The value of guided operating room experience for undergraduate nurses

by

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Doctor of Philosophy

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Abstract

Since the removal of operating room nursing from the undergraduate nursing core curriculum, questions have been raised regarding the ability of nurses to care for pre- and post-operative patients on the acute surgical wards. Can nurses who have not been involved in guided operating room experience care for patients before and after surgery with the same level of knowledge and expertise as those who have? This national research project investigated this issue, comparing different models of operating room education. It also explored transferable skills that may be learned via operating room experience and possible correlations between students’ experiences in this specialty area and recruitment and retention of staff.

Methodology for this doctoral research was a fixed mixed methods paradigm incorporating a triangulated/convergent parallel design. Qualitative data was collected from across Australia investigating undergraduate nursing students’ comment about their time in the operating suite or lack thereof; transferable skills learned in the operating room that may assist them in surgical nursing, and their attitudes towards possible future employment in the operating suite. Quantitative data was collected concurrently from students who participated in differing models of operating room education. Knowledge testing was undertaken on areas surrounding pre- and post-operative surgical ward nursing. Participants’ results were compared to the model of operating room education students had participated in to determine if there was a correlation between their operating room education and students’ knowledge of surgical ward nursing.

Findings revealed that undergraduate nurses receiving guided operating room experience had a 76% pass rate compared to 56% with non-guided experience. At a graduate nurse level, nurses with guided operating room experience as an undergraduate or graduate nurse achieved a 100% pass rate compared to 53% for non-guided learners. These results support the belief that guided operating room nursing experience supports best patient outcomes in surgical patients. Transferable skills learned via operating room experience included pain management, patient education, pre- and post-operative care and asepsis. Recruitment of nurses can be fostered during guided experience and retention of current staff increased.
Genesis of the project: a personal experience

As we sat in the operating suite tearoom the feeling amongst the gathered staff was one of disbelief and great sadness. One of us had just read an article aloud from the daily newspaper (Appendix 1). The story reported the coronial inquest of a 37 year-old mother of three who died from an inability to breathe following routine elective thyroid surgery. Hospital staff told the patient she was just panicking as she struggled for air (Hunt 2004). Two expert medical witnesses, one of whom was her surgeon, gave evidence to say that the patient’s death was preventable (Hunt 2004).

A conversation ensued. One of the more experienced operating room nurses stated:

‘I wonder why the staff didn’t take the stitches out?’

A younger nurse replied:

‘What are you talking about? Surely you don’t expect someone to remove the stitches from a patient’s neck. What on earth would that achieve?’

Another senior nurse replied:

‘Well of course you’d take the neck stitches out because she’s bleeding and this might have saved her life! Haven’t you ever been taught this?’

In unison all the younger nurses replied:

‘NO.’

Glancing around the room it was easy to observe a clear division the older staff were aghast that the junior staff were not aware of the potential loss of life from not removing the stiches, whilst all the more junior staff had a look of absolute shock and fear that this task would ever be suggested. An expert witness believed
that, had the stitches been removed sooner, the patients life could have been saved (Hunt 2004).

In explanation of this situation, one must be reminded that the thyroid gland sits in the deeper tissues of the neck, under the muscle layer. When surgery is performed on these areas vigilant observations must be made of the patient’s breathing. If post-operative bleeding were to occur, the blood could cause pressure within the soft tissues under the muscle layer possibly obstructing the trachea/windpipe which may in turn cause asphyxiation. If this situation occurs, the treatment is to call a medical emergency, and if the patient’s breathing is obstructed in a dangerous manner, to remove not only the stitches in the skin of the neck, but more importantly the stitches in the muscle layer underneath to allow the blood to flow out and relieve the pressure on the trachea. This is a rare but well documented complication with a known emergency response.

Unfortunately this death was not an isolated event, as adverse outcomes in post-surgical patients are not uncommon. An Australian study conducted by Bellomo et al (2004) reported that in a post-surgical control group 390 adverse events were detected in 190 patients. More recent research has reported that surgical adverse events occur in 3.6 per cent of all hospital admissions representing 65 per cent of all reported adverse events (Zegers et al. 2011). These surgical adverse events were severe in nature and 41 per cent were considered to have been preventable (Zegers et al. 2011).

