, next day, I handed over to ------- and found out his CO_2 was ↑90 at 0730. He was then tubed, no thanks to me, & vent through the whole infective Rx bit. He just wanted to make his 21st birthday, I nearly stopped him.

I decided to do my care conference on my poor understanding of the importance of CO_2 measurements & what the disease was. I also needed to know as I had just had a nephew diagnosed with the disease.

This example of learning from mistakes reflected the impact the Nurse's clinical decisions can have on both the patient and the Nurse. Although the event had occurred many years earlier, Jill was still very sensitive about her experience.

Discussion

Once the Nurse had received the handover from Jill, routine blood samples were taken, including the gas at the beginning of the early shift at 7am. The gas could not be measured continuously, so Nurses had to decide when to take the measurement, based on observation, knowledge of the patient's condition and experience. Jill had decided to let the patient sleep overnight but she realised that not being able to convince the patient of the importance of using the Bipap and cough machine, and the consequences of not using them throughout the night, had a detrimental effect on her patient. Although patients could refuse treatment, their decision was expected to be an informed one. Jill's powers of persuasion based on knowledge and experience could have a positive or negative effect on the patient's outcome.

This example reflected the impact that learning by mistakes had on the Nurse and on her patient. Jill's account of this event reflected her desire to pass the information on so that others would not make the same mistake. The Nurse realised that not being able to convince the patient of the importance of using the Bipap and cough machine, and the consequences of not using them throughout the night reflected her lack of knowledge and powers of persuasion.

After this experience, Jill identified that she needed to learn more and worked out ways to achieve this. She had the courage to learn more about the disease and the treatment, and presented this to her colleagues for assessment as part of her learning experience in the Critical Care Course. The outcomes for her patient were more important to her than the consequences to herself, as a critical care student, of making such a potentially harmful decision in her nursing management. Despite her embarrassment in the presence of colleagues about allowing the patient to deteriorate, her greatest emphasis was on her awareness that the patient could have died.

Explanation of terminology and events

Muscular dystrophy is an incurable condition in which muscles, including those used in breathing, become weaker over time. Hence the person has increasing difficulty breathing deeply enough to take in adequate oxygen and eliminate carbon dioxide. The ability to cough strongly enough to remove mucous from the lungs also becomes more difficult.

The air in the lungs is exchanged at the smallest sacs at the end of the lungs' passages. There is the potential for the sacs and the narrower passages to collapse. 'Bipap' is a means of maintaining continual low pressure air or oxygen in the lungs, via a machine and a firm mask, to assist in preventing lungs from collapsing. 'Vent' meant commenced on mechanical ventilation to assist his breathing.

The patient described here had developed a chest infection and was producing large amounts of mucous that he needed to eliminate by coughing so that he could exchange oxygen and carbon dioxide as effectively as possible. The cough machine and a mask, which were used intermittently, alternated pressure and suction as the person breathed. This assisted in removing mucous from the lungs.

'A gas' was a blood test taken from a line inserted into an artery where it remained for several days and enabled measurement of the amount of oxygen and carbon dioxide in arterial blood. This could only be measured intermittently by taking blood samples from the line.

In Jill's example, the gas would have indicated that the carbon dioxide was high and should be reduced by encouraging the patient to breathe more deeply and frequently, and cough up the mucous.

The 'CO_2 levels' were the levels of carbon dioxide, a waste product in the arterial blood. High levels indicated that the person was not eliminating carbon dioxide by breathing deeply enough. The normal level of CO_2 in the arterial blood should read between 28-35 mmHg on a gas. In Jill's example, as the CO_2 was ↑90, it indicated that it was far too high and the patient was not eliminating carbon dioxide effectively.

'Sats' meant oxygen saturation level and indicated the amount of oxygen in the blood. The measurement was obtained by placing a probe on the patient's finger. This could be measured continuously. However, the level of oxygen did not necessarily reflect the level of carbon dioxide, so high levels of carbon dioxide would not be identified through the sats.

'Tubed' meant that the patient needed mechanical assistance with breathing on the ventilator to eliminate the carbon dioxide and to facilitate removal of the mucous. 'Infective Rx bit' in this example was the treatment required to overcome the patient's infection.
A 'care conference' was a presentation about a patient selected by the critical care student as part of their specialist nursing course in critical care.

3. Jill: patient-centred care, embedded in technology

Jill's second example reflected learning from experience and from trial-and-error. She described events that began many years earlier when she was a senior ward nurse in the high dependency unit.

> *Jill:* *Fix axiom drains which are not sumping. Many years surgical nursing & rewriting the procedure for hospital procedure manual & asking surgeons their rationale for switching from portex drains to axiom.*

> *They are very hard to get to sump properly if you don't understand the need for irrigation & suction & potential for adherence to axioms.*
>
> *Once you learn why they are used i.e. to prevent future abdominal adhesions as well as for drainage post op. it all becomes as clear as a bell!*

The ability to keep axiom drains sumping had been a substantial challenge to many nurses throughout the hospital. Jill believed that a nurse would persist with making it function correctly if the implications to the patient were understood.

Discussion

The Nurse in this narrative had mastered a skill that required patience and determination, as well as some knowledge of physics and the correct way the system should be functioning.

Jill was motivated by her understanding of the consequences to the patient if the internal surgical wound was not managed properly post-operatively. In this example, Jill articulated how she learnt this skill. She had to learn about it to write the procedure for the ward manual so that the information could be passed on to other nurses. She gained information by asking the surgeons their rationale for changing to this wound drainage system (axiom) and hence developed an understanding of the way the system should function. She had passed on the information to other nurses through the written protocol. As a colleague, I witnessed her willingness and skill in explaining to other nurses how to keep the system patent.

In this example, Jill described how a learning experience had led her to produce a protocol that was beneficial to the patient and useful for other nurses. She implied that knowing the reason for administering the treatment (*once you learn why*) and how it prevented complications facilitated understanding and compliance by the nurses in correctly managing the treatment (*it all becomes as clear as a bell*).

Explanation of terminology and events

An 'axiom drain' was a drain inserted during surgery, usually in the abdominal cavity. Following surgery, fluid and blood (haemo-serous fluid) accumulate and must be drained to prevent swelling and delayed healing.

Sterile irrigation fluid was allowed to flow into the site of the surgery via one port of the drain, to flush the tissue, and flow out via a larger central port. This process also prevented the tissue from adhering to the drains and causing damage to tissue when they were removed.

One tube was attached to the drain to let fluid in and another on low pressure suction was attached to the central port to let fluid out. There was also a port for air flow to reduce the potential for damage to the tissue from the suction.

'Sumping' meant low pressure suction to remove fluid rhythmically, a few millilitres at a time, sucking it into a tube attached to a drain hooked onto the bed. A 'portex drain' was a drain that allowed haemo-serous fluid to drain, but there was no capacity to flush the site with sterile fluid to minimise adhesions. Hence, axiom drains had been introduced, but with minimum education for nurses. Without irrigation, there was greater potential for tissues that should remain separate to stick together and cause later complications for the patient 'post op.', meaning after the operation.

If the sumping was not effective, the patient's dressing and bed become wet because either the fluid was leaking around the drain or through the wrong port instead of flowing through the central drain attached to the bag. The system had to be checked frequently, usually hourly, to ensure that the system was functioning correctly and the ports are not blocked. If it is not patent it is very uncomfortable for the patient and frustrating for the Nurse. Often, if the ports are leaking and the nurses are unable to solve the cause of the problem, they plug ports that should be open to the air.

4. Philippa: travelling story

Philippa, like Jill, was a senior Nurse who worked part-time in the Unit during this study. She was expected to manage complex patients, and undertake Team Leader and Shift Senior roles. Her part-time position made it difficult to keep up with changes but she was expected to do this somehow.

> *Philippa: Cheers.... Philippa Late shift.*
> *I observed the following 'Learning' experience.*
> *The Dr ordered Codine Phos inject^{n} for a patient – Shiley was SEN & Midge was pt care in Bay 2. Shiley walked from Bay11 → Bay2 to ask Midge why. The answer (according to Midge) was given & Shiley walked back to Bay 11 & told the nurse in the bay the answer, almost word for word. Everyone was happy with the answer & was accepted as "correct".*

Philippa's example was called the 'travelling story' because the Nurse who was seeking an answer for the person in Bay 2 walked from one end of the Unit, past Philippa (the story-teller), to the other end to get the information and returned to pass it on to the Nurse who needed to know.

Discussion

Midge was a full-time senior Nurse with the opportunity and experience to have some knowledge of most of the patients in the Unit. She was often Shift Senior, so would frequently attend medical rounds when the doctors discussed the patient's condition in detail and explored the plan of treatment for that patient. All the Nurses involved trusted that Midge knew the right reason for the medication order. A doctor would most likely have been available on a late shift, but the Team Leader elected to ask the experienced Nurse rather than seek out the doctor.

Collaborative learning processes and an assumption of the experienced Nurse's knowledge were reflected in this example. Based on this assumption, Midge's colleagues trusted her explanations and decisions. It was taken for granted that Midge had extensive knowledge and was a reliable source of information about the patients.

The quote 'ask someone who knows' was a continuing theme throughout the narratives of learning, as will be seen and discussed in more detail in the next chapter. This approach to learning was often the main source of information gained in a hurry by Nurses. They were reinforcing to themselves and each other that identifying and asking someone who will know was an essential, and therefore acceptable and appropriate way of learning in the Unit.

This example revealed the interactions that occurred between Nurses to gain information in the form of a physical performance as the central player moved back and forth across the stage to introduce the other players in the learning event. Philippa, the narrator, was not only an observer and a reporter of this performance, but she was also a learner. However, she was not in the performance itself. Those Nurses in the Unit who were aware of the interaction might also have been passive learners.

Explanation of terminology and events

The 'SEN' was the Critical Care Nurse who was the coordinator for the shift. 'Codine phos' was an analgesic ordered by the Dr (doctor) and could be given as an 'inject^{n}' (injection) for many reasons. For example, it can be administered to a person with head injury or potential respiratory depression, to a person who is allergic to other analgesics such as morphine, or to a person who has diarrhoea and is in need of pain relief. The 'bay' is the space for each individual patient and 'pt care' means that Midge was allocated to care for a patient on that shift.

The Nurse who asked Shiley the question and needed to know the answer for her patient was not named in Philippa's example. This may have been because Philippa had recently returned from maternity leave and may not have known her, especially if the Nurse was new to the Unit.

5. Karen: collaborative problem-solving

Karen had been part-time for many years due to family commitments. She usually had patient care but occasionally undertook the Team Leader role.

> *Karen:* *Informal / Incidental Research.*
> *I am a grade B Part time Nurse.*
> *Took place in the pts bay at handover time.*
> *I was unfamiliar with the mask CPAP mode on the new ventilator and needed the Nurse on the previous shift to show me how to use it.*
>
> *The learning experience occurred through necessity, because I needed to know how to give the patient CPAP if she asked for it (which she did late in the shift).*
>
> *While I was on my dinner break the patient tired and requested CPAP. The Nurse who was relieving me fumbled through and managed to work it out, with the help of a couple of other nurses. (Collaborative thoughts and trouble shooting)*
>
> *The Nurse relieving me was a grade A full time Nurse. The Nurse who initially handed over to me was a grade A full time Nurse who required help at the beginning of her shift with the CPAP on the ventilator also.*
>
> *The patient was anxious this may have increased her anxiety.*

Karen's example was chosen because it demonstrates the use of one-to-one handover in teaching information that may not be acquired by any other means. It revealed the strategies that the Nurses used to know the essentials for the shift. The example also highlighted an awareness of the pitfalls of passing information on from one to the other.

Discussion

This example showed how Nurses compensated for a lack of information about new equipment by acquiring such information when they needed to know it for the care of their patient. It demonstrated that the Nurses overcame such problems, seemingly as standard practice, by passing the information on from one to the other as best they could in a somewhat ad hoc manner, often at patient handover. It can be seen that all of the Nurses receiving the patient on each of the three shifts mentioned in Karen's

story were unfamiliar with the new ventilation mode and required guidance form the Nurse handing over. This indicated that Nurses were highly unlikely to gain access to familiarisation with new equipment prior to caring for people needing treatment with it.

Passing essential information on during handover failed when the Nurse who needed to administer the treatment was not the one who received handover. She had to compensate by finding out what to do from others, if possible, or by trial-and-error. In her description of this incident, Karen suggested that learning about how to use the new equipment was achieved successfully through *collaborative thoughts and trouble shooting*. She viewed this as a positive outcome, although she recognised that the patient was aware that the Nurses were trying to work out how to use the equipment.

Karen acknowledged the potential for an already anxious patient to become more distressed, although it would appear that generally the Nurses seemed unembarrassed about the perceptions of patients/relatives when they were asking each other for advice. They were concerned about the patient's safety; therefore obtaining the knowledge by asking each other was the quickest means. The Nurses reflected on the impact on the patient only after the problem was resolved. On occasions patients and sometimes relatives expressed concern that the Nurses had to ask each other about procedures and equipment. This example illustrated how Nurses did what they were able to do to ensure that the patients had limited complications.

Explanation of terminology and events

Mask CPAP mode was a configuration on a mechanical ventilator which, in conjunction with a firmly sealed face mask, provided continuous positive airway pressure to enable more effective breathing and minimise lung collapse. The Nurses using the new ventilator needed to know how to correctly attach and fit the tubing and mask, and a sequence of commands to change the mode.

The roles of Nurses at various grades have been described in Chapter One. Handover time was the period when there was an overlap between the end of one nursing shift and the commencement of another. During the shift a Team Leader arranged Nurses' dinner breaks in pairs so that Nurses next to each other were watching two patients while one Nurse was at the meal break. The Nurses handed over the information they thought the relieving Nurse needed for the period of the meal break. In this instance, even though the use of the new equipment had been explained to the Nurse allocated to the patient, she did not expect the patient to need the CPAP while she was on her meal break.

Conclusion

In this chapter, the complexity of nursing critically ill patients while dealing with rapidly changing technology and procedures, and learning and building their knowledge has been revealed through individual Nurses' stories. Each story has shown the multiple facets of learning and the influences on it that are at play in any nursing event.

Some Nurses were able to articulate their practice and their reasons for decisions, and passed these on to their peers and others in a clear, concise manner. They were able to make explicit their tacit knowledge and the reasons for their choices and actions. Their practice evolved through experience, critical thinking and problem solving. This demonstrated how Nurses used anecdotes and critical events of their own or others' experiences to teach in the workplace and to prevent a reoccurrence of a similar problem.

These examples have revealed the way Nurses learn informally and the circumstances that place them in this mode of learning in the workplace. Learning from colleagues by seeking out 'the one who would know', by asking the expert, and through collaborative exchange of ideas emerged as the most prevalent and effective means of gaining essential information, and Nurses made the time to assist each other in working out problems together. The examples have illustrated how the Nurses learn from their observations, mistakes or critical reflections, and have highlighted the importance of mastering technology efficiently to enable the provision of essential individual clinical care to keep the patient safe from harm. The explanations have revealed the extensive knowledge the Nurses need to manage their patients.

The Nurses shared information about events that had such an impact on them that they motivated them to acquire the knowledge they needed to fill gaps in their learning and thus become more effective practitioners. They were aware of the impact on the patients and themselves when they needed to learn urgently.

Patient safety depended on the Nurses having the relevant knowledge when it was needed and knowing enough to make the right decisions at the right time. Barriers to learning became visible when all the Nurses who could be caring for a patient did not have adequate information, including any not in the communication loop but who became the person who needed to administer the treatment. Those who were out of the learning loop when they needed to know amalgamated their collective knowledge to troubleshoot the problems together to meet the patient's needs.

The essential information the Nurses needed to care for individual patients during the shift was most likely to be gained during bedside handover. This information was usually only conveyed to the Nurse allocated to the patient and passed on to others as deemed necessary by the patient care Nurse. The Nurses taught informally by passing on new information during handover or by writing protocols that became available to others.

Through an individual choice to engage with learning opportunities by producing protocols, Nurses furthered their own learning and shared their knowledge with colleagues, thus minimising the likelihood of mistakes.

The next two chapters make sense of the learning and scaffolding nursing knowledge in the workplace using categorisation as a method of analysis. This provides a collective analysis of learning, which reveals the social context of the Nurses' learning, with the social pressures and changes that occurred as they were learning. Sections of the five workplace examples presented in this chapter will be included in Chapters Six and Seven where they confirm findings from the analysis of the whole collection of narratives. The examples of nursing and learning did not occur as disjointed interventions but as a flow of ongoing nursing process in which categories of factors influencing learning were entwined throughout each shift. The Nurses' descriptions revealed the complexity of nursing in critical care.

Chapter Six

Critical Care Nurses Explore Learning and Teaching

The next two chapters continue the exploration of Critical Care Nurses' understandings of learning and teaching in the workplace, which was begun in Chapter Five. They discuss the themes that emerged from the analysis, through categorisation of topics, of data gathered from focus groups, written examples and interviews with the Nurses. In the first focus group, informal learning in the Unit was discussed and the participants expressed an interest in writing about their learning experiences. Their discrete stories contained multiple examples of the ways knowledge was shared and revealed the impact of the workplace environment on the Nurses' opportunities to learn. Seven themes of learning in the critical care environment emerged from analysis undertaken in accordance with the method described in Chapter Four: 1) types of learning; 2) teaching and learning through teaching; 3) individual engagement with learning; 4) position and gender; 5) position, power and workflows; 6) threats to patient safety/patient care; and 7) changing and complex technology and procedures.

This chapter focuses on the first three themes, highlighting the positive aspects of teaching and learning. Chapter Seven discusses the remaining four themes, identifying how the participants responded to more challenging situations. The material presented in both chapters highlights the unique ways in which the Nurses learnt in the workplace, and reveals the richness and depth of their stories, including their humour and tension.

Theme 1: Types of learning

Learning from colleagues

When the participants referred to 'colleagues' they were referring specifically to Nurses. Only one Nurse included doctors, other nurses and physiotherapists as colleagues in her narrative. The Nurses learnt in pairs or groups to gain information

that was either new to them or had not been encountered recently, and thus needed to be revised. The information Nurses sought was usually related to the clinical care they needed to initiate at the time. In their examples, the Nurses wrote and talked in the focus group about being *shown, listening, asking their colleague* and *stories from the tea room.*

There was often urgency in the need to learn procedures that might be unfamiliar even to experienced Nurses, such as the management of new equipment. They *ask some one if it's urgent*, because it is *easier to ask someone*. Nurses spoke of *looking for those who will know, looking for the one who has the experience, ask around the Unit who knows*, and *identify nurse 'expert'*.

Even if it were not an emergency, gaining information as quickly and efficiently as possible freed the Nurses for other nursing care. They often sought advice from a colleague in preference to reading written sources of information such as the manual about the equipment, the procedure guidelines manual, textbooks or the intra/internet. Although the answers to some problems with equipment were in the manuals, the Nurses still most often sought out someone who might know where to find the answer. They also revealed that direction to the information needed was not necessarily clear in the manual's index, and colleagues were likely to explain the solution more clearly than the manual.

Knowing it is available and knowing where to find it

In their stories about learning, the Nurses often reported finding out from colleagues about information that they did not know was available. Their examples included information about the use of the hospital patient administration program on the intranet and the location of information about accommodation for relatives. Lack of knowledge about these elusive and rarely used pieces of information could be time consuming and frustrating. These details seemed not to have a place in the introduction to the Critical Care Unit. One regular source of information aimed at bridging the gaps in recent changes in the Unit was the Communication folder. On return from leave, one senior Nurse, Philippa, found it to be a more *valuable source*

of knowledge than her colleagues, who were unclear about specific changes that had occurred during that period.

Collaboration in learning

In describing experiences of learning in their written examples, Gerri wrote of *collaboration with colleagues* and Karen referred to *collaborative thoughts*. In this example, 'collaboration' implied the sharing of knowledge between people who were specialists in different fields. In the context of this study, Nurses wrote and talked about collaboration as sharing knowledge and ideas to learn from each other and to solve problems. Most of this collaboration was not intentional structuring of the learning experience. Instead, it was opportunistic, as those Nurses with additional knowledge in a particular aspect of critical care were not always available on every shift.

As this was a general critical care unit, there were multiple types of injuries, diseases and conditions, and Nurses were likely to encounter any of these on any shift. Therefore, they must know about them all, the associated nursing practice and technology, and individual patient progress. However, they acknowledged that it was not possible to have such a breadth of knowledge. The important thing was to know where to obtain the information when needed, and the Nurses indicated that the quickest means was by seeking out another Nurse for advice or support, or by being offered guidance by a colleague. The Nurses might be novices in some skills and knowledge, but have expertise in others. Collaboration in sharing their knowledge assisted them in bridging the gaps.

Knowing who knows

The Nurses had varying levels of experience in the care of people with a variety of disorders and with specific procedures, and had worked varying lengths of time within critical care. As well as having different levels of experience, the Nurses had different levels of knowledge. Some might have undertaken a critical care course and participated in workshops that enabled them to progress to higher levels of responsibility within the Unit. Nurses who had been in the Unit or who had worked in other critical care units for the same length of time were likely to have different

experiences and different levels of responsibility. A part-time Nurse might have years of previous experience at the senior level and maintain her/his expertise, yet this part-time senior Nurse was likely to be less aware of a patient's progress than a senior who was full-time and attending rounds, or a junior who had frequent contact with a particular patient. In the focus group, it was observed that not all Nurses were aware of the junior Nurse's comparative experience with some equipment.