Timely, appropriate surgery and high quality pre- and post-operative care may be the key in preventing deaths in the first 48 hours after surgical procedures (Mullen et al. 2012). Analysis performed in 2007 revealed that out of 576 reported hospital deaths, 11 per cent were due to serious deterioration of the patients’ condition without appropriate recognition or treatment (Lomas & West 2009b). The National Consensus Statement on essential elements for recognising and responding to clinical deterioration (Australian Commission for Safety and Quality in Healthcare 2010) reports that measurable physiological abnormalities occur prior to adverse events such as cardiac arrest and death and suggests that
early recognition of changes in a patient’s condition followed by prompt and effective treatment can minimise these adverse events. The Statement also suggests that education must be provided to ensure the healthcare workforce is suitably skilled in knowledge of appropriate patient observations, identification of clinical deterioration and appropriate emergency management skills (Australian Commission for Safety and Quality in Healthcare 2010).

As an undergraduate nurse I clearly remember my clinical placement in the operating suite. I recall observing a thyroidectomy similar to that of the deceased mentioned above. During this operation the medical and nursing staff spent much time explaining the possibility of post-operative bleeding, the importance of vigilant airway and respiratory observations and the urgent necessity to report and, if required, rectify this situation. I was very appreciative of this knowledge as I had seen this question on old final examination papers and then felt more prepared; not only to answer a question on post-operative thyroidectomy care but to perform appropriate life saving clinical measures should this situation arise in one of my patients.

Following this clinical placement I knew that I had found my niche in nursing and so following my graduate year returned and made operating room nursing my chosen career. As an undergraduate I departed the operating suite after a six week operating room placement with not only professional direction but a wealth of knowledge surrounding surgical procedures and possible complications to be watchful for on the pre- and post-operative surgical wards; knowledge which, I realised in the tearoom that day, newer nurses may not be aware of as their opportunities to observe surgery were more limited than when I was a student.

I became increasingly concerned about the possible missed education opportunities for undergraduate nurses today and wondered if a connection could

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3 Operating Room Nursing - Nursing care provided pre-operatively, operatively and post-operatively whilst in the operating suite.
be demonstrated between the quality of pre- and post-operative surgical nursing care and undergraduate nurses’ operating theatre experience during the course of their study. This was the genesis of my project.
CHAPTER ONE

Chapter 1: Introduction

The Australian population is aging (Karmel et al. 2012) which, in turn, will lead to an increased demand for surgical health services (Birrell, Lesleyanne & Virinia 2003). So too the operating room nurse matures with 50 per cent of current staff aged between 50 and 59 years (Trice, Brandvold & Bruno 2007). As this workforce gets closer to retirement, and the profession looks ahead to cultivate replacements for these staff, much research and discussion has focused on the relationship between lack of exposure by undergraduate nurses to the operating suite and a dwindling number of nurses entering this specialty field (Allanson & Fulbrook 2010; Bull & Fitzgerald 2004a; Castelluccio 2012). Research has shown that minimal or no exposure to the operating suite by undergraduate nurses has led to decreased interest in young graduates choosing operating room nursing as a career (Happell 2000, 2002). This is occurring at a time when the need for operating room nurses is growing.

1.1 Statement of the problem

In 1985 it was legislated by the Federal and State Governments to begin the transfer of pre-registration nursing from hospital-based training to advanced colleges or university-based education (Heath 2001). Accompanying this were many changes to curriculum and clinical placements. Over time the operating suite placement has been altered from approximately six weeks for every student during the hospital-based training era to new models of clinical experience that differ between university providers. This experience ranges from a reintroduction of operating room nursing to the core curriculum of between one to six weeks, or an elective subject comprising lectures, tutorials, and one week of practical experience, or ad hoc ‘follow through’ visits to observe a patient’s surgery. In many cases students receive no operating theatre experience in their undergraduate education (Touzeau 2005).
In the 25 years since the removal of the operating room subject from the undergraduate nurse core curriculum several questions have been raised in the literature regarding the ability of nurses to care for patients during the pre- and post-operative phases of care provided on the acute surgical wards (Long, George & Gulledge 1995; Touzeau 2005; Walker 1998). Can undergraduate nurses, who have not actively been involved in guided or structured operating theatre experience, care for patients pre- and post-operatively in the surgical ward areas with the same level of insight and knowledge as those who have?