Amelia: *And do you find that ... though the machine's brand new (general laughter) because you've been in the Unit longer, you'll know the answer? (general laughter)*

Elan: *Yeah. Even though you've never used it! (general laughter)*

(Focus Group One)

This interaction showed that some Nurses would assume a senior Nurse must know the new equipment, based on seniority. The laughter, however, could indicate that Nurses in the focus group were conscious that some senior Nurses were less knowledgeable than junior Nurses, and saw the absurdity of senior Nurses not being able to keep up with the changes and new equipment in the Unit. In an environment where it was not possible for each individual to have education on each new piece of equipment or each new procedure, the most knowledgeable and skilled were those who had encountered the latest changes in nursing care. Hence, the concept of junior Nurses being the resource for specific skills and knowledge of equipment in nursing care became an accepted part of the Unit's culture.

Nurses relied on colleagues as an easily accessible source and were aware that the one with the pertinent information might or might not be the senior. They became aware of each other's experience and knowledge, and evaluated the accuracy of the information or advice from any Nurse on the shift, based on their knowledge of the Nurse's recent experience. They also sought advice from colleagues they felt were not only the most knowledgeable, but also the most accessible and approachable.

Anne-Marie: *I took the opportunity to stay with Heather and help out /learn more about the balloon pump her patient had insitu.*

Heather also had a handout about the IABP which was interesting ... very 'user-friendly language'.

The balloon pump is a device that can be used for a limited time to enhance the heart's function. Anne-Marie had had less time in the Unit than Heather, and was aware of Heather's comparative familiarity with caring for patients with a balloon pump. Anne-Marie was keen to learn, and Heather was willing to share her knowledge and expertise. Heather had a special interest in the balloon pump (IABP) such that she had produced a handout on the management of patients who were dependent on this equipment. In doing so she became more knowledgeable about the device and the medical conditions leading to its use, and shared her knowledge with her colleagues. These responses seem to affirm the concept that effective learning is achieved when there is a correlation between the values and social understandings of the learner and the knowledge that is afforded in the workplace (Billett, 2001a; Bloomer & Hodkinson, 2000; Daley, 2001). In this example, Anne-Marie actively took advantage of a learning opportunity and sought a colleague who was able to provide guidance to meet her learning needs.

Gaining access to information and support

In an emergency, some Nurses were able to effectively gain access to learning through assistance or advice. The urgency might be in terms of a procedure that must be undertaken within minutes or might become a first priority for a treatment that must be administered as soon as possible. They asked for assistance from the person they had found to be approachable and helpful. Those who had attained some skill with a procedure assisted Nurses who were not familiar with it, as shown in Gerri's example.

> *Gerri:* *Critically ill patient – requiring urgent treatment. Dialysis needed to be set up and administered rapidly. I had not performed this procedure before... Information was gained from collaboration with colleagues and by following the prompts in equipment manual and software in the machine. The situation was critical and the need to learn urgent. Procedure was completed successfully.*

Gerri identified the strategies she used to overcome her limited knowledge of the procedure needed to achieve a positive outcome. This was one of many examples the Nurses provided about learning experiences with patients who were having continuous renal dialysis via a relatively new dialysis machine.

Gerri was senior in the Unit, so was allocated a critically ill patient due to the complexity of the nursing care that would be needed. Although she was experienced in managing patients undergoing continuous renal dialysis, she was not familiar with the new dialysis machine. However, she was well enough established in the Unit to be vocal about her limited knowledge of the equipment and was effective in quickly gaining support from colleagues. Not all Nurses were able to access support as effectively as Gerri for many reasons, including those discussed in the next section on knowledge gaps.

Explanation of terminology and events

'Dialysis' is a term used by the Nurses for renal dialysis or dialysis of the kidneys. It is a treatment in which a machine and intravenous lines are used to separate waste products produced in the body. The system continuously cycles fluid through the patient's blood vessels to intravenous lines and through a filter. Waste products produced by the body are separated through the filter and flow to a drainage bag. The filtered fluid returns to the patient's body, thus replacing the function of the patient's damaged kidneys. Continuous maintenance of dialysis is time consuming as the machines are sensitive to pressures and air bubbles set off alarms, thus causing frequent stoppages. If the flow stops for several minutes, the blood in the lines will clot and all the lines must be changed. The changes in fluids and electrolytes can cause instability in the patient's condition, therefore the Nurse is constantly assessing the patient's blood pressure and frequently assessing fluid input and output, electrolyte balance and blood clotting times.

Identifying the knowledge gaps/inadequate skill mix/not knowing what is not known

Some Nurses were less well supported, less confident about asking for assistance or unaware of omissions in their nursing care. Gaining assistance depended on their co-workers' willingness to assist. Consequently, identification of deficiencies in new Nurses' knowledge and nursing care by experienced colleagues was likely to be delayed. The Nurses who had less access to support were more likely to learn from omissions picked up by colleagues. This depended on whether they received feedback on the problems, which included explanations of the appropriate nursing actions that should have been implemented. The Nurses in the focus groups

identified the role of *learning from others' mistakes and your own* in avoiding repeated errors that have a potentially detrimental effect on a patient.

Bev, a senior Nurse, received handover of her patient after an allocation change had been made at 1535 pm when the Nurse on the previous shift should have been leaving. Bev reported that she received a good handover but after the Nurse left, she found many crucial omissions in the nursing actions that should have been completed for the patient. A contributor to the series of omissions was that the patient had been transferred to different locations in the Unit three times over eleven hours, which emphasised the complexity of moving patients within the Unit. These omissions included alarms, humidifiers, wave forms not set since the last move, blood tests not taken and the bay not set up for precautions against spread of the infection. Also, the medications had not been ordered since the patient's admission at 4am. Bev described her actions as follows:

> *2nd Day. Follow up with GNP (fairly new to Unit) seemed a little unaware as these pts [patients] are usually "set up" I asked who had helped her.*
>
> *3rd Day. Follow up spoke with one of the TLs who had in fact helped (fairly new TL) but was unaware of the GNP's 'newness' and that the patient had not been connected.*
>
> *4th Day. Asked GNP's preceptor & informed her of what happened for follow up.*
>
> *7th Day. Saw GNP now seems more aware of connecting patients.*

Nurses in their first year as a Registered Nurse undertake a Graduate Nurse Program and are called GNPs. TLs are Team Leaders and assist other Nurses with patients. The Nurses in this example did not know that they did not have the knowledge, so did not know to ask questions. Problems arose because both Nurses were inexperienced in the level at which they were working and were faced with a new event. They were not aware of each other's limited experience and therefore did not know of the need to gain access and support from colleagues. When Bev became aware of the situation she identified causes of the problems and worked out ways of preventing a recurrence. This was achieved by explaining to the Nurses the actions that they should have taken and by advising the new Nurse's preceptor to follow up on her subsequent progress, thus ensuring adequate support in the future.

This example demonstrates that affordances for learning can only be achieved in the workplace if the bases for participation are understood. This further supports Billett's (2001a: 212) statement that 'the kinds of opportunities provided for learners will be important for the quality of learning that transpires'. In this example, the opportunity for learning was afforded by Bev who seized the teachable moment with each person involved to extend their understanding of the patient's needs in a chaotic situation.

The roles of the key team members were structured so that experienced Nurses, who were allocated as Team Leader or Shift Senior, assisted Nurses on patient care with any procedures requiring more than one Nurse. This increased the possibility that the experienced Nurses would recognise changes in the patient's condition, and omissions or errors that the inexperienced Nurse had not identified. It was also an opportunity in a cluttered environment to learn effective patient care from role models and to ask questions. The patient care Nurse was likely to be more familiar with the patient's recent progress than the Team Leader or Shift Senior, so knowledge was shared. In Bev's example, the structure was ineffective because both Nurses were new to their role, and thus were less likely to know who was knowledgeable, approachable and accessible. Also, a new Team Leader might be reluctant to reveal a lack of knowledge or an inability to keep up with the pace when she/he had stepped up to a new role with greater responsibility and was keen to appear competent.

Experts

The Nurses referred to 'experts' as those who had expertise or some knowledge in an aspect of care or management of equipment. The Nurses were frequently confronted with new equipment and procedures, and took notice of, or asked advice from who was with the patient most recently, or who might be familiar with the relevant procedure. When they needed to know, they asked at handover or at any time during the shift. The person who was asked might be the Nurse in an adjacent bay, the Team Leader, the senior or a colleague on the shift who was believed to have the knowledge. This person might be physically sought out by the Nurse who needed the information. If necessary, Nurses used a series of colleagues to gain information. In

some instances, depending on the skill mix on the shift, the extent of the experience may have been limited, as seen in both the written examples and the focus group.

Dave, Team Leader:
Use the Kimal™ once and you're the expert.

The only thing I know about the Kimal™ is I've made every single mistake I could possibly make – I spent three hours, getting it right.

Elan: *See you're a good resource person then (general laughter).*

Dave: *That's what happens. I set the Kimal™ up once, and get it on the patient, the next thing you know, you're an expert.*

Elan: *Yep (general laughter).*

Dave: *And I did it once.*

Fran: *And rather than go to the manual and wade through stuff, if you go and ask a specific question and they'll say turn to page four.*

Elan: *Oh yes, I've had that and you can go straight and get the answer that you want straight away without leafing through indices.*

(Focus Group One)

The laughter in the focus group during their conversation reflected the absurdity and tension around the way Nurses gained information, while recognising it as an effective means and often the only way to learn. The expert could be a junior Nurse who had cared for a patient with the new equipment on a previous shift. However, there were varying levels of awareness about the accuracy of the information that was passed on. During a discussion about shift-to-shift bedside handover, focus group members referred to the exchange of teaching and learning that they saw as inherent in this type of interaction between Nurses. However, they also recognised the disadvantages that surrounded sharing such information, as reflected in comments from Focus Group One, such as: *doesn't reach everyone*; *possibly inaccurate;* and *wrong things* [can be] *passed on for days.*

Seeking out the expert

The Nurses were aware that they needed to be selective about who they would ask for advice.

> *Amelia:* *I think though ... That with the informal learning, that you will ask people that you're familiar with and compatible with and think that ...*
>
> *Brenda:* *That's true.*
>
> *Amelia:* *And are nice to you? (general laughter)*
>
> *Cal:* *Yeah and you feel comfortable with and you feel comfortable asking a question.*
>
> (Focus Group One)

These responses demonstrated that in addition to needing information, the Nurses were also negotiating the path towards acquiring help or advice. They worked out who in the Unit was likely and able to provide the support with the least discomfort to them as learners.

> *Donna:* *Historically in nursing we informally tend to pass things on and learn in that manner. Because it is something that is, I think, fairly unique to nursing. Because nursing ... has always been so practically orientated. So much of what you learn you have to do and you have to see ... I don't know ... I'd hazard that because that stuff you learn informally is retained better. You remember the specific situation and the specific person, the specific patient and what you did wrong, what they did wrong ... and you learnt so I think it's fairly unique to nursing.*
>
> *Hal:* *And you'll never get rid of it so you might as well make it effective.*

By being selective, the learner is seeking to engage with a senior Nurse who shares seemingly similar interests, values and beliefs (Billett, 2002 b: 464). In her study of novice carers in an aged care facility, Somerville (2003b) revealed the influence of the carer's subjectivity on her workplace and on the transformation of the carer's subjectivity in response to the other workers in the environment.

The novice was selective about the type of care that she wanted to provide. Her engagement with learning, and remaining in the workplace, depended on her opportunities to learn from, and work with role models with shared understandings (Billett & Somerville, 2004). This inter-subjectivity, as described by Billett (2002b:

465), was seen in the context of this study as enabling learning between Nurses through shared understandings and meeting workplace standards. However, the learner decided the extent to which there was engagement with learning and participation in the workplace (Billett, 2002 b: 466; Boud & Solomon, 2003).

When Nurses were not able to find someone approachable who was likely to know the answer, it was more difficult to gain the information they needed. They were faced with the decision to work out the problem themselves, avoid the problem or ask someone who was less compatible. Choosing the expert depended on identifying who had the knowledge, who was approachable and who was accessible. By choosing to work out the problems alone, they might find that they were learning from mistakes.

Learning from mistakes

When Ronda described the ways in which she learned to prepare for retrievals, she included formal processes such as *workshops* and *equipment placement* as well as *speaking to others* and *making mistakes*. In her example, she reflected on the reasons for the mistakes and on the actions she subsequently took routinely to avoid a recurrence. Her examples of errors related to inadequate restocking of supplies or vital pieces of equipment, and delays in administering medications quickly. Ronda compensated by checking that certain vital supplies and equipment were restocked, and by preparing in advance those medications that she judged were most likely to be used in each specific situation.

> *Ronda: When others made mistakes I took note of what they were, remembered and adjusted my preparation accordingly.*

Such responses were not only possible, but seen to be acceptable in an environment where Nurses were open to discussions about problems they encountered and were seeking advice on ways to avoid future problems. Ronda was able to create her own opportunities for learning, and learnt from others' mistakes, because there was a culture amongst the Nurses of sharing stories about problems they had encountered and how they managed.

Handover at the bedside

The handover process at the bedside intertwined the learning and teaching between colleagues. The use of equipment was explained and shown by one Nurse to another at the bedside. Heather reported learning about the renal dialysis machine during handover, adding that she learnt most about that piece of equipment *bit by bit* from colleagues. On another occasion she reported learning about a new attachment to the mechanical ventilator during handover. As explained in the previous chapter, Karen's ability to manage new respiratory equipment depended on the direction and explanation she received during handover from the Nurse on the previous shift.

The Nurses talked not only about learning during handover, but also getting to know the patient's situation.

> *Jessy:* *When you're getting handover you're assessing the patient's situation. You're learning conclusions that the previous person drew from a particular situation.*
>
> *Kay:* *Yeah*
>
> *Jessy:* *[H]e dropped his blood pressure and I thought he needed that, that and that so you learn from that situation.*
>
> (Focus Group One)

Although the Nurse receiving handover knew about managing complications in general, the information given in the example above ensured that the Nurse was prepared for any specific change in the patient. Such handovers ensured that a Nurse was more likely to understand the patient's condition and was aware of the treatment that had been effective previously. However, the Nurses were aware of the potential pitfalls of bedside handover.

> *Lil:* *Something gets passed on for days and not acted upon or the patient's condition might actually change but what we keep telling each other is what we keep doing. The same things.*
>
> (Focus Group One)

When information is passed on one-to-one, the Nurse receiving the information must rely to some extent on the accuracy of the information. The advantage of the bedside handover was that the Nurse was looking at the patient as the information was given, and was able to visibly check the medical orders and the drains and lines, as well as

observe the patient's appearance. In this situation there was an immediacy of knowledge-sharing when the Nurse was able to assess and ask questions at the time.

Global handover

Another means of confirming accuracy was in global handover. In the Unit, global handover was traditionally referred to as 'big' or 'full' handover. There was discussion in the focus groups about reinstating full handover as it was considered to be a valuable learning opportunity. At the time of the study, the full handover rarely included all Nurses coming on shift because the shifts commenced at variable times. Hence, the global handover consisted of the oncoming and out-going Shift Seniors, and the oncoming Team Leaders. The handover was referred to as 'global' because all the patients in the Unit were handed over to the oncoming senior and Team Leaders.

The Nurses allocated to patient care would attend the handover for the opportunity to learn about patient treatments and conditions in conjunction with the X-Rays that were viewed during the handover. The comments made by the doctors during the medical round were more likely to be reported by the Shift Senior, who attended the medical round, than between the Nurses at the bedside. In the focus group it was also suggested that Nurses attending big handover were likely to hear about patients they would be nursing in a few days.

Nurses who were ending their shift might encourage the oncoming Nurse to attend.

Mary: *Well you're free ... everything's done in this bay, go out and have a listen, you'll learn a lot.*

(Focus Group Two)

Nell: *Often people could best benefit from listening to a proper big handover. Don't often get the opportunity to go out there.*

(Focus Group One)

Attendance of most Nurses at big handover, although considered to be a valuable learning opportunity, was only an option if there was a quiet moment. However, the Nurses acknowledged that the content was variable and not all Nurses needed to know confidential information about patients they might not be nursing. Learning

was achieved by sharing ideas or by teaching something new to a colleague while learning how to pass on the information, hence confirming and embedding one's own knowledge.

Theme 2: Teaching and learning through teaching

Teaching and learning between Nurses in the Unit overlapped and was shared. It was not unusual for Nurses to be in a teaching and nursing role concurrently, or to be moving between these roles shift by shift or during a shift. In this section the Nurses who undertook this role intermittently have been referred to as 'teachers'. In their written examples, the Nurses did not tend to refer to themselves as teachers but talked in the focus groups about teaching. They set the scene by using phrases such as *teaching in equipment* or *working with* [a new Nurse] *at the bedside.* This theme covers the stories that Nurses have written about their teaching experiences.

Teaching and learning

When the Nurses were teaching they would *pass on* information by *describing* or *showing* others how to perform the task. Bev reported describing a new process to a Nurse who then tried it. Bev had passed on this information without practising it herself first. However, she was motivated to learn the new procedure because, as she explained in her example, there had been inconsistent blood results and the cause had been identified, so the new system of taking blood would eliminate the problem. To Bev, the other Nurses should have been motivated to learn the new technique because the reason for needing to change was sound and had been made clear to the learners.

> *Bev:* *Even though I still have not had to use this system I was able to pass on the information successfully. Will be using the process myself tonight.*

This was an illustration of Bev as teacher blending into the role of learner. Bev reflected the ability of experienced Nurses to move between roles without apparent tension.

Shaz described learning from mistakes and problem solving while teaching the equipment placement to colleagues.

> *Shaz:* *[T]hey picked something up I probably wouldn't have noticed – inspirational / exp elbows in wrong positions ... valuable lesson that I should check these more thoroughly ... teaching always gives you back a learning experience!*

Shaz recognised that the connections on the tubing circuit of the mechanical ventilator were incorrect. While demonstrating changing the circuit, Shaz reported taking five minutes to work out the reason for the problem that had been identified by the students. Prior to encountering a circuit that was reassembled incorrectly, she was unaware that the connections were different. She described this experience as a valuable lesson gained through teaching in a workshop.

Pre-planned teaching sessions in groups

Some examples that the Nurses described related specifically to their experiences of pre-planned teaching sessions associated with orientation of new staff, teaching in workshops with Nurses who were learning new roles or with students in a critical care course. The sessions were either one-to-one at the bedside for the day or with small groups of four to six Nurses for a few hours or a full day. Sue described her experiences of teaching the full orientation, which began with two to three days of classroom and equipment room sessions.

> Sue: [Clinical Nurse Consultant] *has orientation power point presentations already prepared. It gives a great deal of info. & ensures everything is covered.*

The Clinical Nurse Consultant who was the most senior Nurse in the Unit usually taught the first two to three days of new Nurses' orientation. Hence, he prepared the content in electronic form for teaching these sessions and made it available to Sue or any one else taking the orientation. This saved preparation time for the teachers and helped to ensure that the content was covered consistently.

However, success in teaching with set content depended on the students' prior knowledge and the teacher's ability to recall information and, at times, the basic knowledge. Ronda described her experience teaching critical care students, in the

late stages of their course, who had limited prior knowledge to learn advanced analysis of cardiac rhythms in preparation for their practical assessment. She used abbreviations in this example that are familiar to Nurses and to the critical care nursing students ('ECG' is an electrocardiograph that shows a trace of the shape, size, rate and rhythm of the heart, 'MI' is myocardial infarction or heart attack, and the cardiac unit is referred to as 'CIC').

> *Ronda: Most of them still can't read a basic ECG & some are still having problems with stuff more basic than this. I know some bits about ECGs ie basic MIs, what's abnormal etc. but I will have to go and get a lot from CIC & learn what I have forgotten & then explain / teach as I go. This shouldn't be a problem but I should do some more reading before I start, however there is no personal time available & certainly no spare minutes at work.*

It was essential that Ronda researched the topic to teach these sessions but allowance was not made for preparation, so she revised and prepared in her own time. Such problems were recognised in other workplace studies (Billett, 2001a; Dymock, 1999). Billett (2001a: 212) argued that 'the mentoring process is unlikely to be fulfilled without careful scene setting and thorough preparation'. This is essential for the worker to be afforded the best opportunities for learning. However, if the learners' capacity and the way in which they are able to engage in learning was not fully understood by those providing the support, the potential for learning would be limited. Ronda's example identified clearly the challenges she confronted when she was required to teach.

The teachers also followed up on, and reported that they felt responsible for their students' progress. However, they acknowledged that the individual's ability and willingness to learn affected the outcome.

> *Ronda: I also can't help feeling a little responsible for some of the students' lack of progress. I know you can't make people learn, but this doesn't stop the guilt.*

The teacher's sense of responsibility towards the students was reflected in Ronda's additional preparation time after hours in order to meet the needs of students who had limited prior knowledge. This demonstrated the commitment of many Nurses who chose to participate in teaching students in the Unit. For such Nurses, whose

usual role was clinical and not teaching, there was no prior time allocated during working hours to revise their knowledge in preparation for their teaching sessions.

The teachers also kept track of their students' progress, as illustrated by Sue.

> *Sue:* *... follow up to see how they are going. Even though Kristy will be in a CN group, she knows she can always approach me.*

All Nurses in the Unit were placed in a group with one of five Clinical Nurses (CNs) who had the role of guiding the development of each person in their group and providing annual reports on each one. Each of the five Clinical Nurses had up to twenty-five Nurses in their group at the time of this study, but were not allocated additional time to undertake these responsibilities.

These examples show that the Nurses had limited time to prepare and teach. However, they developed strategies to be adequately prepared in accordance with their students' skill level and knowledge.

Assessing prior knowledge and scaffolding

The teachers determined the new Nurse's prior knowledge early in the session and used this as a base to build on. The aim was to adjust their level of teaching to meet the needs of the majority in the group. In her example of teaching a beginning Nurse (Kristy) one-to-one at the bedside, Sue was aware that Kristy was on the last day of her orientation to the Unit and had previously worked on a surgical ward. Sue also knew that a colleague had shown Kristy the newest ventilator the day before, so she only needed to explain the difference between that and the old ventilator, which was being used for their patient. The rapid development of technology meant that equipment was frequently updated. Consequently, scaffolding was common in the Unit as different models and makes of equipment, serving the same purpose, were being used concurrently. Effective scaffolding requires teachers to have an accurate understanding of the learner's skill and knowledge, as well as the complexity of the procedure to be learnt or the problem to be solved (Billett, 1994b; Harris & Simons, 2001). The Nurses learnt the basics of the equipment and procedures, and built on their knowledge of the differences.

Sue reflected on the process of orientation and commented on reasons for the apparent outcomes for Kristy as a new Nurse.

> Sue: *This day was made easier due to good orientation with Noelene the day before & Kristy being a person who picks things up quickly and retains them well from what I've discovered.*

She recognised the ability of the new Nurse and acknowledged the contribution of her colleague who had taught Kristy the day before. The success of Kristy's orientation showed that effective learning for new staff depended on a combination of factors.

Teaching one-to-one at the bedside

When new Nurses in critical care begin, there is a period of orientation in which they work with a teacher for one or two days at the bedside before being allocated their own patient. Teachers wrote about their experience of learning how to share information and how to survive while assuming the dual roles of teaching and caring for their patients. Sue recognised that it was difficult to maintain control of her day.

> *Sue:* *I always feel disorganised on the days I orientated someone. As my usual routine of bloods, check my drugs then full assessment is delayed. Not a major problem today as the patient acuity was low-moderate. New staff must have the opportunity [to] do what you teach them so it takes longer.*

Sue described earlier how she had taken the time to allow the new Nurse to take the routine morning blood samples and had explained more about the different techniques. She had also encouraged a new Nurse to undertake a procedure in the way she had been shown by another Nurse the previous day, as she believed there were many ways to perform certain procedures and did not want to confuse the learner.

The teachers emphasised the importance of practice for beginners in critical care nursing. Their acknowledgement that students needed time to practise the nursing care and procedures meant the processes took longer than if the teachers were

nursing the patient alone. The teachers were prepared to *explain problems* and provide methods for resolving them.

These reported experiences build on Billett's (2002b: 461) findings that the practice of routine work enabled the beginner to reinforce and refine procedures such that they became automated and no longer required conscious thought. Learning routine work correctly is important for building on knowledge and engaging in novel tasks (Berggren & Severinsson, 2003; Harris & Simons, 2001). It frees the learner to engage in forward planning and learn the more complex processes of their work. They are able to achieve this 'through the process of applying existing knowledge to the task and learning about the limits to, and extension of the application of that knowledge' (Billett, 2002 b: 461). The Nurses hone skills that become embodied so they can redirect their thinking to the patient's holistic care. They are able to concentrate on anticipating their patient's needs and on the potential for the patient's condition to change.

Teachers often chose to take opposite meal breaks from both the student and the Nurse in the adjacent bay, who would normally relieve for meals. This allowed the student to have some independence without compromising the patient. Sue recognised that the new Nurse in her example *used her initiative to do things that ... we do routinely* so she did not have to find the time to reinforce it with her. Kristy was reinforcing her new knowledge by practising. Hence, building on the beginner's knowledge rather than revising, being aware of the clinical care beginners can undertake fluently and having the new Nurse immediately available for procedures requiring two Nurses can sometimes compensate for the time taken in teaching and practising. When the student went for a meal break, the teachers had a rest from talking and explaining. They were able to catch up on work if they were behind and able to check that they had not missed anything.

Additional demands on the teachers

The Nurses who had the knowledge and experience to be teaching one-to-one at the bedside while caring for their patient were also seen as advisors by other Nurses on the shift.

Sue: *[O]ther staff often will still be asking for help, suggestions or information so other informal learning / teaching happens at the same time.*

Sue was at the bedside and visible to other colleagues. Although they could see that she was teaching another new Nurse, she was easily accessible, knowledgeable and approachable for those colleagues who sought her advice on other matters such as patient care or managing equipment. This added to the complexity of Sue's role as teacher and reflected the expectations Nurses placed on those colleagues who were viewed as having the knowledge. Seeking information from others, sharing knowledge and teaching others were all ways of engaging in learning.

Theme 3: Individual engagement with learning

Engagement with learning was a unique experience for each individual involved in the process. Nurses who were able to gain access to information and support urgently reported successful outcomes of events in their clinical practice. They readily shared and described the approaches they used to learn with, and from their colleagues. Nurses who were well established in the Unit had confidence in being vocal about their limited knowledge in specific areas and were usually effective in quickly gaining colleagues' support.

Heather: *While having handover ... I, the learner, was taught by my colleague of similar experience. The Unit was busy č [with] 22 patients, however we were both on patient care. My knowledge of the Kimal™ is very poor.*

These two Nurses each had a patient in adjacent bays. Heather's patient was having continuous renal dialysis and her colleague, Anita, was willing to share her knowledge and time. It was common for the Nurses to openly share the information needed to care for the patient appropriately without concern that others would be made aware of their limited knowledge. On the day to which Heather referred in the above comment, there were twenty-two patients for the fifteen-bed Unit, so some patients were in the Overflow Unit. It would have been unlikely that a Team Leader could have assisted Heather with the dialysis on such a busy day.

Not all Nurses were able to access support as effectively as Heather. Newer Nurses might not be aware of the expertise of other Nurses in close proximity. Some Nurses might have been reluctant to admit that they did not know, and hence worried alone and did not take prompt action. Their lack of agentic action had an impact on the effectiveness of learning from colleagues. An example described earlier, in which Bev ceased the opportunity to teach two Nurses who were new to their role, also has a place here in revealing the accessibility of learning opportunities for different Nurses. Bev highlighted the gaps in knowledge of the two Nurses, who did not know how to set up the patient after being moved several times during their shift. The two Nurses were unaware of each other's inexperience and lack of knowledge.

Although both were new to their role, neither appeared to have sought other Nurses' advice to confirm their actions. There was no evidence from Bev's description that others were mentoring them in their new role. They had not been afforded assistance or guidance on the shift. The presence of relievers, as described in Bev's example, indicated that the Unit was busy. This was also apparent in Heather's example above, but, in contrast, the more experienced Nurses were able to gain access to support from each other and were aware of each other's expertise. They had had more positive outcomes because they had developed their own informal support networks. Newer Nurses had not yet had the time or opportunity to build these strategies to gain assistance.

In Bev's example, the two Nurses who were in new roles at different levels did not appear to know how to support each other. They also seemed unaware of safety measures that should be in place after moving a patient to a new location. Their depth of knowledge was not at a sufficient level to comprehend what they did not know. When the Nurse going off the shift handed over to Bev, she did not mention those nursing actions that were either not done or not complete. At the time, she seemed unaware of the omissions and hence was unable to ensure the patient's safety. Concerns about the safety of future patients motivated Bev to follow up with the two Nurses involved, and ensure they were more aware in the future of the processes and procedures that needed to be enacted when relocating patients within the Unit.

Motivation

Nurses were motivated to learn for many different reasons, such as being able to manage emergencies and provide clinical nursing care effectively. Anne-Marie described taking the opportunity to *stay with Heather, and help out / learn about the balloon pump her patient had in situ.* She had time before her patient arrived so she watched and assisted another Nurse with her cardiac patient. Anne-Marie took advantage of the time available to extend her knowledge of the care of patients undergoing cardiac surgery. Later, her patient, who had returned following cardiac bypass surgery, began to deteriorate. She recognised the warning signs but initially had difficulty getting the Team Leader to recognise the sense of emergency and to obtain an immediate response from the doctors.

> *Anne-Marie:* *[T]the doctors arrived when the MAP was 32. Things were chaotic, however, I must say, I was amazed that I managed to not only be of help, but initiate and anticipate in this nightmarish situation.*

The 'MAP' is the mean blood pressure that normally should be greater than 80. Anne-Marie commented that she found her knowledge and ability during this episode were equal to that of Nurses she considered to have extensive expertise in such emergencies. She later reflected that *[i]t was a great lesson in self worth.* Anne-Marie had spent time learning from Heather and was subsequently able to manage the critical elements in caring effectively for her unstable patient. She felt valued and was motivated to learn from Heather's knowledge and expertise.

Illeris (2002: 59) argues that in a crisis, there is a fourth level of learning 'where the learner has an urgent motivation and can summon psychological resources to learn'. He describes this as complex accommodation in which the learner must restructure many cognitive and emotional models concurrently. The learner has had to change through transformative learning in order to progress further.

As Nurses shared their knowledge, they set an example to each other about the depth of understanding needed to clinically manage their patients effectively. The value of co-participation in learning was described by Teresa, whose observation affirmed the influence of positive role models on learning.

Teresa: *I think people learn well when taught by a colleague, in that they may be impressed and wish to understand the subject as well as the colleague.*

This example seems to build on Billett's (2002b: 468) concept of co-participation, where workers relied on the affordances offered in the workplace, and engagement in learning through working relationships with experienced colleagues. Teresa seemed to feel that where good role models existed, the Nurses would be more likely to engage with the opportunity to learn. Over time, as the learner became more familiar with the knowledge and skills of the role model, their perception of the role model was transformed. The learner would engage with, and adapt some of the role model's practices while rejecting others that were not compatible with the learner's beliefs and values (Billett, 2002 b: 468; Fenwick, 2001; Gibson & Heartfield, 2005).

On occasions when familiarisation with new equipment was arranged for Nurses in the Unit, it was not necessarily in time. For example, Florence reported that on her return from holidays, she found that there were new types of beds in the Unit. She had four shifts prior to her scheduled in-service training, so, in the mean time, she *just practiced the use of the beds* so that she could safely manage the care of her patients. Florence did not explain how she managed this.

Motivation to build expertise

Shaz considered that good communication and a calming influence were important in patient care. She developed confidence in communicating with patients by listening to other experienced Nurses as well as by trial-and-error. Shaz reported that at first she was self-conscious with patients who were sedated, unconscious and not responding to her talk.

Shaz: *It's difficult having a one way conversation ... since then, I've developed my own little repertoire.*

In this repertoire, Shaz introduced herself and explained to her patient what had happened. She would chat to her patient about the reason for being in hospital, the length of time the patient would be there and the nursing care she planned to administer. Although her patient seemed unresponsive, Shaz knew the patient might

be aware of their surroundings, scared or confused, and at some stage was likely to respond.

The Nurses were motivated to learn to identify signs of deterioration so they could effectively manage emergencies related to their patients. They actively learnt techniques and developed skills that would be beneficial to their patients. Those Nurses who were motivated to learn so that they would be able to teach and support others reported that they gained personal satisfaction from such experiences.

Lack of motivation

One Nurse wrote that she had lost the drive to keep up since being part-time. This comment was made in response to a series of questions forwarded to the participants during the data-gathering phase of this study.

> Q 1: What do you feel you've still not grasped, or have difficulty with, or would like to know more to be satisfied with your skill expertise?
>
> *Serena: Still don't understand a lot about respiratory waveforms.*
>
> Q 2: What do you think are the reasons for the gaps in your learning/understanding? i.e. what are the barriers/hindrances?
>
> *Serena: Part-time [therefore] not here often. Lost the drive to be bothered. Difficulty of not being on roster when lectures are on. Not much literature in Unit about them. Not used widely as a tool here in the Unit.*

In her response to the first question, Serena referred to a diagnostic tool showing respiratory wave forms that were available on some mechanical ventilators. There had been limited teaching sessions on the tool and only a few Nurses were familiar enough with it to use it as part of their nursing management. However, her comment that she did not know much about wave forms could indicate that she expected herself to keep up with the most recently introduced technology and to undertake the more complex aspects of nursing diagnosis. The reasons she gave for the gaps in learning highlighted some of the difficulties part-time workers encountered.

While Serena perceived herself as having lost motivation to learn about this aspect, she recognised that access to teaching sessions was more difficult as a part-time Nurse. She also commented that there was *not much literature in the Unit about [wave forms]* and acknowledged that the tool was not used much. On further reflection, a connection between limited information on the wave forms and their limited use by the Nurses might have become evident to Serena. In this example, it appears that, unlike Heather's enthusiasm for producing the handout about the balloon pump, there was no apparent interest in building or gathering literature on the respiratory wave forms. If a Nurse were confronted with a patient on a balloon pump, it was essential to become adept at managing the equipment for the patient's safety, whereas the use of the respiratory wave forms as part of the nursing assessment was optional.

In the Critical Care Unit, part-time Nurses rarely worked short shifts but were offered less frequent full shifts per week. Part-time Nurses could be allocated any role from patient care to Shift Senior according to their experience. As the part-time Nurses were in the Unit less frequently, their chances of being present during teaching sessions were reduced. A part-time Shift Senior was less likely to be familiar with all the patients and had a more demanding job of catching up with each patient's progress and treatment. Part-time and full-time Nurses used the less hectic periods in their shift to explore learning, but these periods occurred less frequently for those on less shifts. Part-timers had less experiential learning time and at times perceived that they were less likely to be allocated critically-ill patients who required the most complex nursing care. Hence, it became more difficult to maintain skills.

Many motivated part-time Nurses would request one-day workshops in which the full-time Clinical Nurses and the Clinical Nurse Consultant assisted in the revision of selected aspects of critical care nursing. Much of the day was spent on technology that had been introduced in recent months and topics to be covered by the Clinical Nurses were chosen in advance by the part-time Nurses.

There were some differences in learning opportunities between part-time workers on short shifts and those on less frequent full shifts. Both had less frequent interaction than full-time staff with patients, and less likelihood of being on shift at times when

in-service sessions were held. Those on shortened shifts are often rostered during the busiest periods when opportunities for learning are unlikely. However, during the data-gathering period of this study, no Nurses were on shortened shifts.

Those Nurses working part-time were more likely to miss opportunities to attend in-service education sessions and were generally less knowledgeable about the long-term treatment of patients. As part-time workers, they missed the continuity of care, dealing mainly with the patient issues and treatments that related to patient care on the day. Hence, the part-time Nurses were likely to be less reflective or inquisitive about their patient's condition and path of recovery, and their motivation to learn would be affected by being allocated a different patient on each shift. Although there was no emphasis on continuity of care from shift to shift for any of the Nurses, part-time Nurses were less knowledgeable than full-time Nurses about the progress of each patient due to being on shifts less frequently.

Charlene and Deb were both part-time Nurses in the Unit. Charlene asked Deb about a problem that she had identified with equipment that was being used for her patient. Deb had a quiet patient, which meant that she was not busy continuously, so she searched and found the answer on the web. Deb provided a brief explanation to Charlene and provided an accessible source for her colleague to extend her knowledge about the topic. Charlene had limited computer literacy and seemed not to be keen to explore the topic further. Deb, who was also part-time, reflected critically that at times *we are too content to accept a simple second hand explanation instead of using our resources to find answers.*

Access to the World Wide Web has potential to provide an abundance of learning opportunities. However, part-time staff might not have known how to access the web. They might not have been aware of the knowledge they lacked. Nurses who used the intranet or internet less frequently found it harder to remember how to access information and were less efficient. Consequently, they were likely to be less motivated to access computers as a learning resource. For them, the quickest way to gain information was more likely to be to ask a colleague.

Learning from colleagues and *asking someone who knows* were common practice in the Unit, where Nurses needed to know urgently or only wanted to know the essentials when they were busy. Some Nurses filtered the information they really needed for survival, as seen in Charlene's response, while others were more motivated to learn and retain more information, and share it with others, as shown by Deb's actions.

Conclusion

The examples of learning that the Nurses presented as narratives or described in the focus groups revealed that gaining information from, and sharing knowledge with colleagues was the predominant means of learning in their workplace. They gained information by asking those colleagues they expected would know the answer or be able to demonstrate the procedure. As the Nurses were likely to encounter many facets of nursing and technology on any shift, they realised that they could not retain all the knowledge needed. Those needing to learn were generally selective about the person they would ask for advice or support. The choice between a junior or a more senior Nurse depended on their recent experience relevant to the information they were seeking. This person was likely to be perceived as the expert in a specific aspect of nursing. The learners placed importance on their colleagues' knowledge, approachability, accessibility and trust that their lack of knowledge would be confidential.

The Nurses varied in their success at gaining access to learning opportunities and assistance. This analysis has indicated that those who were well established in the Unit were able to gain support and tended to build on their shared knowledge through collaboration with colleagues to resolve problems. On the other hand, junior Nurses often were not aware of their lack of knowledge and were dependent on the attention of a senior Nurse to learn. Senior Nurses had the experience and expertise to identify the problems and share their knowledge. The Nurses recognised, however, that it was not only the seniors who were perceived as experts. Junior Nurses could also be attributed the position of expert if they had frequently encountered a nursing procedure or new technology.

Handovers, both at the bedside one-to-one and the global handover of all patients, were regarded as opportunities to learn, teach and demonstrate. Asking questions and sharing information were generally encouraged in handover. Other teaching opportunities were encountered in pre-planned sessions, workshops and as Nurses passed on new information one-to-one, as seen in teaching the system for blood tests. However, the examples given indicated an awareness of the pitfalls of asking others who may or may not have a correct answer.

Even when the Nurses had a teaching role, they encouraged questions and made the beginners aware that they were available at any time for ongoing support. The Nurses created a culture of learning by asking about components of skills or specific information as needed at the time. They tended to pull the pieces together over time to facilitate scaffolding of their learning, and recognised the importance of giving beginning Nurses time to practise, thus building their confidence and attending to patient safety.

The Nurses were motivated to learn to ensure the patient's safety and wellbeing. In particular, they were conscious of the need to learn the warning signs of deterioration so that they could initiate their own actions and help to ensure prompt action by the doctors.

The next chapter explores in detail aspects of the Nurses' responses to challenging situations.

Chapter Seven

Challenges to Learning

This chapter examines the circumstances and events that challenged the ways Nurses learnt in the Unit and addresses the ways in which the Nurses responded to these problems in the learning environment. The data discussed were collected from written examples and focus groups, together with interviews conducted towards the end of the research. Influences that inhibited learning in the workplace and the difficulties Nurses had to overcome to care adequately for their patients dominate the examples presented here. They reflect multiple influences, categorised to build an understanding of the barriers to learning in the Unit. The effect on learning by the social interactions in work, had potential to change the Nurses' understanding of their own identity (Illeris, 2002: 203). This was illuminated in their examples of challenges created by the influence of position and power between staff.

Four dominant themes emerged related to the challenges the Nurses had to face to either engage with learning opportunities or miss out. These were themes 4) position and gender; 5) position, power and workflow; 6) threat to patient safety and patient care; and 7) changing and complex technologies and procedures.

Theme 4: Position and gender

In the following examples, a Critical Care Nurse described how she felt about the way she had learnt. She had extensive experience in the Unit but limited or infrequent exposure to some clinical procedures. Practices and technology changed frequently and there was not always time to update, with potentially catastrophic consequences. Henny described three incidents over one shift in which she and others experienced bullying, anger and humiliation.

> *Henny: The first incident of the shift was a pt [patient] transferred down from the wards. On admission to the Unit the patient had arrested most likely on transit. My colleague and myself began CPR [resuscitation] and called for medical assistance. When the consultant*

> *arrived, we were greeted with "what happened, what did he look like, when he arrived and what did we do." My colleague and myself felt like we were being blamed, as usual frustration taken out on nursing staff.*

Henny was used to abrupt language in an emergency. However, her perception of this situation was, for her, disturbing and memorable. The Consultant's approach to the situation, in which he seemed to question the Nurses' actions, created tension, even though the questions he asked would appear to be appropriate to gain an understanding of the patient's condition and the circumstances of the arrest. While the Nurses believed they had taken the appropriate action in response to the arrest, they interpreted the Consultant's questioning as distrust of their competence and nursing actions.

The method of communication that Consultants used with Nurses was not reciprocated. The Consultant spoke from a position of power and seemed to assume that the Nurses were in error. Consultants could also make decisions, and write or give orders concerning patients without explanation or collaboration with the Nurses. In contrast, the Nurses did not feel positioned to speak in a similar manner, and could only influence the Consultants' decisions through communication or collaboration with them. The Nurses were aware of their ability to have an influence on any specific decision concerning patients, but only if they could make their voice heard. The final decision was evidence of their success or failure in doing so.