Previous research conducted by Sigsby and Yarandi (2004) compared the surgical knowledge of undergraduate nursing students who had experienced different practical clinical placements, namely, the operating suite or the medical and surgical wards. Findings revealed that students who had been exposed to operating suite experience scored consistently higher on areas of surgical nursing knowledge than those who had clinical placements in the medical and surgical wards (Sigsby & Yarandi 2004).

Similar findings were reached in the research for a Master of Professional Education and Training completed in 2005, which addressed the question of guided operating suite experience in Victorian undergraduate nurses just prior to their completion. Touzeau (2005) revealed that students who had not experienced guided operating suite experience had a pass rate of 53 per cent when answering questions regarding pre- and post-operative surgical care, compared to 86.5 per cent pass rate for those students who had completed a weeklong elective subject (Touzeau 2005). Findings also showed that 21 per cent of undergraduate nurses who participated in the research had not entered an operating suite in their entire undergraduate education, with a further 15 per cent having had three hours or less exposure (Touzeau 2005). Limitations of this study were its small sample size and application to only one university and one Australian state. Recommendations of both Touzeau (2005) and Sigsby and Yarandi (2004) were to explore this issue in more depth by conducting a larger study comparing students from different universities.
CHAPTER 1: INTRODUCTION

Great advancements have been seen in the areas of anaesthesia and surgery (Taylor & Johnson 2003; Wysocki, Moestra & Schlag 2003) since the removal of operating room nursing from the core curriculum. Keyhole or laparoscopic surgery is now commonplace, new anaesthetic drugs are introduced on a regular basis, and even robotic-assisted surgery has emerged. Every new procedure and medication is accompanied by a need for new patient education, new care regimes, and new post-operative complications for nursing staff to comprehend (Touzeau 2005). A review of literature revealed concerns regarding possible deterioration of surgical ward nursing skills resulting from decreased exposure to the operating suite (Long, George & Gullede 1995; Sigsby & Yarandi 2004; Walker 1998). However, an even greater loss of knowledge may be occurring as a flow-on effect (Touzeau 2005). Domino (2005, p. 187) states that in order to keep pace with continuous changes in medical care, nurses must become ‘lifelong learners’ to maintain competence. When all undergraduate nurses had a placement in the operating suite, part of their role was to keep ward staff abreast of changes in operative practice (Touzeau 2005). As undergraduates rotated through the operating suite, they provided a great educational resource by discussing new procedures and techniques with trained staff on return to the ward area (Lunday, Winter & Batchelor 1999). This practice traditionally helped to keep all staff up-to-date, facilitating the lifelong learning process. If undergraduate nurses do not visit the operating suite this will not occur.

A review of the literature that informs operating room nursing practice clearly indicates that the most resounding discussion, both old and new, relates to the staffing crisis facing operating suites both nationally (Allanson & Fulbrook 2010; Australian Workforce Advisory Committee 2006; Jongeneel 2002) and internationally (Girard 2006; Martha 1987; Martin 2011) and the recruitment and/or retention of nursing staff to this specialty area. If nurses are not exposed to the operating suite as undergraduates they are unlikely to choose operating room nursing as a career on graduation (Castelluccio 2012; Happell 2000, 2002).

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4 Surgical Ward Nursing - nursing that encompasses pre- and post-operative nursing care provided to patients outside the operating suite in the surgical ward.
A gap in the research literature is noted in the exploration of the operating suite as an area of rich learning, and in the educational effects of limited or no operating room experience on undergraduate nurses’ ability to care for pre- and post-operative patients in the surgical ward area. A second gap is noted in the comparison of students’ experience in the operating suite and the impact of this on both recruitment of new graduates and retention of existing staff.