In this study, the doctors had the theoretical knowledge the Nurses felt was used to silence them. It was apparent that there remained a perception that medical practitioners were masculine and nurses were feminine, with the associated power and gender issues. These observations seem to affirm Kellner's (1997: 86) conclusion that '[g]ender relations are part of a differential system of power and domination, with unequal power relations producing domination and subordination.'

The second incident Henny described involved a nursing colleague assisting with the admission of a paediatric patient. Admission of children to the Unit was rare, and was usually stressful for staff because they had limited paediatric experience. The staff were aware that this child had the potential to deteriorate rapidly, adding to the

stress. Henny was Team Leader and assisting elsewhere, but *could hear raised voices from the medical profession.* While the reason for the raised voices was not explained, this atmosphere reinforced the stress associated with treating children in the Unit and created a difficult learning environment. Issues of anger, humiliation and bullying that were prevalent in the Unit not only influenced the way Nurses learnt, but also the potential learning opportunities they avoided. Some resisted being allocated children or busied themselves away from doctors they viewed as abusive.

In the third incident, Henny had set up equipment for a bronchoscopy but it was not functioning correctly.

> *Henny: '...get someone who knows how to fix the problem'. I explained there was no one in equipment and I have never cleaned the bronchoscopy. His ...reply was: '...get someone. Now....' Having worked so physically and mentally challenged all day, giving my best. I felt humiliated and worthless.*

Nurses were required to be familiar with many procedures and aspects of nursing care for a wide variety of conditions, as shown in this example. However, they were exposed to some procedures infrequently and it became difficult to maintain a high level of skill in these. *Infrequency* of use and lack of practice, including *no opportunity as yet to set it up,* were often referred to in the narratives and the focus groups. When treatment was needed urgently and there were errors in assembling equipment or parameters were not set correctly, the stress increased.

The perception of nursing as female work and medicine as male work contributed to the oppressive environment in which the Nurses were learning. At times the Nurses felt silenced by the more extensive theoretical knowledge that the doctors could use to discount or under-rate their concerns about their patients. It was apparent that there remained a perception that medical practitioners were masculine and nurses were feminine, with the associated power and gender issues.

At this research site, thirty percent of the Nurses were males, and they also wrote about feelings of anger and humiliation generated from their working relationships with doctors in the Unit. Ed observed a Consultant *abusing staff and relatives alike for no obvious reason.* Under these circumstances, Ed, like many other Nurses, was

unable to confront the Consultant at the time, but directed the *angry and upset relatives* to the Patient Advisor. The entrenched perceptions of hierarchical positions within the structure made it difficult for the Nurses to manage abuse face-to-face. When they did confront the issues, they were the ones who opted to leave, rather than continue in such a contentious environment.

Establishing credibility

The Nurses wrote of difficulties getting Team Leaders or doctors to respond to problems with their patients.

> *Anne-Marie:* *The MAP dropped to 68 where I called for my TL to get the doctors, nothing seemed to happen, I called more insistently, where the doctors arrived when MAP was 32.* [When the doctors arrived the MAP was 32]

Some Nurses found that they had to convince their Team Leader or the doctors that a patient was deteriorating and needed attention. They had to be able to build a picture of the patient's condition to put to the Team Leader or doctor to give them credibility when they asked for assistance. In the example above, there was no response until the patient's blood pressure was extremely low. My observation in the Unit indicated that there was a tendency to respond more quickly to those Nurses perceived by the Team Leaders or doctors to be knowledgeable and able to accurately assess deterioration. However, the delay in responding to less experienced Nurses on the assumption that they were over-reacting was dangerous for the patients, especially as less experienced Nurses were also likely to be slower to detect a change in the patients.

Often when an inexperienced Nurse expressed concerns about a patient, the Team Leader or doctor would ask further questions about the patient's clinical status before assessing the patient themselves or providing assistance. The Nurse's credibility in providing convincing evidence of patient deterioration had the potential to evolve as the Nurse built on previous experience of interrogation, thus presenting more detailed information about the patient. An alternative was for more experienced Nurses to guide new Nurses in decisions about the types of observations and tests to undertake prior to asking for advice. This guidance in critical thinking and decision-

making would occur in planned workshops and sometimes opportunistically at the bedside. One experienced Nurse said that he not only provided the essential observations and supporting tests, but also put forward suggestions on dealing with the problem that were often approved by the doctor.

Power relationships were reinforced by the tasks that doctors did or did not undertake. Jim described an incident during the morning medical round when he was assisting the Nurse next to him with urgent tracheal suction for her patient. At that time, five doctors were examining his patient, but they advised Jim that his patient needed suction. The doctors could see he was busy and they all knew how to perform the procedure, but did not. Jim called for another Nurse to attend to his patient while he was helping his colleague. His anger was revealed in his reflections on the situation.

> *Jim:* *A clear case of super egos interfering with patient wellbeing...merely scoring points and having the nurses run after them. I must remember to ask them next time if they couldn't find the suction trolley.*

This example of the frustration and anger felt by these Nurses in the workplace also represented the Nurses' tendency to manage complex situations themselves without confronting the doctors about actions the doctors could have taken in the best interest of the patient.

Avoiding confrontation

During a discussion in the first focus group, about the value of a full handover of all patients for on-coming Nurses, there were suggestions about speeding up the medical round and altering handover period. Quite often, the medical round had not finished by 1:30 pm when the nursing handover commenced. The full handover emerged often as a topic during discussions about learning because there seemed to be an underlying belief that it was a valuable opportunity for sharing knowledge. One Nurse reiterated that we cannot base plans on changing doctors' practice. *We've been trying to change that one for years.* That comment was followed by laughter, suggesting an awareness of difficulties with communication and Nurses preferring to look at learning in ways they could control themselves, thus circumventing the

problems of negotiation with the doctors. The long medical rounds also had repercussions such as delays in treatments and related nursing interventions. The Nurses' response to the combined effects of long medical rounds suggested that Nurses preferred avenues in which they could work around the difficulties to avoid confrontation.

Theme 5: Position, power and workflow

The Shift Seniors were experienced Critical Care Nurses responsible for allocation of Nurses to patients. This allocation within the structure of the nursing hierarchy in the Unit had an effect on the support and learning opportunities that were made available to the more junior Nurses.

In her written example, Stella listed a number of considerations she made when allocating nursing staff to patients and positions within the structure of a geographically divided Unit. She described positive actions that she took, such as identifying those who needed to extend their experience by managing higher acuity patients. She allocated senior Nurses to critically unstable patients, but also aimed to spread experienced senior Nurses across the Unit to provide guidance to scaffold and support nearby junior Nurses. It was normal to allocate lower acuity patients to one or two senior Nurses who would be available to facilitate learning or to receive unexpected admissions. However, when relievers were sent to the Unit late in the handover period, it was often necessary to change the allocations for reasons of patient safety. The relievers would be allocated those patients of lower acuity who might otherwise have been allocated to a senior Nurse. Typically, relieving Nurses did not have the knowledge, skills or the time to support junior Nurses located near them. Hence, affordances for learning through allocation were not always achieved.

Allocation for the shift might be made by the Shift Senior on the previous shift or at the beginning of the next shift by the on-coming senior. This depended on the preferences of the Shift Senior commencing the shift and on the time when he/she began work. Stella reported that she learnt how to allocate from observing other senior Nurses and from discussions in the senior workshop sessions. However,

although the senior Nurses' decisions on the allocations had to be worked out each shift, based on the constantly changing mix of patients and staff, there were no guidelines for the process. The criteria on which the Shift Seniors based their decisions were passed on verbally. They were teaching by passing on their experience, coping with changes and learning from each other.

Coping with geographical distance

When the Unit was full, those patients who were waiting for a beds on other wards or deemed by the doctors to be more stable or were moved down the corridor to another area of the hospital called the 'Overflow Unit' or 'Unit 2'. Stella did not include senior Nurses in her allocation of staff to the Overflow Unit. There had been a tendency for more junior staff to be allocated to this area, although this was the most dangerous place to be because it was hard to get the doctors to review their patients. Shift seniors would often allocate Nurses at the level of Team Leader or part-time senior Nurses, often with a patient load, as coordinators for the Overflow Unit. Stella revealed how she learnt staff allocation and described the considerations she made in her allocation.

> *Stella:* [learnt by] *observing other SENS [senior nurses] ... SEN workshop session talked about allocations ...U_2 [Unit 2] allocation: enough A & B [Grade of nurses] to cover shift. If possible plan U_2 co-ord [co-ordinator] pre shift.*

Grade A and B Nurses could be allocated a patient and the Grade B Nurses could also take the role of Team Leader. This statement shows that Stella did not consider that senior Nurses were needed in Unit 2. There was a perception among some Nurses that those Nurses with the most expertise were rarely allocated to the Overflow Unit. Thus, the less experienced Nurses were dealing with a more difficult working environment, even though they had less experience to be innovative or to make rapid decisions. Their learning opportunities were typically trial-and-error, and if they needed advice or assistance it was given over the telephone from staff in the main Unit. The advice also depended on the availability of the appropriate person to take the call. Alternatively, a Nurse had to walk down the corridor to the main area to discuss a patient.

In relation to the telephoned request, the most experienced Nurses and the doctors were not located in Unit 2, and therefore were not making a visible assessment of the problem. The likelihood of the staff in the main area recognising deterioration in a patient and taking action depended on the ability of the less experienced Nurses to identify a problem and provide crucial information. This created the potential for the less experienced Nurses' observations to be limited and worse still undervalued, especially if the patient had been stable and there was no expectation of deterioration.

If there were experienced Nurses in the Overflow Unit who were familiar with the procedure or who were able to solve other problems that arose, their decision to teach, explain or guide the novice depended on the time available. Alternatively, the Nurse who was Team Leader in the area would have to assist with nursing care guide new Nurses to avoid potential errors or omissions, whilst continuing to coordinate other staff, find time to arrange the patient's new ward and transfers, keep track of new changes with patients and at times write the patient's notes. Thus, the opportunity for the patient care Nurse to gain experience and learn depended on whether the Team Leader had time to guide him/her through the procedure, or whether the patient care Nurse was needed elsewhere while the Team Leader attended to the procedure. Hence, the learning opportunity was limited or lost.

Some Nurses who were frequently allocated to the Overflow area learnt to remind those doing the allocating of their situation, and to request a patient in the main area. Nurses who were frequently together because they were out there so often reported feeling some solace in the company they were keeping (comments from focus groups). They learnt to manage in the more isolated environment by 'stocking up' at the beginning of the shift, building up supplies and equipment to be returned to the main area, and making a list of needs so that the next person who had to go to the main area took and returned all the necessities.

Working in the Overflow Unit was often stressful due to the isolation. Every now and then there would be a bit of upheaval and uproar at a meeting, due to complaints from the Nurses who were allocated there with minimal support. Seniors would then be allocated to that area. Some would be out there with their mates and have an

upper level of highly experienced staff, a much different situation than when the inexperienced staff were put there with little support and had to try to work things out together as best they could. There was a general comment form the senior Nurses that *it's not hard round there at all.* The senior Nurses had the experience to observe and analyse changes and deterioration in patients quickly and respond effectively thus reducing additional work dealing with complications in their patients. This demonstrates the effect that the hierarchical structures had on the type of learning available and the limited opportunities for learning afforded to junior Nurses.

Dealing with conflict

When the Nurses encountered less familiar procedures, this was likely to occur in urgent situations where they needed to perform under pressure. Some Nurses had lost or not developed the embodied knowledge to perform the required task automatically and rapidly while keeping their patient's additional needs in mind. Also, it was more difficult to think clearly when they were under threat or in fear of being verbally abused. Rachael identified how poor communication could limit or inhibit learning.

> *Rachael: The learning process was at times painful (humiliating). So much comes from colleagues & so if colleagues are in bad moods or simply not good teachers/communicators, learning can be slow, inaccurate & frustrating.*

This again showed the extent to which Nurses relied on each other for information and depended on colleagues to be approachable. It also indicated that the ability to maintain expertise reached beyond their ability to follow procedures and manage technology.

When the Unit was busy and Team Leaders were working with Nurses who had limited experience, their patience and willingness to teach could diminish. One of the study participants, June, noticed that established Nurses under pressure tended to question new graduate nurses' suitability for critical care before they had had a chance to develop the specialised skills and knowledge they needed. This resulted in loss of confidence, distress and humiliation for the new Nurses. During busy periods, the Team Leaders could not control the inadequate staffing levels or skill mix, and

thus were likely to express frustration with less experienced colleagues who needed more support.

June expressed the view that these behaviours by the Team Leaders related to the *strong personalities* in the Unit. In the example that she witnessed, she wrote: *I do hope your study will address this issue in some way as I feel learning/teaching can not occur in such a negative environment.* Such horizontal violence was particularly visible when the Nurses did not feel they had the power to procure adequately skilled staff to ensure safe and appropriate clinical nursing care. They did not stop to think about the graduate nurse's potential value, but rather reacted against the immediate pressures.

One Nurse, Bella, felt that her ability to deal with conflict was limited by a lack of practice. While she could list the appropriate processes to be considered when managing conflict, she suggested that she lacked expertise because she did not have to deal with conflict very often.

Some Nurses reported being marginalised in their opportunities for further learning and for promotion into advanced roles. When the students completed the Critical Care Course they were encouraged to advance to the Team Leader role as a Grade B Critical Care Nurse. Justine reported that although it was twelve months since she completed the course, her enthusiasm and efforts to put her knowledge into practice and *facilitate* [her] *learning...ha[d] been stifled.* She explained her willingness to continue her learning and to teach anyone who needed support but observed that other Nurses who had undertaken only the six-day Team Leader workshop, but not the Critical Care Course were being pushed into Team Leadership roles. She described being *bundled into any corner where the standard of work requires an A grader* and reflected on the meaning of an A grader being a beginner in the Unit, in direct contrast with the concept of A grade student or A grade sport. She had requested a Team Leader role without success.

Justine explained the inequities in the learning opportunities that were afforded, as she saw them.

Justine: Learning anything is a privilege bestowed on a precious few in this Unit.

This sense of being undervalued led Justine to seek alternative options. Recognising her need to be valued, Justine took casual work in a country hospital where the staff sought her advice and assistance. She gave examples, such as successfully trouble-shooting the electrocardiographic equipment, in which she was able to use her recent knowledge and experience to contribute to problem solving with equipment and patient care. She saw that she had the choice of either continuing to work in an environment that was not stimulating for her at the level that was offered, or to gain satisfaction elsewhere in casual employment. The other option for workers who were not afforded opportunities for learning was to leave.

Justine applied to move to another department. In the last part of Justine's story, she gave *snippets of learning* in which she described misinformation that was promulgated in the Unit and the ways in which she had discovered some of the truths. She questioned practice, sought out answers and expressed the need to feel valued. Some of her story was written in anger and some with humour.

Theme 6: Threat to patient safety/patient care

This theme highlighted the influence of technology, urgency, time pressures and having the time to reflect on learning experiences on the opportunities for Nurses to build on their knowledge and nursing practice, and their overall learning outcomes. Patient safety emerged as a dominant theme because the Nurses' examples revealed that many of them felt learning practices were so unsafe.

Every staff member was challenged when patient safety alone overrode the Nurses' desire to provide the best, total patient care. Patient safety was the crisis prevention of patient care but the Nurses were trying to include total patient care as a priority with varying success. They knew there was more to patient care than just safety, but because patient safety was the bottom line, they could not reach the stage of thinking about overall patient care in an environment where everything was so urgent and the learning was not happening effectively.

Mastering the technology was identified as one impediment to patient safety, as demonstrated in the example below in which Marjory described a learning experience from an incident that put her patient at risk.

> *Marjory: While washing a patient on dialysis; on turning the pt. [patient], the venous line disconnected from the vascath with obvious results. I learnt that, while I always check connections when connecting lines to vascaths, CVC's etc, I should also check connections with existing treatments.*

When a line was disconnected, blood spurted out and the likelihood of infection was increased. Marjory was already aware of the consequences of disconnected lines and was diligent in checking that they were secure when she connected new ones. However, after this incident she identified that to ensure her patients' safety, she also had to check those lines that had been connected by other staff. In this way, Marjory was able to overcome the threat to patient safety.

A 'vascath' is a catheter that is inserted into a large blood vessel and connected to lines that enable the patient's blood to flow out with the aid of an external pump. The blood passes through a filter where toxins and wastes are removed before the blood returns to the patient via another line connected to the vascath. These lines are called 'venous' and 'arterial' lines. Continuous renal dialysis could last for days to weeks, and when patients were moved in the bed there was potential for stress on the lines during washes, repositioning and changing the sheets.

Urgency and time pressures

The following descriptions reveal the potential for an emergency and for any patient to become unstable. The need to take action was always present in the Nurse's working environment.

The Nurses were managing new technology that typically was introduced with minimal familiarisation. The training information that was provided did not reach all staff. Heather's summary of her description of learning about renal dialysis equipment highlighted the Nurses' concerns.

> *Heather: It was important that I knew how to use the new equipment, in order to look after my patient.*

To Heather, a sound knowledge of equipment was part of being able to care for her patient. An initial investment in time, practice and guidance from colleagues built competency and efficiency with the technology so that patient safety was primary and the Nurses would have time for patient care.

Urgency to ensure that the patient survived was a motivating factor in the following learning experience. In her example of setting up dialysis urgently, Gerri's awareness of patient safety was foremost, but was hidden in the description of her learning. She wrote: *Critically ill patient – requiring urgent treatment,* and further down, in quotation marks, *"the situation was critical and the need to learn urgent"*. Although many Nurses had limited teaching sessions on the use of a new renal dialysis machine, they often needed to set it up and administer the treatment rapidly in order to stabilise a critically ill patient. The urgency for renal dialysis was most likely to be related to instability of electrolytes that could cause cardiac arrest.

Stella described the importance of restocking the bays, in response to the survey question: 'What do you feel you do/know well?' She discussed the importance of checking the equipment, and having a clean area and all the supplies on hand, and ended with:

> *Stella:* *Nothing more frustrating than in an emergency falling over pieces of equipment or expecting to put your hand on a piece of equipment in an emergency & it not being there. Increases stress and time.*

If supplies were not immediately available, the patient was put at risk.

The experiences described above underpinned the Nurses' learning and their actions to minimise delays or harm to their patients. In these situations, the Nurses were unlikely to have time to reflect on events until later.

Reflection and problem solving

Problems arose that were not necessarily identified or resolved and built into their body of knowledge until time was taken to reflect on the events, as explored in this section. For example, when the Nurses encountered apparent anomalies in tests they

needed to work out whether there was a change in the patient's condition or whether there was an error in the test result. While Sue was teaching a Nurse who was new to the Unit, she noticed that the result from a blood test was abnormally high. She had concluded that the very high result was unlikely to be a dramatic change in the patient's condition, so she offered the new Nurse an alternative method to avoid further errors and worked through the Nurse's method for taking the blood.

Sue: *Later found that APTT very high, only possible cause was mix up of coag syringe & aspiration syringe. Suggested to clearly separate 2 on bed & keep interlink in discard syringe after flushing bung.*

The Nurses were constantly solving problems and anomalies in processes and needed to develop flexible ways of problem solving. If they did not know something they would ask someone and if that person did not know they would try somebody else. The answer could come either from someone who knew or from someone passing the information on second hand. Some Nurses acknowledged that this was not necessarily reliable, as demonstrated by Rachael's reflection.

Rachael: *Often information is coloured by peoples own attitudes/ opinions. Hence collating data in your own head can take years as slowly you get exposed to more viewpoints about the same issue...books don't explain how to clinically apply the knowledge or how to use specific pieces of equipment ...or how to trouble shoot them. In learning how to trouble shoot we rely on accurate info from those who have previously used them. This does not necessarily happen.*

The Nurses frequently asked other colleagues for advice but evidence that they assessed the reliability of the information varied. Rachael used critical thinking in *experimenting with what works best for individual patients.* Her responses showed her awareness of the broad and variable information that was available and the changing treatments. She had confidence in her ability to *care, diagnose, problem solve and teach.*

The following example of working with new Nurses showed how Sue managed the challenges of her teaching role while ensuring safe patient care.

Sue: *...need the break away by having separate meal break - allows me often to catch up if we are behind.*

The Nurses often reported that they felt as though they had not cared for the patients adequately or not allocated as much time for the relatives to visit the patient as they would like. They needed to think critically about their work, to make sure that they had not missed anything. Some reported that they found it difficult to concentrate with relatives present. They sometimes asked relatives to leave for certain procedures and delayed recalling them until they had caught up and checked their patient thoroughly.

Critical incidents

During this study, Nurses were asked to describe a critical incident. Many of these included their reflections on the stories rather than providing a simple description of events or learning experiences. Some wrote about their patient's condition, as well as appropriateness of decisions and care for the patient's individual circumstances. Rick wrote of an example that led him to question and subsequently reflect on the decisions that were made for a patient who had an end-stage respiratory disease. This patient had been on home oxygen and was admitted with an acute chest infection. The treatment of choice was the use of a face mask (CPAP mask) that must be applied firmly enough to prevent leakage of air around the patient's face, thus creating a low pressure to aid breathing. However, the patient's reaction created an ethical dilemma for Rick.

Rick: *The patient did not tolerate the extreme pressure required for the CPAP mask to be effective & after 2 hours he refused the mask all together. His wish was to be left alone to go home to die!*

In his story, Rick discussed the ethical issues of doing good and not inflicting harm. His patient's condition was not curable and was slowly deteriorating, so the priority was comfort not cure. Rick explained that the doctors and Nurses were stressed. They were in a unit where cure was the goal, and had lost touch with the patient's need just to be relieved of the acute, severe pain and discomfort. Rick added that the patient's agitation had made his condition worse. Gradually the patient began to improve with the short time that he had on the CPAP mask and administration of medications. Rick added:

Rick: *The turning point was the re-establishment of the patient autonomy, he needed to feel he had some self*

> *determination & he was in control. In an environment of mutual trust, relationships thrived & so did the patients condition.*

The staff had lost touch with the patients' needs as they tried to fulfil their perceived role of curing the acute phase. The situation was a dilemma for all the staff, who appeared extremely stressed about not treating the symptoms aggressively. Rick wrote in his reflections that for him *the learning ... was a belief already internalised.* The learning experience confirmed his understanding that when doctors and Nurses treated the person as a whole and individually, they met the patient's needs and not just the symptoms, and avoided compromising their duty of care.

The uniqueness of each patient's condition and specific needs were such that the Nurses needed to continuously employ their critical thinking and problem solving skills. The one-to-one nature of the Unit structure enabled the Nurses to devote their attention to the needs of the patients in their care. However, Debbie gave an example of learning in which it became clear that at times, when trying to understand the treatment being administered, it was possible for the Nurses to lose sight of the patient's uniqueness, which led to misunderstandings about appropriate treatment.

Debbie's patient had an acute, severe respiratory disease (referred to as ARDS). At handover it was made clear that the Consultant *wanted* the Nurses to keep the patient's carbon dioxide (CO_2) high, as measured from blood tests. This did not seem unusual for such patients, but Debbie asked the Consultant why. His response was, *no, we were tolerating a high* CO_2 *not wanting one. High* CO_2 *may however have a protective role in ARDS.* Debbie added that this was an example of the way in which *conversations get misinterpreted* so that the Nurses managed their patients according to the misinterpretation. This example of misinterpretation also demonstrates the extent to which the Nurses were aware of the uniqueness of, and differences for each patient in the Unit, but often failed to think about and question the reasons for the differences.

During discussions in the focus groups about technology and troubleshooting with equipment, comments such as it *takes away from patient care* were associated with the frustrations of dealing with technology. In patient care, the relationship between

touch and the patient in critical care had been portrayed by outsiders, including nurses, as being limited because the patient was sometimes barely discernible in the surrounding technology. Critical care patients were more likely to receive care and contact than most hospital patients on general wards. Technology had the potential to take up time available for patient contact. Few examples were written about routine procedures, such as hygiene and pressure area care or wound care. However, these actions were occurring between management of technology and critical incidents, and at a more frequent rate than would be expected on the wards. Usually attending to hygiene and repositioning patients would occur two to three hourly in the Unit and a maximum of one to three times a day on most other wards.

Theme 7: Changing and complex technologies and procedures

The Nurses, in describing their learning of the management of new equipment, reported that during the set up and management they were also undertaking other patient care procedures. They were continuously assessing the condition of the patient and documenting hourly, as twenty items associated with actions or observations related to the patient's progress. They observed the patient and the electronic devices for signs of change and signs of deterioration to which they must respond. A degree of urgency in the timing and frequency of some tasks and skill often occurred, and this was in addition to the complexity of patient care and managing the associated technology. Periods of urgency due to deadlines followed by delays in work have been reported in many workplaces (Billett, 2002b: 473), but in the Unit the urgency related to a life-threatening situation or lasting damage from which the patient might not fully recover. In these instances, the technology overrode the stories of clinical nursing care.

When teaching more complex procedures to a beginner in the Unit, Sue emphasised that the beginner *get TL's to help until they are happy with the way she does the procedure.* This way the experienced Nurses were ensuring the patients' safety as best they could by assessing whether the beginner was undertaking the procedure accurately and safely, and by deciding when she/he could work alone. The teachers emphasised the importance of understanding the reason for using a particular

technique so the patient was *not put at risk.* They acknowledged that some procedures could be undertaken in different ways but the learners must understand the rationale underpinning the procedure in order to be safe.

Time pressures and lack of practice

Some sessions on new procedures and equipment were conducted during overlap of shifts but Nurses might not have had the opportunity to practice setting up equipment. At best in some instances they reported having learnt through exposure to patients when caring for them but not having the opportunity to set up and initiate the procedure. On occasions when familiarisation with new equipment was arranged for staff, it was not necessarily in time. For example, on her return from holidays, Phyllis found that there was a new type of bed in the Unit. She had four shifts prior to her scheduled in-service training, so in the mean time she *just practiced the use of the beds* so that she could safely manage the care of her patients.

In her description of learning more about the renal dialysis machine from a colleague, Heather began: *Anita ... explained some preventative problems.* This example typified one of the survival mechanisms adopted to try to ensure colleagues did not make errors. Without the opportunity to learn thoroughly about new equipment, emphasis was placed on how to avoid likely errors and resolve problems. In their stories, the Nurses referred to:

> *Working it out for your self if no one's around*
>
> *Working things out*
>
> *Problem solve quicker for a person, rather than helping him problem solve*
>
> *Stories in the tea room*
>
> *Manual doesn't solve problems*
>
> *The stuff you learn informally is retained better because you relate it to the patient or event.*

Infrequent use of equipment

Some equipment was used infrequently. The Nurses had to work out learning strategies to maintain an understanding of equipment that they might be called on to use at any time. Annette reported that she had limited experience with the

management of a potentially toxic gas that was used in small amounts for treatment of some acute respiratory conditions. The gas was provided via a large portable gas cylinder. Due to the toxicity, the flow rates and signs of leakage had to be checked diligently. The set-up of tubing for management of the gas to the patient via the mechanical ventilator as well as the collection of expired gas had to be accurate. Annette reported that she needed to develop a *mental picture of the cylinder and parts* because she had had *no opportunity as yet to set it up*. Although there were guidelines, when the system needed to be set up it was usually urgent.

Complexity of patients and technologies

Understanding the complexity of moving patients within the unit was not grasped by the two Nurses whose new roles of patient care and Team Leader were described in Bev's example of a series of nursing actions that had been omitted (see Chapter Six). Bev had received her patient from a new Registered Nurse (GNP) and had listed the new Nurse's omissions in her nursing care. The omissions had not been noticed by her Team Leader on the previous shift, who was also new to her position as Team Leader. Bev's example of learning was associated with the complexities of care that the nurses did not know. The number and type of nursing actions that had to be considered during the movement of a patient within the Unit were routine for experienced Critical Care Nurses but required knowledge of multiple procedures. The two Nurses in this example were both encountering new procedures that were taken for granted by experienced Nurses who no longer saw the complexity and did not recognise the less experienced Nurses' need for support. In this instance, the patient was not harmed, however Bev's actions reflected Daloz' (1986: 17) description of the mentor as guide:

> They embody our hopes, cast light on the way ahead,
> interpret arcane signs, warn us of lurking dangers, and point
> out unexpected delights along the way.

Bev's actions were those of a mentor in that she persisted in identifying the problems and ensuring that the nurses involved would be able to provide safer care in the future.

Nurses in the Unit were not necessarily aware of their patients' complexity. In her narrative of supervising a new Nurse with her patient, Sue described the patient as:

> *Stable. Ventilated...admitted previous day with COAD – exacerbation ... low dose inotropes & swanganz. Respiratory Study for PEEP undertaken 11^{00} – 1330 (no extra work for us).*

It was necessary for the Nurse to learn how to *get a feel for the wedge*, which involved learning the delicate manoeuvre of inflating a balloon via the catheter inside a major blood vessel to obtain readings without over-inflating and bursting the vessel. The Nurse also needed to watch the wave form change on a screen in the bay to ensure that it was 'wedging' and not over-inflated. There were a number of different readings that had to be taken intermittently. This task added to the complexity for the new Nurse who was also learning to juggle the ventilator and the general care of her patient. Yet, Sue later referred to the patient acuity as low to moderate. To Sue, the care of this patient was fairly standard and teaching a new Nurse in addition to the patient's clinical management was a reasonable expectation.

'COAD' represented a form of chronic respiratory disease and 'PEEP' was the pressure affecting expired air. The 'swanganz' was a catheter inserted into a large blood vessel in the chest, passed in through the heart and out, to sit in a large vessel that circulated blood around the lungs. The readings that were taken using the catheter were produced electronically and provided an indication of the status of the heart. Subsequent calculations determined the level of 'inotropes' to be administered. The catheter was also a means of administering medications such as the 'inotropes' (intravenous medications used to mediate the strength and output of blood from the heart) that must be managed cautiously to avoid deterioration in the patient's condition.

Complexity of work and conflict

In the Unit, patients were returned directly from the operating theatre, without any period in the Recovery ward. Samantha's story of the difficulties of receiving patients from theatre following coronary artery bypass surgery (CABG) made the complexity of this event visible. It was usual for a Team Leader to assist with the post-operative care of the patient and Samantha was able to gain assistance soon

after the patient was admitted to the Unit. However, she also had to deal with the staff who returned the patient from surgery and who were anxious to return to theatre for the next patient. Samantha found these staff impatient, rude and not helpful. The anaesthetist was giving handover to Samantha while she was trying to sort her patient.

> *Samantha:* *Anaesthetist still talking while I was trying to untie the cable from the boom. Swirling his end of the cable. SARCASM*

Samantha was dealing with the complexity of the situation and finding solutions that were included in her story below. She continued her story with the heading *LEARNING*, representing her reflections on actions she would take next time and the outcomes that would be achieved.

> *Samantha:* *Yell out to assisting Nse. You take handover from that arrogant Anaesthetist and attach patient to ventilator. I will do the ART LINE /CVC. Commence SNP PROPOFOL if need – OR to chart obs and then attach SNP / PROPOFOL and check wound / drainage.*

Samantha recounted a traumatic experience on receiving her patient from surgery, but explained what she had learnt to manage for any future incidents when she had to deal with influences beyond her control.

Power, technology, complexity and keeping patients safe

As evidenced from the nurses' stories, the new dialysis machine (Kimal^{TM}) was a central focus for many of the examples of learning. It was portable, but bulky, equipment that was difficult to use, and had coincidentally been introduced to the Unit soon after this study on workplace learning began. The Nurses were not consulted on the choice of equipment, even though they must manage it while nursing their patient. The power of doctors to select the equipment that Nurses must use created a barrier that they had to overcome to manage their patient care.

During the data gathering, participants wrote some stories by hand and produced others on the computer after hours at home. Among the latter is an example from Dave, in which he described frustrations with the *infernal machine*. His story

revealed the amount of time that could be taken up in dealing with technology in the care of patients. Although he once said to me, *there's an old saying, that reflection is bad for you,* he produced a humorous and cynical insight into the exasperation of working with the technology during his shift with a patient on dialysis. The first part of his story was related to routines that affect our decisions: *'Waiting for the filter to clot', she said.* 'She' was Nurse who handed over to him at the change of shift. Dave numbered the learning experiences, as his written narrative of his evening shift with the Kimal™ unfolded. Within this narrative the influences on learning will be highlighted.

There were a number of different effects that could be achieved from dialysis, depending on the patient's condition. The method that was chosen depended on the reason for dialysing each particular patient, and doctors, not nurses, made the decision on dialysis. There had been some debate among the doctors about the names of the various methods and the effects on the patient. Also, the doctors could elect to change the settings in response to changes in the patient's condition. The nurses found that they needed to learn and understand these different settings so that they could negotiate between the doctors who, at times, wrote apparently conflicting orders.

They had time consuming difficulties with their initial programming of the Kimal™ such that it could not be started unless every stage had been set in the correct sequence. The Nurses had inadequate knowledge of the machine because they had inadequate training in its use. Eventually, once it commenced they needed to gradually increase the flow to a functional rate. Dave reported that: ... *the arterial pressure shot up. Presumably the catheter sucks on to the side of the vein like my vacuum cleaner sucks up the curtains.* If there was not enough blood flowing into the catheter in the patient's vein, the vein was likely to be drawn onto the side outlet of the catheter, blocking the flow and increasing the pressure while the suction continued. Dave's comment suggests that he had worked out that this was the probable cause for the sudden spike in pressure. Dave concluded that the machine was too complex, labour intensive, difficult to get started, the alarms were very sensitive and there was a lack of knowledge by everyone about the machine.

Dave's story of the Kimal™ combined the challenges that confronted the Nurses. It revealed the complexity and overlapping nature of the categories where the power positions between doctors and nurses interacted with the changing technologies and the lack of support for learning. Dave's willingness to pursue the problems and the support from his Team Leader enabled him to eventually resolve the dilemmas with the dialysis equipment, and he overcame this highly complex and seemingly impossible situation.

Conclusion

Many of the examples in this chapter have revealed diverse influences on learning which overlap into several categories. These examples have shown the roles played by multiple influences in the work and learning the Nurses were undertaking.

The emerging categories revealed power distinctions between doctors and nurses that illustrated where medical staff occupied dominant positions. Power differences between nurses were also identified as influencing the Nurses' decision-making related to Unit staffing and illustrated how this impinged on learning opportunities. Threats to patient safety were apparent in examples of the urgency of managing critical conditions, where time pressures and nursing skill mix had contributed to limited or non-existent reflection. This was exacerbated by geographical distance between the two sections of the Unit involved. It was evident that the constantly changing and complex technology and procedures had a major impact on Nurses' learning.

The nature of the Unit in which all critically-ill or injured patients, over six months of age, were admitted, created a working environment which required staff to be constantly up to date with a very broad spectrum of critical conditions and traumatic injuries. Associated with the general nature of the Unit were the range of procedures and equipment the Nurses must know, even though they might encounter some infrequently. In reality, time was not available for staff to meet the demand to know everything and to keep abreast of all changes.

The spread of the Unit over two locations within the hospital created a challenge for the Nurses to ensure an adequate skill mix for management of the patients and to keep up to date with the complex procedures. The need to address patient safety as well as the urgency of many situations had the potential to override the time available for provision of basic patient care. The Nurses indicated a constant awareness of the additional care they should provide, but at times this was beyond their capacity to deliver effectively.

The examples in the first section of this chapter have revealed the influence of power, position and medical dominance in the Nurses' work and learning. They worked in an oppressive environment of unpredictable verbal abuse and blame. The barriers to learning were influenced by the environment in which the Nurses experienced verbal abuse or humiliation. The multitude of conditions that the Nurses encountered with their patients created unpredictability, and hence difficulty in being prepared and up to date with any event. Throughout the themes described in this chapter, urgency, time pressures, reflection, problem solving and complexity of learning were exacerbated by changing technology.

The next chapter will discuss the implications of the data for overall workplace learning practices, with specific reference to critical care environments.

Chapter Eight

Discussion

In this chapter the sources of knowledge for Critical Care Nurses and the influences on gaining access to these sources will be discussed. This integration will be centred on the reflective narratives written about their experiences and the dialogue they generated in the focus groups. The term narrative is used in a general way to embrace both the written and told stories of the participants in this study. These described the way participants employed any learning opportunities that were available. Stories from the current study will be contrasted with experiences identified in earlier research studies.

The Nurses in critical care more often than not needed information urgently. They acquired specific knowledge in any way possible because the impact of their responses often had life and death consequences. If the information was not gained immediately or a problem ignored the patient would suffer. The Nurses could neither put it off for another day nor leave it for someone else to sort out. They reported on the challenges of constantly dealing with rapid changes to practice and to technology. The consequences of not keeping up with these changes were more dramatic in the Critical Care Unit, than in other parts of the hospital.

This chapter begins by examining the predominant strategy used to gain knowledge, that is, learning by asking. Then, the impact on learning about complex disease processes, rapid change and technology in the Unit is presented. A discussion of the Critical Care Nurses' engagement with learning and the affordances offered in their workplace follows.

Predominant features

Learning by asking

In this study, it was revealed that, the way that the Nurses acquired knowledge most frequently was by asking their colleagues. In their written examples of learning and in their discussions in focus groups their reference to 'colleagues' was to other Nurses in the Unit, in all but one or two instances. The Nurses needed to gain accurate information in a timely manner and relied on colleagues as an easily accessible source. They often required the information urgently.

The experienced Nurses talked and wrote about *asking* in the focus groups and in their written examples, as though it was as an art to be acquired. Similarly, aged care workers reported learning by asking questions (Somerville, 2003c), suggesting that they too used any means available at the time to gain essential information. In the workplace, the Nurses openly asked each other for information, guidance or advice and encouraged new workers to follow the same practice. They were aware that the relationships developed with others assisted them to articulate their ideas, a finding supported by Coetzee, Britton and Clow (2005). In this process, the Nurses identified who was approachable and not judgemental about the lack of knowledge, and who was most likely to know the answer or how to get the information. The approachability depended at times on confidentiality as well as the willingness and the manner in which the Nurse would respond with advice. The Nurses made similar choices in approaching the doctors, and although unlike the senior Nurses, new Nurses were unlikely to be aware that the Registrars had different levels of knowledge and experience.

Accuracy of asking

The potential pitfalls were also apparent in the Nurses' examples, which highlighted the need to question the validity of the advice, as reflected in their jokes such as: *You do it once and you're the expert.* This was an oblique way of identifying their lack of knowledge and displayed their awareness that it was not the most reliable way to solve problems. They recognised that potentially the *wrong thing* could be *passed on for days.* The accuracy of the information or advice provided by colleagues was

evaluated based on their knowledge of individuals and/or their recent experience. The Nurses' awareness highlighted the importance of questioning new insights, as advocated by Apgar (1999).

Complexity and rate of change

The Nurses showed that they learnt in any way they could to build on an already complex and extensive knowledge base. There was an ongoing expectation of accurate clinical decision-making, based on extensive theoretical and procedural knowledge, plus experience, as was common amongst all health professionals (Newman & Peile 2002). The uniqueness of this study, was that the rate of change and the multi-skilled capability of Nurses in a combined general adult and paediatric critical care unit required a sound knowledge of patients with such critical conditions as cardiac, neurological, renal, hepatic, gastric, orthopaedic disease or injury. Each situation presented unique challenges as everybody was different. The Nurses were constantly confronted with caring for patients with multiple types of conditions and the associated equipment, and nursing patients who were all variable. Patients with the same conditions have different bodies and respond differently to every aspect of nursing and medical treatment. The Nurses had to be alert to the specifics of each patient. They did not have the luxury of working in a specialist unit such as a coronary care unit or neurological intensive care unit.

Making complexity explicit

The Nurses in this study did not appear to be aware of the complexity of their work or the extent of their knowledge. Their stories, written and oral, did not explicitly discuss the complexity of their work, although closer examination revealed the intensity and depth of their experiences.

There was limited evidence of in-depth studies on the complexity of nursing or on how Nurses learn in the workplace (Ball & McElligot, 2003). Achieving a sound clinical capability required the Nurses to build on their knowledge of complex processes of managing equipment, of observation and management of multiple aspects of patient's physical condition and physiological status or of clinical decision making as the patient responded positively or negatively to the action taken. The

complexity was evident throughout the Nurses' descriptions of their learning, but was not made explicit by the Nurses in this study. Their examples did not include specific reference to the complexities of their work. Gordon (2006) suggested that lack of research situated around Nurses' roles had led to an ongoing public perception that Nurses were altruistic, silent, compassionate and caring. This was partly because Nurses had difficulty explaining what they did (Coetzee et al., 2005; Gordon, 2006).

In this study, the Nurses were specifically aiming to describe their learning experiences and, as such, were able to articulate their practice but did not highlight the complexity or value of their work. This is likely to be due to the nature of the research question in which they were exploring learning in particular. Gordon (2006) argued that although one of the reasons was concern for patient confidentiality, the acts of assessing patients, observing problems and taking action for the benefit of the patient had to be described without identifying the patient. This has been shown in the examples provided by the Nurses in this study on informal workplace learning, in which the Nurses explained their work in many situations relating to patients, without compromising the patients' confidentiality. Although the complexity of their work became apparent through analysis of their examples, the Nurses' descriptions did not show evidence of their own awareness of the complexity.

The tendency for Nurses to have difficulty recognising the complexity and value of their work has also been identified among carers in the related field of aged care. In Somerville's (2004: 178) study of trainees in aged care, it was the trainees' descriptions of problems they encountered in their journey towards resolving these issues that made the complexity of their work visible. Physical, political, social and organisational paths to be negotiated were made apparent in a carer's description of her experience of trying to move a resident out of bed and into a chair daily. The carer described the problems to be overcome, not her achievements in overcoming them. Similarly, it was claimed by Gordon (2006) that Nurses tended to credit the team, and thus the doctor who was perceived as heading the team, rather than taking credit for their own positive actions. Many of the Nurses who described teaching others in this study credited the learners with the positive outcomes, as with Sue in Chapter Six crediting Kristy with being a quick learner.

Technology versus workloads

Critical Care Nurses were frequently confronted with new equipment that they must use safely for their patients from the commencement of their shift. The time needed to master the new technology added to their workloads. They often gained information about the new technology during bedside handover from the Nurse on the previous shift. The new information could be the management of a new renal dialysis machine or new respiratory equipment, or it may be troubleshooting a specific problem with the equipment or nursing care unique to their patient. The Nurse handing over would explain or show the procedure to her colleague who was commencing the shift.

There was always the possibility, especially when equipment was recently introduced, that the Nurse who needed to administer treatment with the new equipment was not the one who was familiar with it. For many reasons, as seen in Karen's example of the CPAP in Chapter Five, Gerri's of the Kimal^{TM} in Chapter Six and Henny's example with the bronchoscopy in Chapter Seven, the Nurses had encountered neither the new equipment, nor the new procedures associated with it, before. In some instances they were allocated to patients with the new equipment, or alternatively, they were relieving other Nurses on a meal break when the treatment with the new equipment needed to be administered. On these occasions, the most likely source of information was from the Nurse handing over from the previous shift. The information gained would be limited to that Nurse's knowledge and ability to pass on the essential knowledge. The Nurses were learning from colleagues but this failed when it did not fill the gap of learning for all the staff on the shift. A Nurse relieving for meal breaks was unlikely to be advised of the use of the new equipment if it was believed that the patient would not need the treatment during that period. The Nurse who was not familiar with the equipment was occasionally the one who had to carry out the procedure when knowledge of the new technology was needed.

Workloads and education on new technology

New equipment was installed in the Unit without any restrictions on its use by accredited staff. When new equipment was introduced, there was the possibility of a

series of teaching sessions during handover. At this time a small group of Nurses were able to attended demonstrations, but the practical learning was undertaken at the bedside. The likelihood of follow-up guidance or support was unpredictable. The procedure was not held off because some Nurses were not yet competent to operate the equipment. The Nurses had to use the equipment and hope they did not make mistakes. Staffing allowed for the patient load only, so opportunities for teaching everyone new practices and new technology prior to undertaking these procedures were limited. As mentioned in Chapter Three, evidence in the literature of the impact of frequent introduction of new equipment and procedures is limited (Currey & Botti, 2003; Endacott et al., 2003; Kiekkas et al., 2006) except for specific studies on a procedure or new equipment item. An extensive study of the overall impact of ongoing changes would be useful.

Inadequate cover of knowledge across all shifts

The Nurses in this study could be rostered to any of three different shifts covering the twenty-four-hour day and the configuration of shifts for each Nurse varied. The ratio of Nurses from Grade A to Grade C was considered in the rostering of Nurses for each shift and this, to some extent, met Ball and McElligot's (2003) recommendation that staff ratios should be based on skill mix. That is, there were, whenever possible, a minimum number of experienced Nurses, based on the acuity and patient numbers on any shift. However, this did not ensure an adequate combination of Nurses who could provide a full compliment of knowledge and expertise in every aspect of nursing that might be needed on the shift. Hence, there was still potential for Nurses to be required to undertake procedures that were unfamiliar to any on the shift. At these times some Nurses revealed willingness and the motivation to work out how to deal with the problem or new procedure, whether it was learning to use new beds, fixing axiom drains or problem solving on the Kimal™. The Nurses' written examples revealed that those most highly motivated to manage all situations and new techniques kept up to date by preparing training sessions and written materials for others, plus reading in their own time. In previous studies, workers have reported personal benefits of learning and improving their own work performance through preparing manuals and teaching others (Bechtel & Davidhizar, 2000; Dymock, 1999; Gerber et al., 1995).

Time for patient care

The Nurses reported that they were challenged by the need to find a balance between the time taken to manage and fault-find on equipment, and time needed for direct patient care. This was reflected in the comment; *it takes away from patient care,* made about technology in Focus Group One. The relationship between touch and the patient has been debated in relation to intensive care environments in which the patient and nursing care of the patient were sometimes barely discernible in the surrounding technology (Barnard & Sandelowski, 2001; Walters, 1995). The Nurses in the Unit were aware that learning the troubleshooting of equipment often took time. In spite of the one-to-one nature of nursing in the Unit, the Nurses' perceptions were that learning to manage the technology interfered with time for direct nursing care of the patient. However, it was due to the one-to-one ratio that patients were likely to receive more care and contact than most patients on general wards, despite demands on continuous learning.

Learning experiences surrounding basic care in the workplace were rarely made explicit during this study, in contrast to the information provided by Critical Care Nurses in Coetzee et al's (2005) research. The participants' narratives contained few examples of routine patient care activities, such as hygiene, pressure area care or wound care, even though these nursing actions were integral to their work. These forms of care occurred more frequently than would be expected on general wards. Although basic nursing remained an important feature of the Critical Care Nurses' role, they were experienced in providing this care and it was not changing as rapidly as other aspects. The presence of multiple lines and equipment, along with the potential instability of critically ill patients, complicated the routine care procedures. The predominant learning experiences the Nurses described centred on critical incidents, complex procedures and technology.

Engagement with learning

This section explores the Nurses as learners in their workplace. The study has shown that the way in which Nurses engaged with learning in their workplace varied between individuals at various levels. Their engagement with learning in the Unit

was not only prompted by urgency and necessity, but also by the willingness and the motivation to learn (Newman & Peile 2002). The extent to which Nurses engaged in acquiring knowledge and new skills in the workplace depended on their subjectivity and their ontogenies, as seen in the discussion below.

Learner/teacher identity in ongoing learning

In the Unit, changes were constantly occurring with procedures and equipment, making ongoing learning an essential element of the work. The Nurses in critical care identified themselves as learners in their examples of learning, both written and spoken. This challenged Boud and Solomon's (2003: 330) concept that being identified as a learner was associated by their subjects with not being a 'fully functioning worker' when relating to those they were teaching. Such a concept would imply that all Nurses were limited in the way they performed. To the Nurses in the Unit, identifying with being a learner was vital for patient safety and wellbeing, plus it added value to their workplace performance. The Nurses were a prime example of the central importance of ongoing/lifelong learning. If they did not keep abreast of change they could not be a 'fully functioning worker'. However, the Nurses were open about their ongoing learning and about not knowing everything with those colleagues they were guiding/teaching. A key factor motivating them to continue learning was survival, their own and their patient's, and they portrayed this message when they were teaching.

In this study, some Nurses wrote about their learning from teaching others. The senior Nurses recognised that they too were learning from those they were teaching (Edwards 2003). When they were teaching, many senior Nurses endeavoured to acknowledge the previous experience and observational skills of new Nurses. Shaz' account in Chapter Six of her experience of learning while teaching new Nurses is an example. One of the new Nurses identified an error in the set-up of a ventilator. Shaz was unaware that the connections were different because she had not previously encountered an error due to incorrect placement. It was a learning experience that she, as a Clinical Nurse, was keen to use in teaching because it showed that fault-finding could build on knowledge of the equipment. In her role as mentor and teacher, Shaz was assessing the ability of the new Nurses to check the equipment

thoroughly and accurately before returning it to the Unit for use. Willis (2002:204) claims that:

> ... the teacher mentor has a kind of *licence to challenge* which comes from the inner experience of having overcome a particular learning challenge on the one hand, and of a strong feeling of oneness with the leaner being taught on the other.

This sense of oneness is extended further in the experience reported by Shaz. She was challenging her students, but also acknowledged that she was learning from them and that they had all learnt how to resolve a new potential problem. In contrast to the findings above, Boud and Solomon (2003) also recognised certain circumstances in which workers identified themselves as learners who were adding value in terms of benefit to the organisation and to their individual performance, but not in the presence of those they were teaching.

The circumstances in which workers saw themselves as learners and those in which they preferred not to be seen as learners were highlighted by Boud and Solomon (2003: 327-328) who argued that the label of learner in the workplace had social and political implications in which 'learning' and 'learner' were 'indicators of power relations at work and ... part of its social construction' (Boud & Solomon, 2003: 331). The teachers could not be seen as lacking knowledge, and if they labelled themselves as learners in a teaching context there was implied inadequacy as a teacher.

In their study, Boud and Solomon (2003) found that workers talked about how they learnt and it was clear that they used reflection to examine the process critically. For example, teachers in their study did not see themselves as learners when they were teaching, although they described themselves as learners with their colleagues. These teachers were employed as designated teachers, in contrast to the senior Nurses in this study, who undertook the role intermittently as an integral part of their position. This suggested a difference in power relations from that experienced by the workers in Boud and Solomon's (2003) study.

Mixed roles and identities

In the Unit, there were a range of clinical roles that commingled perceptions of who was learner and who was teacher. This was most apparent in the examples given by seniors who approached less experienced Nurses for guidance in the use of new equipment. This was openly practised in the Unit. The seniors recognised that the less experienced staff were involved with patients and the new equipment every shift. Consequently, they became more knowledgeable about the problems and related fault-finding than seniors who had various roles and worked with the new equipment less frequently. Newman and Peile (2002) also noted that learners in positions of seniority reported finding themselves less competent and feeling vulnerable when confronted with knowledge gaps.

There appeared to be limited evidence in the literature, indicating similarities or differences in the distribution of Nurses' roles in other critical care units. The multi-functional roles of Nurses in this study had a significant effect on the demands for ongoing learning. The senior Nurses in particular needed to keep up with every aspect of critical care nursing in order to function safely in any role allocated from shift to shift.

Nurses' priorities were not only for learning opportunities, but also for giving the kind of quality care that they would prefer to provide. The Nurses were constructing their identity within the Unit. Some chose to always have patient care and be nursing the patients. Some preferred to be co-ordinating the Unit as Shift Senior. This range of positionings had been identified earlier by Billett & Pavlova (2005), who noted that workers decided how they chose to engage with their work. Within the Unit where the Nurses were able to engage in many different types of work from shift to shift, and at times within shifts, they created identities within identities, or transformed from Team Leader to Shift Senior with different roles, responsibilities and positions within the hierarchy, in a similar way to reports from Billett and Pavlova (2005) and Billett and Somerville (2004).

Threat to patient safety

The flow of patients in the Unit could fluctuate from slow to extremely busy quite rapidly. It was not possible to predict the numbers or the acuity of patients. The Nurses often needed to assess and meet the particular critical needs of their patients immediately to keep them safe. Their examples explained the nursing interventions that were necessary to keep patients safe and revealed the way the Nurses accessed information quickly to fill the knowledge gaps just in time. The participants recognised that ad hoc learning could be a threat to patient safety, as they were frequently devising and actioning strategies to procure essential information.

The participants' responses affirmed Billett's (2004: 321) argument that increasingly individuals were being required to participate in ongoing learning activities as work practices and goals were continuously being transformed. Hence, the Nurses, like other workers, needed to engage in ongoing participation in workplace learning activities. Billett (2004) argued that these activities were structured and regulated by norms and practices in the workplace in an attempt to ensure continuity of learning experiences. The way in which learning experiences in the workplace were regulated depended on various interests being served inside and outside the Unit. Preferential treatment was at times given on the basis of seniority or institutional interests that facilitated control of workers' activities. However, individuals were able to choose whether or not they would engage in ongoing learning opportunities that were afforded and the individual determined the extent of participation in those practices.

Maintaining standards

The quality of care provided to patients by colleagues did not necessarily comply with a particular Nurse's standards. Nurses reported different expectations of each other in terms of promptly attending to necessary treatments, quality of care or omissions in care. These were reflected in examples of omissions by some Nurses, irrespective of their level of experience. In the examples given by George, Bev and Rachael in Chapter Seven, they noted that new graduates were not meeting their expectations of basic standards of care in the Unit, and that some of their colleagues seemed unconcerned. The fear of admitting lack of knowledge might be concealed by appearing unconcerned because there was no apparent harm to the patient.

These examples represented the deskilling that was occurring in the Unit as cost-saving strategies were being implemented at the organisational level. The duration of the critical care training course altered from twelve months to eight months, thus reducing the teaching periods and opportunities to hone skills. The students graduated with a basic understanding of critical care nursing and limited experience, with no formal plan for ongoing education and development of their specialty. Their clinical decision-making skills in relation to critically ill patients were reported to be at a rudimentary level.

In contrast, some Nurses were frustrated at not being able to implement their current knowledge and acquire opportunities to access further learning and experiential activities. In her example in Chapter Seven, Justine reported her frustrations at not having a Team Leader role that incorporated a teaching role. She felt that by not being given greater responsibility, she was not valued in the Unit. This response to workplace recognition was also highlighted by Billett and Somerville (2004: 316-317), who discussed the changing attitude and motivation of apprentices to their work as they learnt more and developed their knowledge and skills. They found that as apprentices became more experienced they preferred not to be identified with the more menial tasks that they were expected to perform as beginners. They began resenting tasks that they associated with early stages of their apprenticeship, such as sweeping the floors, and, over time, showed less respect for experienced workers. It could be interpreted that they did not see cleanliness and tidiness as important in safe and effective work practices. Alternatively, they associated these tasks with being seen as beginners and were ready for recognition of their ability as more advanced, skilled workers.

Justine believed that she was denied the opportunity to demonstrate her ability by not being allocated Team Leader roles and sought other ways of achieving recognition. She sought satisfaction in teaching others. To Justine, her identity as a capable Critical Care Nurse was in guiding and teaching others. She wanted the opportunity to share her knowledge and skills with others in the Unit. Justine dealt with this by transformation of her identity and worked in other wards where her knowledge of critical care nursing was valued. To Justine, work appeared to be of greater importance to her sense of self than to some other colleagues in defining self. Justine

was keen to engage in learning and teaching, but the opportunities or affordances offered to her did not meet her needs. The impact of such frustrations builds on Billett and Pavlova's (2005) observations that workplace conflict was more significant for those to whom work was at a more intense level.

The experienced Nurses' stories placed great emphasis on routine work practices taught as beginners, such as tidiness and cleanliness. They believed these approaches enabled them to find essential items and concentrate on the job at hand in an emergency. Tidiness has been emphasised in many fields of work where there is education of novices. However, as seen above, it has been found that apprentices began to think of these practices as menial tasks that identified them as novices rather than workers who were able to handle greater responsibility (Billett & Somerville, 2004: 316-317). As the Nurses became more experienced and reconstructed their identity, their stories showed that they valued and so returned to routine work practices such as tidiness, which enabled them to meet their standards and values in caring for patients.

Critical thinking

The written narratives and input to focus groups indicated that the participants based their decisions on experience and knowledge. Those Nurses who had more extensive time in the Unit reported events in which critical thinking and reflection played a role in enhancing the care of their patients. Such examples were presented by Nurses such as Debbie questioning the carbon dioxide levels, Rick and his patient with end-stage respiratory disease and Rachael in her description of critical thinking in Chapter Seven, as well as Dave in relation to cardiac surgery in Chapter Five. They had cared for many patients with the conditions they described in their examples and were familiar with the disease or the surgery undertaken, the treatments, the medications, the patient's physical and mental state, and the appropriate nursing interventions. With their experience, they were making seemingly intuitive choices or questioning practice so that they could care for their patients most effectively.

The examples revealed that the Nurses' decision-making in relation to their patients had become clear to them, such that they could communicate the choices in an

explicit way to colleagues. In a similar manner, Eraut (2000: 257) recognised that intuition was acquired implicitly without explicitly understanding the source of the knowledge. However, he argued that there have been examples where intuitive insight was made explicit by individuals who were able to describe the links leading to their understanding of the situation. Although Dave made intuitive decisions about the choice of medication in relation to each patient, he had made connections that enabled him to explain the process to others.

Building expertise

Nurses who were able to access assistance and information effectively learnt quickly and were increasingly viewed as experts. It was apparent that these Nurses initially asked more questions and did not appear to be concerned about people being aware of their knowledge deficits. They in turn were asked for help more often and worked out more problems to add to their repertoire. By seeking to assist others, these Nurses built on their knowledge, and gained power and acceptance. My journal notes made during the study indicated that such outcomes for some Nurses evolved over several months.

Affordances in the workplace

This section addresses the affordances for learning that were offered. In the Unit, the means by which learning opportunities were made available and the factors that influenced Nurses in taking up learning were limited by organisational support. The Nurses, who were required to build knowledge and new skills to keep abreast of rapid change in their workplace, overcame these limitations by providing learning opportunities amongst themselves and were motivated by the need to ensure the safety of patients. The teaching and sharing of knowledge helped the Nurses to provide safe, effective care, which had earlier been recognised by Apgar (1999) as a key factor for trauma practitioners.

The senior Nurse, Bev, showed a desire to ensure patient safety and provide new Nurses with essential information. This motivated her to seize the opportunity to provide guidance for two Nurses in new positions. Her example in Chapter Six revealed the difficulties that arose when two Nurses, both learning new roles, were

endeavouring to provide safe care. Their combined knowledge was not adequate to meet all the safety needs of the patient. By identifying omissions and bringing these to the notice of the novices, Bev contributed to their learning. She also spoke to the new Nurses' preceptors, which caused them to reflect on the support needed for novices in their group. Bev's example revealed the need for ongoing support, after the initial formal workshops or orientation. Similarly, Technical and Further Education Practitioners providing training within private enterprise found that once they had addressed the discernible gaps in learning, they identified ongoing learning needs in the workplace. As a consequence, they began to work with individuals more holistically by supporting their development in the workplace (Harris, 2005).

Teaching others

Many participants talked and wrote about teaching to share knowledge and to learn as they taught. By teaching they felt valued, helped to prevent others from making mistakes and helped others to be proficient in their professional practice. Many Nurses taught one-to-one at the bedside in addition to their own workload. Manias and Street (2000) emphasised Nurses' fear of critique of their nursing care but did not recognise the value of the teaching and learning opportunities that were identifiable in this study. When the Nurses were teaching at the bedside, their examples revealed that they emphasised the importance of giving learners time to watch and practice. They would manipulate the work so that the learners were able to concentrate on the new procedures. In a similar way to that identified in Harris and Simon's (2001) study of trainers in small business, Sue revealed in her example in Chapter Six that she assessed Kristy's learning needs and gave Kristy the opportunity to practice those procedures Kristy had not previously encountered. Some Nurses built their knowledge and skills in a specific field such as retrieval or neurological nursing so that they were able to provide support to others. Teaching was also seen as an avenue for promotion.

Team work

The geographical and functional aspects of the Unit encouraged team work. It was an open circle environment where most events, activities and interactions were apparent to all in the Unit. The Nurses became involved with each other's patients because

they assisted in pairs or more with many procedures. They rarely worked alone or missed an opportunity to comment on each other's patient, equipment or nursing care. All these factors meant it was not easy to hide a lack of knowledge. The Nurses recognised the essential need to seek out help, ideally from those Nurses with whom they felt comfortable about revealing their deficits.

In Somerville's (2003c) study, workers in aged care also reported a frequent need to rely on others to give adequate care. In both environments, the care of bodies predominated. Most movement of patients in critical care and of residents in aged care required more than one worker. The workers in aged care did not always have assistance when needed, and negotiation of the quality of care occurred with other workers (Somerville, 2003c: para 18). The new carer decided who she would model and whose practices to avoid.

Handover

Much of the Nurses' learning and teaching took place when sharing information from shift to shift during handover and during shifts. There were a number of examples in which Nurses revealed the teaching and learning that occurred through description, explanation or demonstration during bedside handover. They recognised that handover either at the bedside or as a group at the commencement of a shift was valuable teaching time. The working relationship between Nurses influenced the effectiveness of information sharing. In the focus groups, Nurses discussed the impact on learning that had occurred when shift timings were changed and when the Unit expanded. As a result of these changes, the 'big handover' had ceased, with the consequent loss of a productive learning opportunity.

Relational interdependence and co-participation

Gerri's example in Chapter Six demonstrated the co-participation between Nurses in the Unit. Gerri gained her information when under time pressure by asking colleagues, plus following prompts in the software and manual. She was well enough established in the Unit to readily access collegial support. Gerri had chosen to engage in any way that enabled her to achieve the goal of commencing dialysis for her patient. This example supported Billett's (2004: 320-321) position of the

existence of a relationship between the individual's choice to engage in practices that led to learning and the activities that were afforded in the workplace. The activities and interactions in which the individual participated could be within contested workplace practices, in which the affordances offered were influenced by power, gender, social interactions, knowledge and perceived competence. Billett, (2004: 320) claims that '[i]ndividuals will decide how they will participate in and what they learn from what they experience'. This demonstrated a relational interdependency between individuals and the social practices in their workplace (Billett & Somerville, 2004: 321; Fenwick, 2005: para 15, theme 5). As a consequence, some individuals gained more support and learning opportunities that arose from working with colleagues than others.

Guided learning

Guidance in learning had limitations in the environment in which the Nurses worked. In the Unit, support and guidance for new Nurses relied on allocation of an available and willing senior Nurse. This senior Nurse was usually called the preceptor, although the Nurses in the Unit often used the terms mentor and preceptor interchangeably. There was minimal structure associated with the preceptoring role. The variable shifts inhibited continuity in working with a guide or preceptor on every shift. On occasions the preceptor and beginner were scarcely able to meet over several weeks. Previous studies have also reflected such limitations in ensuring adequate frequency of contact with mentors (Billett, 2000; Dymock, 1999). Willis (2002: 204) describes a mentor as someone who is 'engaged in a supportive relationship with people attempting to learn/ become something'. He adds that the mentor is usually relatively successful in the work and provides 'living proof that the learning tasks being attempted can be achieved'

Support for learning through preceptors was ad hoc in the unit. Although experienced Nurses offered guidance or support, as revealed in their writing or discussions, a form of guided learning was not apparent. Billett (2002: 469) claimed that the concept of guided learning was essential for learning in the workplace, although the limitations of mentoring were recognised particularly in small business where the mentor was likely to be the owner-manager. Workplace trainers as such

were not employed (Billett, 2001: 212). Apart from orientation over three to four days, as described earlier, time and staffing for guided learning was not part of the structure of the Unit. Responses from participants in this study suggested that this was an area that requires further exploration.

Power relationships

The staff were allocated to patients and where they were located highlighted the influence of power, favouritism, perceptions of individuals' capabilities and the need for learning opportunities in the Unit. As described in Chapter Six, only the senior Nurses allocated staff to patients, so the junior Nurses had limited influence on the decisions and the learning opportunities that could be offered on any shift. The criteria that senior critical care Nurses used for allocation to patients, as well as the critical care Nurse's role for the shift, reflected the power relationships within the workplace.

There were many considerations influencing the decisions for allocation of critical care Nurses. The acuity of the patient, the number of patients at the time and the capability of critical care Nurses influenced the learning opportunities that were available on a shift. The Nurse's preferences or requests to work in an area or to avoid likely conflict and preferential treatment could also affect decisions. The affordances to experience activities that enhanced their learning were not spread evenly among the one hundred and twenty Critical Care Nurses on staff in the Unit.

Negotiating the obstacles

Nurses negotiated pathways of communication both between doctors and in their own conversations with doctors when obtaining advice or decisions about treatment for patients, as identified by Benner et al. (1999). Nurses use indirect patterns of communication to achieve medical intervention for their patients. In the Unit, Nurses reported that they felt they were in the firing line when things went wrong and believed verbal abuse by the doctors had a powerful negative impact on learning. As a consequence the Nurses' examples indicated that they often became selective about who they would approach for advice or medical orders for their patients.

In Chapter Seven, Dave described the difficulties of obtaining agreement between doctors on the type of dialysis needed for his patient. The doctors did not consult each other, but sent messages through the Critical Care Nurses, who had to juggle the power-plays between the doctors in order to care for their patients. They could not choose not to administer the treatment until there were clear medical orders because the patient could deteriorate. These negotiations with doctors also took up the Nurses' time.

The Consultants could make decisions and write or give orders concerning patients without explanation or consultation with the Critical Care Nurses. Baggs, Schmitt, Mushlin, Mitchell, Eldredge, Oakes and Hutson (1999) identified that nursing input was not needed for medical decisions, even though nurses had more contact with the patients. In contrast, in the current study, the Nurses only had the opportunity to influence decisions made by doctors through communication or collaboration with them. Hence, the Nurses were aware of their limited opportunity to have an influence on any specific decision concerning patients. The final decision was evidence of their success or failure in being heard. The doctors had the theoretical knowledge to silence the Nurses. There remained the perception that medicine was masculine and nursing was feminine, with the associated gender issues as discussed below.

Gender and communication

The method of communication by the Consultants with the Nurses was not reciprocated. This reflected the power and position of the doctors to assume that the Nurses were in error and communicated this accordingly, but the Nurses were not in a position to speak in a similar manner. In the last focus group, the issues affecting the way Nurses learnt in the Unit were touched on, but were followed by: 'But we can't change that'. A number of factors contributing to the problems appeared to be the length of time taken for the medical ward rounds, the organisational attitude to the cost of nurse education, the policy of not refusing admissions to the Unit even when there were not the staff to nurse them, and the doctors' reluctance to use opportunities to teach on rounds.

The gender divide was apparent in the Unit, in which the doctor-nurse hierarchy was made visible. All the permanent doctors were men and although approximately thirty percent of the Nurses were men, they worked in a field that was perceived as women's work. Brader (2001) explained this position as a power achieved through recognition as an independent profession, which had contributed to the abuse of nurses. It perpetuated the medical dominance. The interactions in the Unit and the learning opportunities for the Nurses reflected the issue of nursing as women's work.

Coping with abuse

When there were problems during procedures and in emergencies, the Nurses were frequently held accountable and expected by the doctors resolve any problems. Henny's example in Chapter Seven of one day in the life of a Critical Care Nurse provided insight into the environment in which they worked. She described the implied incompetence when managing a cardiac arrest with another Nurse as the patient arrived in the Unit, followed later by audible abuse heard across the Unit and lastly anger with the Nurse during a bronchoscopy when the equipment failed. The Nurses found ways to negotiate a change for their survival. Some of the avoidances were revealed in their examples. The need for change might be associated with work pressures, or personal demands and changing to part-time work. Some chose to change from senior to patient care or to Team Leader, or voiced their need for a break from a patient or a doctor. From the examples, the evidence of the effect on Nurses of verbal abuse by doctors was manifested in a gradual change in the way the Nurses engaged with work in the Unit, such as avoidance or by leaving critical care nursing as in Henny's example.

Affordances and women's work

Howell, Carter and Schied (2002) explored the role of education in the workplace. They were looking at the influence of organisational training and development on workplace learning. However, the insights into gender related affordances can be considered in relation to the attitudes and social and political influences between the positions of workers within an organisation (Howell et al., 2002). The perception of nursing as women's work in which caring and nurturing are natural abilities that need limited ongoing learning influenced the affordances within the Unit. Gordon

(2006, para 20) claimed that the public does not know of nurses' knowledge and 'that nursing is a package of medical, technical, caring, nursing know-how – that nurses save lives, prevent suffering and save money'. She argued that the reason the public do not know of nurses' work and knowledge is because nurses do not remind themselves of their own knowledge and capability, and their influence on patient outcomes. In this study, Nurses were articulating their work, knowledge and learning in their examples, but this is not necessarily verbalised or made public.

Part-time workers

Goals at work changed for some Nurses as they made the transition from full-time to part-time workers. Philippa, for example, described having less motivation when she came back from maternity leave and changed to part-time. Her life outside work had become a greater focus since the growth of her family. At the time of the study, part-time Nurses in the Unit were not eligible for promotion from Level 1. If Critical Care Nurses had been employed as Level 2 Clinical Nurses and returned from leave to work part-time, regardless of their qualifications, experience, capability, enthusiasm and proactive nursing, they were downgraded to a Level 1 position. Probert (1999) also found that women were disadvantaged in their careers when they chose to work part-time.

Conclusion

The predominant aspects of learning and engagement with learning that emerged have been presented in this chapter. These components become meaningful, when understood within the context of Illeris' (2000, p18) three dimensions of learning and a summary of these is presented.

In review, the cognitive approach comprises the acquisition of knowledge and skills. The emotional component is described by Illeris as the psychological energy that drives and influences learning through individual 'feelings, emotions, attitudes and motivations' (2002: 18) and the social dimension is a combination of the social, interpersonal interactions, and the societal context underpinning and affecting the

nature of the interaction and the individual engagement. These three dimensions operate concurrently to form a whole.

An understanding of the interrelations of Illeris' three dimensions of learning elucidated the complexity of learning the Unit. It enabled the processes to be clarified while acknowledging the interdependencies of the cognitive, emotive and social dimensions of learning. The influences on learning that have been identified through an analysis of this study can be broadly divided between the three dimensions of learning, but also reveal the interdependencies.

In this chapter, the aspects of learning which had the most impact on the way new knowledge was acquired in the Unit have been emphasised. In the final chapter all the categories and sub-categories emerging from the data are mapped to present a new framework to interpret learning in a critical care setting.

Chapter Nine

Complexity of the Whole

This study examined the ways Critical Care Nurses understood informal learning in the Unit, as they enacted participatory action research principles to enable them to implement strategies to enhance their professional practice. The Nurses produced written examples that detailed their contextual experiences of learning. They also shared strategies in focus groups and opportunistically about ways to capitalise on their growing awareness.

The intrinsic complexity and technology associated with critical care has the potential to overshadow the patient, who should always be the primary focus. In analysing the elements of the processes of learning that are occurring in this workplace, the existence of cognitive, emotional and social dimensions can be visualised as seen in Figure 2 (see next page).

The three dimensions are broadly depicted by the three metaphorical plant boxes revealing the aids that nurses use for learning and teaching. The knowledge and skills are acquired through the cognitive dimension of learning and teaching. The garden beds in which the challenges to learning have been sown are entered and exited via pathways that deviate from the goal of optimum care of the patient. All the paths eventually lead to the heart of the maze in which nurses must overcome the complexities and challenges of technology. This illustrates that the central focus of critical care nursing which is the safety and care of the patient.

The seeds are planted as the Nurses seek out knowledge, often urgently, by any means. They also share knowledge and teach those who are novices to the Unit or to new procedures and technology. As the Nurses learn they must negotiate beds of intertwined obstacles and challenges to the heart of their work.

GARDEN OF LEARNING AND TEACHING WITH MAZE OF COMPLEXITY AND TECHNOLOGY

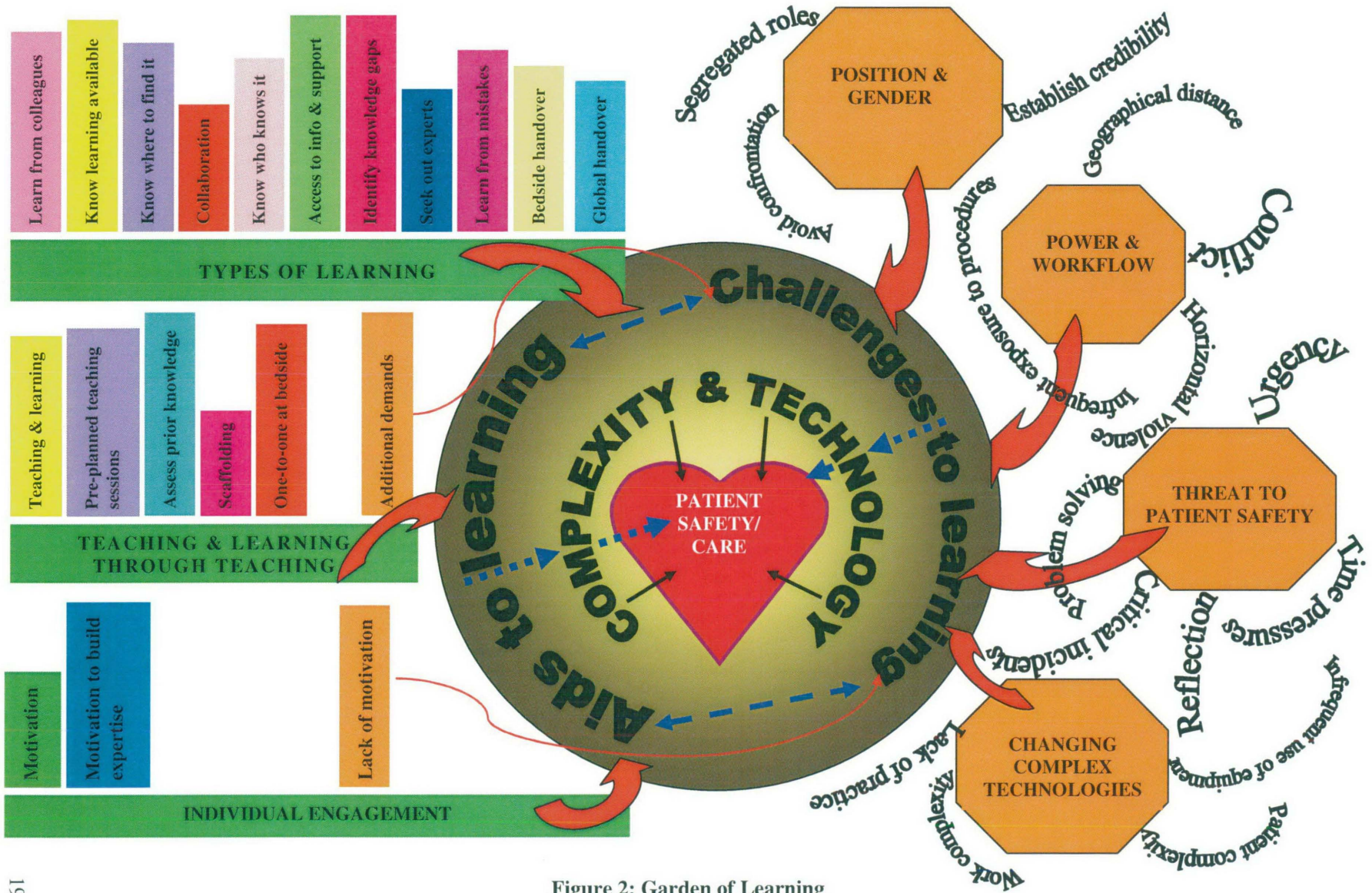


Figure 2: Garden of Learning

The three dimensions do not function as separate entities but rather are interdependent. The cognitive aspect involves the 'content of learning' and the emotive involves the 'dynamics of learning' (Illeris 2002: 72). The emotional component or motivation to learn influences the cognitive acquisition of knowledge and skills through the individual's willingness to engage in learning opportunities Motivation is also influenced by the social environment of the workplace in which there may be collaboration, conflict, power relationships, horizontal aggression, time pressures, or the complexity of the work. Motivation, as an emotional component, can influence retention of new knowledge and the transfer of that learning into different contexts and to further learning (Illeris 2002: 73).

In this study Illeris' (2002: 142-143) social dimension of learning was evident in the way it was 'tied to community and practice, and creates meaning and identity'. The societal component of his theory of learning is social obligation. This was reflected in the sense of obligation that the Nurses had towards to nursing the patients rather than focusing only on the technology. All paths in the maze lead to the heart of the matters where the learning must be achieved and challenges overcome to provide safe and effective care to the patient.

Anne-Marie's experience presented at the beginning of this thesis demonstrated the complexity of nursing work and learning in the context of critical care. The complexity lay primarily in the technology and the management of critically ill patients. This exemplifies the ways that many Nurses seized opportunities to gain knowledge and skills whilst thinking critically to make decisions about the care of their patient. The sharing of knowledge has been shown to be an essential component of their learning. The narrative also shows how enthusiasm to learn when the opportunity arises has significant benefits when Nurses retrieve their knowledge in an emergency. The example revealed the challenges in communicating a sense of urgency in order to obtain prompt medical responses, plus an ability to manage in critical situations.

Anne-Marie: *I was amazed that I managed to not only be of help, but initiate and anticipate in this nightmarish situation.*

Her comment above shows that she has reflected on this experience and had not only gained new knowledge about nursing care but also recognised her own ability to respond to and manage critical situations. Through accommodative processes, she has incorporated new knowledge and awareness.

Outcomes

Overall this research has mapped out the many ways in which Critical Care Nurses in a specific Unit managed the complex and rapidly changing work environment in which they worked under the pressure of caring for critically ill patients. They learnt on the run as they managed fluctuations and unpredictability in each shift. The Nurses reported that their learning depended on the actions they took to gain information as quickly as possible. They sought out those who were approachable and knowledgeable, and they collaborated to learn together. They also worked in this way with some consultants and junior doctors (Carmel 2006).

Contrary to commonly held beliefs, this study demonstrated that the senior Nurses in the Unit could not be assumed to possess the most advanced knowledge in all aspects of their nursing. Like Ball and McElligot's (2003: 230) study, the attributes of knowledge, experience and exposure of individual Nurses contributed to the overall outcomes of their patients. The junior Nurses in the Unit were more likely to have greater exposure and hence greater proficiency managing new technology. An awareness of this enabled Nurses to freely access support from those who had the technical knowledge and to share and integrate this with the experiential knowledge of the more senior Nurses. Not only was it made explicit in this study that the senior Nurses were not the most skilled in some aspects of their work, but also revealed that an awareness of this amongst the Nurses in the Unit influenced their learning practices.

The development of policies and procedures to achieve an overall balanced skill mix, where the junior rather than the senior Nurses had the exposure to the new technology, might appear to be sufficient action to resolve these issues. However, the junior Nurses reported that they lacked the level of experience and knowledge to fully identify evidence of clinical changes and be proactive in management of their

patient. Although the Nurses in this study viewed experts as the ones who had exposure to the new technology, they needed to be aware that the junior Nurses had limited experience in other aspects of patient management, such as anticipating and acting on changes in their patients that might need guidance. By making this explicit through the study, the senior Nurses were able to facilitate junior nurses' learning in the workplace by linking their technical skills with knowledge to enable them to be proactive in patient care.

In general terms, Nurses who were experienced and established in the Unit were able to access support and information from colleagues more effectively than junior Nurses. The examples also indicated that junior Nurses were less likely than more experienced Nurses to attract support from colleagues, in particular when receiving new admissions, returns from the operating theatre and experiencing technical problems. There was limited evidence of this in the literature and the potential to make change here needs to be explored further. The evidence from this study suggests that experienced Nurses need to be aware of the tendency to assist some colleagues more than others, and to be more proactive in identifying the transient and pressing needs of all staff.

The Nurses were frequently required to change roles to accommodate new admissions. Such disruptions had an effect on other patients and a number of Nurses. Resolution strategies identified in the Unit recognised the necessity to roster and allocate staff based on patient needs, Nurses' skill mix, patient acuity and taking account of the geographical layout. This affirmed Ball and McElligot's (2003: 234) findings. All these factors influenced the ability of Nurses to respond effectively to patients as they were admitted to the Unit. The Nurses argued for staffing based on patient needs rather than 'fiscal imperatives'.

Effects on learning in the Unit

In their initial responses, the Nurses expressed feelings that they could not change the culture of the Unit. Over the space of the study change became apparent through reflections on the learning process, seizing responsibility for their learning and working collaboratively. They became part of the participatory action research

project, encumbered with all the restraints of shift work, of not all being able to get together, and with emergencies and interruptions. As they began to explore how they were learning, the Nurses found the time and the motivation to engage in an ongoing manner. Some strategies trialled during the study are ongoing, others have been transformed to fit particular needs more precisely/effectively, and inevitably some could not be maintained. These strategies addressed specific areas and small pockets of learning for Nurses in the Unit.

Some nurses formed small Specialist study groups to share and build on their area of expertise developing resources and being a resource for other Nurses in the Unit. There were groups specialising in neurology, midwifery, orthopaedics, and wound care. The continuity of these depended on the enthusiasm of a group leader.
The participants explored the possibility of revisiting their journal club, which continued to fluctuate inversely with periods of increased workloads. In-service education was also revisited with a less ad hoc approach to planning the sessions and continued successfully. Building on the clinical teaching skills that Nurses currently use in bedside teaching was also explored and developed. The outcomes of these strategies will be explored in a later paper and points to the need for more in-depth examination in the future.

Contributions

This research adds to the body of evidence related to how individuals learn throughout working life, and how their priorities and motivation to explore new knowledge, change as their lives alter outside the workplace. The study reveals the deeply operational character of the challenges and exchanges of Critical Care Nursing. It shows what is happening, how nurses manage the learning they need to pursue; how they talk about it and how they manage to continue to practice. It adds support to the application of Illeris' (2004a & b; 2003) theory of learning within a workplace environment.

There were senior Nurses with extensive expertise in critical care nursing, who found that on returning to the workforce after maternity leave, their lives and priorities for career and work had changed. They were more likely to take part time

work. The difficultly in updating clinical skills and knowledge, especially for part time Nurses, have been revealed in this study, thus highlighting the importance for institutions to offer options that maximise learning opportunities for these Nurses to keep up to date with new procedures and technology.

Implementing guided learning as described by Billett (2000; 2002) is problematic in a critical care unit where organisational support for learning can be limited. Such options as staff development, planned and facilitated, and repeated in small groups at unit level, require financial investment in ongoing learning to ensure staff are released for such sessions.

This study articulates aspects of nursing practice and adds to the understanding of the critical care specialty area. It makes explicit the complexity of Critical Care Nurses' work, and reveals the manner in which they responded to challenges. The complexity is not only in the technology but also in the patient's condition (which can include multiple disease processes). Accurate assessment and recognition of change in the patient's condition, linked with the ability to make clinical decisions on the appropriate nursing interventions adds to the complexity.

The study builds on Coetzee et al's (2005) investigation of Critical Care Nurses' awareness of their learning needs in a specialist paediatric unit, confirming that Nurses rely heavily on gaining information by asking for guidance from those who they identified as approachable and knowledgeable. This research revealed many of the difficulties of learning in the workplace. Also the Nurses' contributions have uncovered the reality of less than adequate outcomes. The Nurses in both studies were learning in situations against the odds, in which their skill mix and the difficulties of providing or receiving adequate support and guidance became apparent. Although the complexity of Nurses' work in critical care became apparent through analysis of their examples, the Nurses' descriptions did not articulate awareness of this as a central focus.

Filling the gaps in research

There appeared to be limited documented evidence indicating similarities or differences in the distribution of nurses' roles in other intensive care units. In this study, the Nurses were working in a general paediatric and adult critical care unit with a broad spectrum of trauma, disease and related technology. These multi-functional roles of Nurses had a significant effect on the demands for ongoing learning. The senior Nurses on any shift were required to undertake the role of shift coordinator, teacher, team leader or practitioner with patient care. As such they had a particular need to keep up with every aspect of critical care nursing in order to function safely in any role allocated from shift to shift. It has been shown in this study that the majority of their shifts comprised coordination of the Unit with limited time nursing patients. When providing direct nursing care to patients the senior Nurses identified and gained support from junior Nurses who had more frequent contact with the patient and the related technology. Such strategies of accessing appropriate colleagues to enhance learning and overcome deficits in knowledge were made explicit throughout this study.

This study has detailed ways in which Critical Care Nurses go about learning, without organisational support, while knowing the consequences to the patient of getting it wrong, or omitting treatment or nursing interventions. Being licensed to practise as a Registered Nurse is an enormous responsibility and in this environment the stress of ensuring that other Nurses are working safely is very high.
Some Nurses began using new strategies to enhance learning, but these were difficult to maintain on shift work, without support in terms of time made available in the form of additional rostered Nurses.

Limited evidence was apparent in the literature related to the way in which Critical Care Nurses procured knowledge and new skills informally to meet urgent demands for their application in the workplace. There were studies on programs for learning, many based on information technology. There was also an increasing popularity for evidence based practice studies, but these do not have the capacity to provide learning to meet the multitude and pace of changes in nursing practice in a critical care unit (Davies, 2005).

Future research implications

I began this study conscious of the need to make visible the importance of informal learning, in clinical nursing into something coherent. I and my professional colleagues knew that for the level of complexity and critical nature of the work, a piecemeal approach to such learning was inadequate and stressful. Early in this thesis, it was explained that the shortfall between training received and performance required was filled by informal learning that occurred principally through trial-and-error, incidentally, and just-in-time from manuals or colleagues. I had believed since my Masters in Nursing Studies (Dew, 1994) research that there were elements of theories of nursing and reflective practice that would be valuable to Clinical Nurses who do not have access to the academic thinking and literature about learning in clinical practice or in the workplace.

Strategies to enable Nurses to share their learning with colleagues, to value the knowledge they already have and to develop a deeper understanding of their own and the workplace's influences on their learning require further investigation. This would provide Critical Care Nurses with feedback on ways they might enrich and enact these strategies for learning.

The literature on workplace learning revealed an inter-relational dependence between the individual and the workplace in offering learning opportunities, and their appropriation by the worker. Billett (2002b: 460) claimed that learning was influenced by the affordances offered in the workplace and whether or not individuals elected to engage in them. I also found that opportunities to participate in learning were not uniformly distributed. Just as Billett indicated, those workers who were able to access support from others or who were offered support were afforded greater opportunities to learn than those who were marginalised. This study showed that some Nurses felt they were not given the opportunity to demonstrate their skills and knowledge through increased responsibility and hence were not able to extend and apply all their learning. An understanding of these relationships and an awareness of those elements that marginalise or restrict access of some Nurses to workplace learning has the potential to promote the development of a broad variety of affordances. There is potential for future research in investigating whether an

understanding of the politics of affordances by the Nurses would improve the opportunities for those who appear to be disadvantaged in the workplace.

It has been identified that that there is a need to explore in-depth the extent to which beginning Nurses in critical care are supported by experienced colleagues and to explore the Nurses' understandings of how to scaffold this learning effectively. The extent to which the senior Nurses are aware of the supportive needs that beginning critical care nurses have for knowledge building, assistance and guidance in patient care requires further investigation.

In some units, Nurses do not have access to organisational arrangements for learning and updating their practice. In this study, the participants focussed on implementing change in conjunction with colleagues in the unit. Further research which explored the impact of policy changes within critical care units to facilitate such opportunities would be appropriate.

Conclusion

The unique aspects that this study highlighted were the multiple effects of the pace of change, the overall complexity, including the technology, and the deficit of guided learning in a critical care unit. This study revealed the Critical Care Nurses' specific experiences of learning through the diverse examples that they chose to write about knowledge acquisition in the workplace. By allowing Nurses to write their own stories, in real situations, their voices were more likely to be heard. There was less opportunity for their work to be overlooked, devalued or silently subsumed under the heroic contribution of the medical specialists. Supporting the practice of these highly skilled Nurses was important for them personally and professionally and particularly important for the people and families in their care and the society in which the Nurses worked.

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Appendix One

Approvals for Research

XXXXX

CONSENT TO CONDUCTING RESEARCH IN XXXXX

"A qualitative study of informal learning in critical care nursing."

I, _____ give my consent for Sally Dew to conduct research in the XXXXX. I acknowledge that this research study will include focus groups and exploration, by the participants, of their informal learning, in the clinical setting.

I acknowledge that the researcher will make every effort, to avoid imposing on patient care.

I acknowledge that this research is being reviewed by the Clinical Investigations Committee at XXXXX.

Signature _____Date _____

Position _____

_____

[redacted] Clinical Research Ethics Committee

10 April 2000

MEMORANDUM

TO: Ms. S. Dew, RN, [redacted]

FROM: [redacted]

TOPIC: **Research Application 25/00**

I am pleased to advise that the [redacted] Clinical Research Ethics Committee has approved your research application in accordance with the following extract from the Minutes of its meeting held on 27 March 2000.

4750 RESEARCH APPLICATION 25/00 – MS. S. DEW
A qualitative study of informal learning in critical care nursing.
Reviewer: [redacted]

This application (including revised information sheet, confirmation of supervisor approval and clarification of use of transcripts) was approved.

If conditional *('subject to' or 'in principle')* approval is granted, research involving human subjects **may proceed only after written acceptance of the conditions of approval** (including a copy of the modified research protocol) has been received by the Committee.

This approval is for a period of one year. Application for re-approval must be made annually. Please note that if this trial involves normal volunteers it will be necessary for you to keep a record of their names and you may be required to supply this list with your annual report.

You are reminded that the [redacted] Clinical Research Ethics Committee must approve the content and placement of advertisements for the recruitment of volunteers.

The Committee must be notified and approve any changes (e.g. additional procedures, modification of drug dosage, changes to inclusion or withdrawal criteria, changes in mode and content of advertising) in the investigational plan particularly if these changes involve human subjects.

The safe and ethical conduct of a trial is entirely the responsibility of the investigators. While the [redacted] Clinical Research Ethics Committee takes care to review and give advice on the conduct of trials, approval by the Committee is not an absolute confirmation of safety, nor does approval alter in any way the obligations and responsibilities of investigators.

It is the duty of the chief investigator to give prompt notification to the [redacted] Clinical Research Ethics Committee of matters which might affect continued ethical acceptability of the project, including:

1. Adverse effects of the project on subjects, including the total number of subjects recruited, and of steps taken to deal with these adverse effects.
2. Other unforeseen events.
3. A change in the base for a decision made by the Committee, e.g. new scientific information that may invalidate the ethical integrity of the study.

If patients are involved the chief investigator is also responsible for the process of notification, seeking approval or permission of Departments, Divisions or individual consultants.

[redacted]

The [redacted] Clinical Research Ethics Committee is constituted and operates in accordance with the National Health and Medical Research Council's National Statement on Ethical Conduct in Research Involving Humans (June 1999).

Appendix Two

Information Sheet and Staff Consent Form

XXXXX
STAFF INFORMATION SHEET

" A Qualitative study of informal learning in critical care nursing"

I am currently enrolled in a PhD program at the University of New England under the supervision of Dr Margaret Somerville and Dr Darryl Dymock.

Nurses with a minimum of six months of experience in a critical care unit, are invited to take part in a study of the informal learning skills of critical care nurses.

Informal learning is predominantly learning from experience, and includes learning from mistakes, or trial-and-error. Also, the outcome is unpredictable. Although informal learning may be a consequence of an inability to meet training needs, it is inevitable that in any work place, informal learning, in one form or another will take place.

If you choose to take part in this study, you will have the opportunity to collaborate in exploring and implementing strategies for optimising informal learning, in the critical care unit.

As a participant in this project, you will join in a series of focus groups and clinical phases, in which you discuss informal learning, and decide on strategies for exploring your informal learning skills, in the clinical setting. There will be four half-day focus groups, alternating with clinical phases of four months. It is anticipated that the first focus group will be held in May /June 2000. The study will cover sixteen to eighteen months.

It is important that discussions from the focus groups are shared with other nurses in the unit. The same process that is used with the unit staff meetings will be adopted. The transcripts of the discussions and decisions from the focus groups, will be placed in a folder and made available to all nurses who work in the unit. You are free to discuss the study with any nurses in the Critical Care Unit.

You need to be aware that you will be identified in the transcripts. It will be my responsibility to remind you, prior to, and if necessary, during, the focus group. The advantage is that your contribution to the study will be recognised. Any of your conversations in the focus group will be deleted at your request. You also need to be aware that the researcher is obliged to disclose any unethical activity that becomes evident in the process of the research. Your involvement in this study is voluntary and you can withdraw at any time without prejudice. Your non-participation will not affect you at XXXXX in any way.

If you have any questions about the research, either before, or during the study, you can contact me, (Sally Dew), at home on XXXXX or at work on XXXXX.

The supervisors for this study are Dr Margaret Somerville, and Dr Darryl Dymock, who can be contacted at the School of Administration and Training, in The University of New England, on XXXXX and XXXXX, respectively.

This study has been reviewed by the Research Ethics Committees at the University of New England and XXXX. Should you wish to discuss the study with someone not directly involved, in particular, in relation to matters concerning policies, information about the conduct of the study, or your rights as a participant, or should you wish to make a confidential complaint, you may either contact the Administrative Officer – Research, XXXXX, at the XXXXX, or the Secretary Human Research Ethics, XXXXX, at the University of New England.

XXXXX

STAFF CONSENT TO PARTICIPATE IN RESEARCH

I, _____request and give consent to my involvement in the research study entitled "A qualitative study of informal learning in critical care nursing". I acknowledge that the study has been fully explained to me by Sally Dew and my consent is given voluntarily.

I acknowledge that I will be participating in focus groups and exploring informal learning, in the clinical setting. I understand that the audio-taped or written transcripts of the focus groups will be placed in a folder and made available to all nurses who work in the XXXXX.

I give permission for the use of data and other information gained, to be used in the completion of a research thesis and publication.

I have understood and am satisfied with the explanations that I have been given. I have been provided with a written information sheet.

I understand that my involvement in the research study may not be of any direct benefit to me and that I may withdraw my consent at any stage without affecting my rights or responsibilities of the researchers in any respect.

Signature of participant _____Date_____
Signature of witness _____
Printed name of witness_____

I, Sally Dew as the researcher, have described to_____ the research study and what it involves. In my opinion, he/she understands the explanation and has freely given his/her consent.

Appendix Three

Guidelines for Focus Groups

FOCUS GROUPS

Talk to each other – not necessarily the researcher
Try to talk one at a time.
Jot down a word to come back to, so your thought is not lost if someone else is talking.
No wrong answers or comments – only different points of view.
Try to give everyone a chance / time to air their views.
All ideas and views are given equal value.
Respect the other's opinion.

Jot down anything that you'd like to expand on or I have not picked up on.
Spontaneous interruptions are OK if they're shared around.

INFORMAL LEARNING STUDY.

How are we learning in the unit?
Are there ways of enhancing the informal learning?
Evaluate these strategies in relation to our nursing practice.

Appendix Four

Prompts on Note Pads

PROMPTS

These are prompts for you when you write about a learning experience.

What was the informal learning experience / incident?
When was it?
Where was it?

Who learnt from which source?
E.g. colleague, relatives, patient, book, manual, other health care worker.

Give an overview of the busy or quiet nature of the unit
patient acuity

Urgency of the need to learn or of the situation.
What was the outcome?

Were you the teacher / observer, learner?
Grade A.B.C, Gender, Full-time, part-time?
Any thing else that you think is relevant.

When you have written a story, tear the sheet out and put it in the blue box in the corridor by [the Clinical nurse Consultant's] office. This will ensure that it is kept confidential. Feel free to put your name on if you like.

Appendix Five

More Detailed Prompt Sheet

Alternative options for action research ***: Looking at informal learning in CCMU***.

I. What do you feel you do/ know well?

How did you develop the expertise?

What can you remember about how you learnt it?

It may not be procedure, it may be dealing with certain circumstances; e.g. relating to patients/ relatives etc.

2. What do you feel you've still not grasped, or you have difficulty with, or would like to know more to be satisfied with your skill expertise?

What of this do you already know?

How did you learn what you've learnt so far?

What do you think might be missing in your understanding?

What do you think are the reasons for the gaps in your learning/ understanding?

I.e. what are the barriers/hindrances?

3. How did you know to do _____

4. What is your most significant learning experience this week?

Was it good?

Or was it stressful?

E.G What do you wish you'd known in time?

Appendix Six

Checklist

INFORMAL LEARNING CHECKLIST ALTERNATIVE OPTION

WHAT DID YOU LEARN?

WHEN WAS IT? EARLY LATE NIGHT SHIFT OTHER.

WHERE WAS IT?

HOW DID IT OCCUR?

WAS THE UNIT BUSY? ☐ QUIET? ☐

PATIENT BUSY? ☐ QUIET? ☐

WHAT WAS THE SOURCE OF LEARNING?

COLLEAGUE MANUAL /JOURNAL /BOOK.
RELATIVES MISTAKES
PATIENT OTHER

HOW URGENTLY DID YOU NEED TO KNOW?

URGENT ☐ NOT URGENT ☐

WHAT WAS THE OUTCOME?

DID YOU NEED TO FOLLOW IT UP?
PASS IT ON?

WAS IT COMPLETE OR WAS IT PART OF SOMETHING YOU ARE LEARNING BIT BY BIT?

IT WILL ALSO HELP TO KNOW WHETHER YOU ARE

FULLTIME ☐ PARTTIME ☐

GRADE A ☐ GRADE B ☐ GRADE C ☐

GENDER M/F ☐

YOU CAN INCLUDE YOUR NAME, BECAUSE IF YOU PUT IT IN THE BLUE BOX OUTSIDE THE CNC OFFICE, IT WILL BE KEPT CONFIDENTIAL

FEEL FREE TO ADD ANY THING ELSE ON THE BACK

Appendix Seven

Phrases from Focus Group One

Asking for help

Asking how to do something

From bedside handover

Looking for those who will know

Familiarity with the patient or equipment

Looking for the one who has the experience

Quicker to ask than use the manual

Manual doesn't solve the problems

Ask someone if it's urgent

Learning from the nurse on the previous shift

Stories in the tea room

Learning by the Senior at medical handover

Doesn't reach everyone

Possibly inaccurate

Misinformation

Working it out for your self if no one's around.

Lack of experience

Wrong things passed on for days

Working things out

Communication folder is another way of learning informally

Learning by listening to relatives, other nurses, may be chatting to each other.

A practical thing

Need formal learning too

Not always accurate

Happens in nursing

Problem solve quicker for a person, rather than helping him problem solve

Benefit from big handover

Time constraints in getting to big handover

Need to get people thinking about it

Getting people out there

Time constraints

Staff needing lunch

Unit getting busier

Could doctors change ward round?

Not able to change the doctors

Short shifts affect handover

I question and look up things but does everyone do that?

Easy way out

Need to be motivated to look things up

Easier to ask someone

Ask around the unit who knows

Creates good interaction

Nursing is so practically orientated

Stuff you learn informally is retained better because you relate it to the patient or event

Learning from other's mistakes and your own

You're not gonna know everything about everything

You're gonna have to always tap into someone else's brain

Have their specialties

Need to make it not quite so ad hoc.

People with more knowledge / experience in some fields

Ask someone who's not as busy.

Used to be specialist or competent on one thing

Learning by mistakes

Resource person

Use the Kimal™ once and you're the expert

.....

I looked at the categories that came from the first phrase and worked down , numbering them according to the categories that appeared.

HOW IS INFORMAL LEARNING OCCURRING?

CATEGORIES

1. ASKING

Asking for help

Asking how to do something

Ask around the unit who knows

Looking for those who will know

Looking for the one who has the experience

2. HAND OVER

From bedside handover

Learning from the nurse on the previous shift

Learning for the Senior at medical handover

Benefit from big handover

Time constraints in getting to big handover

Need to get people thinking about it

Getting people out there

Time constraints

Staff needing lunch

Unit getting busier

Short shifts effect handover

3. EXPERIENCE

Familiarity with the patient or equipment

4. WHY ASK?

Quicker to ask than use the manual

Ask some one if it's urgent

Lack of experience

Problem solve quicker for a person, rather than helping him problem solve

Easy way out

Creates good interaction

You're not gonna know everything about everything'

'You're gonna have to always tap into someone else's brain

5. WHY NOT AN ALTERNATIVE TO ASKING?

Manual doesn't solve problems

Easier to ask someone

6. TEA ROOM STORIES

Stories in the tea room

7. DISADVANTAGES

Doesn't reach everyone

Possibly inaccurate

Misinformation

Wrong things passed on for days

Not always accurate

Time constraints

8. SELF-DIRECTED

Working it out for your self if no one's around

Working things out

I question and look up things but does everyone do that?

9. COMMUNICATION FOLDER

Communication folder is another way of learning informally

10. LISTENING

Learning by listening to relatives, other nurses, may be chatting to each other

11. WHY INFORMAL LEARNING? (BENEFITS)

Need to make it not quite so ad hoc

Nursing is so practically orientated

Stuff you learn informally is retained better because you relate it to the patient or event

12. LEARNING FROM MISTAKES

Learning by mistakes

Learning from other's mistakes and your own

13. RESOURCE SPECIALIST KNOWLEDGE

Resource person

Use the Kimal™ once and you're the expert

Appendix Eight

Further Guidelines for Exploring Strategies

Explore ----------→ **EVALUATION**

At the second focus group, I discussed evaluation of what we're doing and it was suggested that I give you an outline of the types of questions that you need to be thinking about in your groups.

These are some of the questions you need to keep in mind when you are exploring the strategy that you've taken on. Have you had a change in attitudes, practices, receptiveness to alternative practices, and developed a sense of ownership with learning in the unit?

1. Keep it small, simple and cheap ---------- but RECORD THE PROGRESS.

2. What are you looking for?

3. What difference has it made?

4. How do you see the staff in the unit benefiting from the strategy?

5. What would have to be done to make a difference?

6. What is the major draw back in the strategy?

7. What elements would you like to see continue or continue yourself?

Sally D

Appendix Nine

Summary for Specialist Groups

Aims/Objectives

(Meet monthly to discuss plans and progress & I can follow & support prn from the research perspective).

1. Learn more about neuro matters
2. Be a resource person/group on neuro matters
3. Teach procedures, nursing care, equip. pertaining to neuro
4. Gain ore knowledge – how, when and who is in the group

What first?

Collate groups' knowledge in an informed manner, ie identify the specialist knowledge and areas of expertise within your group

Discuss individual and group goals

(eg for some it will be predominantly learning, for others it will be to share expertise)

Sally D.

Appendix Ten

Summary for Participants

This was handed out to all the participants after the second cycle.

ENHANCE YOUR OWN LEARNING IN THE WORKPLACE - XXXXX

I am still in the process of collating the last focus groups that reflected the group strategies. I will give you feedback on these, but it will take a little longer!

In the mean time!!!-
The study has reached a stage where **individual** strategies can be suggested that may enhance your own informal workplace learning.

Some will be strategies that you have already used and discussed. Others will be new to you and you may choose to explore them.

I have divided them into two groups. The first group does not require much additional time, energy or skills from your current practise in the workplace. On the whole they enable you to enhance your current learning skills / ability.

These are

1. Observation - watching others. E.g. seeing some one else solve a problem quickly, or seeing and reflecting on whether you would have a different approach.

2. "Self-managed observation" - That is, reflecting on your own practice. Without reflection the learning experience is rarely retained.

3. Talking to others - Bedside hand-over, in the tea room, in the same section.

4. One-to-one at the bedside - Interaction with others.

5. Being aware of the extent of the learning that takes place in the workplace.

6. Problem-solving together - Taking opportunities to work problems out with others.

7. Reflecting on mistakes - Your own or other's are usually memorable.

8. Developing an ability to identify your own learning needs. Knowing when to learn the next stage. Is it safe for you and the patient? Is there an appropriate 'teacher' nearby or available?

9. Identifying and accessing nursing expertise in the unit.

10. Seeking feedback from those who see things quite differently. Encourages lateral thinking and is usually memorable.

11. Seeking opportunities to practice skills. E.g. Offering to set up for a procedure, helping some one else out, requesting challenging patient allocations.

HIGHER ENERGY STRATEGIES

a. Teaching others by -
Offering alternative learning techniques to suit the learner.
Creating a relaxed environment to learn. Not always possible.
Working with the learner.
Telling stories of your experiences.

b. Learning through leadership - by writing protocols or manuals, or mentoring, coaching or teaching others.

c. Learning and keeping up to date through journals and seminars - usually in your own time.

d. Undertaking post-graduate study including mini-courses that are offered through work or externally.

e. Motivating one's self to the above by requesting leave with pay to attend!

ARE THERE ANY STRATEGIES HERE THAT YOU HAD NOT THOUGHT OF BEFORE?

IF SO, DO YOU SEE YOURSELF TRYING ANY?

IF SO, WHICH ONES?

DOES AN AWARENESS OF THESE MAKE ANY DIFFERENCE FOR YOU?

You can put your responses in the blue box outside XXXXX's office, or leave me a note, or catch up with me. I am contemplating one **last** set of opportunistic focus groups, each about 3 -6 people, in a month, to discuss whether the above has been beneficial for your own learning. Please let me know what you think of that.

Thanks, Sally.