The aim of this research was not to explore the acquisition of surgical knowledge for nurses who work in the operating suite, but rather to explore the knowledge gained from practical operating suite experience that supports nursing outside this specialist area, such as in the pre- and post-operative surgical wards. A surgical patient’s journey involves a three-part process, which includes the pre-operative phase, operative phase and post-operative phase. This research considers the potential educational impact on undergraduate and graduate nurses’ knowledge of pre- and post-operative care when the middle piece of the three-part surgical patient journey has been omitted.

![Patient's surgical journey diagram](image)

**Figure 1.1 - Patient’s surgical journey**

Figure 1.1 is my summary of the entire surgical process, which distinguishes the areas of surgical ward nursing and operating room nursing.
The definitions of nursing titles within the operating suite are evolving (Sigurdsson 2001), and this has caused some confusion in the literature when separating nursing care provided in the operating suite from nursing care provided pre- and post-operatively in the surgical wards. In 1978 the American Operating Room Nursing (AORN) society (as it was known then) began work on broadening the scope and definition of operating room nursing and developed the term ‘perioperative’ nursing to reflect the shifting paradigm (Sigurdsson 2001). This definition encompassed the roles of nursing within the operating suite, allowed for the addition of patient advocacy roles and also shifted the focus of practice geographically to the temporal process of the patient's experience during the pre-operative, intra-operative, and post-operative periods (Sigurdsson 2001). The Australian College of Operating Room Nurses (ACORN) website defines perioperative nursing in two forms one literally, around the time of surgery, and the second more specifically as the period that extends from the time a patient is admitted to hospital until they are discharged home (Australian College of Operating Room Nurses 2010b). This clearly includes surgical ward nursing. However, when ACORN discusses the nursing roles within the operating suite they refer to roles including, but not limited to, anaesthesia nursing, scout/scrub nursing and Post Anaesthesia Care Unit (PACU) nursing, which are all roles that are confirmed exclusively to the theatre environment. The remark ‘including but not limited to’ reinforces the notion that these are not static definitions and are still evolving. Clinically, in a working environment, Australian nurses know ‘perioperative nursing’ to be nursing care provided in the operating suite, which contradicts the theoretical definition and reveals that there is no explicit definition in the Australian context (Callaghan 2011).

As this research compares learning in the operating suite and assesses how this informs surgical nursing practice, there is a definite need to clearly define and separate these two areas, not just for the current readers but more specifically for future readers. As the definitions evolve further, there is a risk in the coming years that misinterpretation of this research may occur. For these reasons the older terms of operating room nurse/nursing and surgical ward nurse/nursing will be used in this research to separate the two areas. The term ‘perioperative nursing’
will be used when discussing university course subjects as many of these have the ‘perioperative’ title.

Given the changes to undergraduate nursing curriculum over the last 25 years, there would be value in investigating several questions that surround undergraduate operating room nursing experience in Australia.

- Do undergraduate nurses need to be involved in guided operating suite practical experience in order to achieve skills and knowledge that will support a high standard of nursing care in the pre- and post-operative surgical wards?
- What are the different models of operating suite education offered to Australian undergraduate nursing students, which of these models yields the best educational outcomes and what are the transferable skills acquired from operating suite experience that assist in pre- and post-operative surgical nursing care?
- How might these differing models of operating suite education impact on recruitment and retention of nurses to this specialist area?

This mixed methods study addressed these questions, exploring comparative models of operating room education in Australia by firstly establishing their ability to facilitate a high standard of understanding and surgical knowledge for undergraduate nurses, and secondly determining if these models yield different results in recruitment and retention of nurses to the operating suite.

A mixed methods paradigm incorporating a convergent parallel research design (Creswell & Plano Clark 2011) was used, a type of design in which different but complementary data was collected surrounding the same topic (Creswell & Plano Clark 2007). The convergent design, which collects both qualitative and quantitative data at the same time, was initially conceptualised and referred to as a triangulation design but was renamed due to confusion with single method triangulation (Creswell & Plano Clark 2011).
CHAPTER 1: INTRODUCTION

This research was conducted in four phases. Phase 1 sought information on the differing types of undergraduate operating suite education offered nationally by conducting a phone survey of all Australian universities that offered undergraduate nursing. Once completed, a taxonomy of these models and selection criteria were developed and ten universities were invited to participate in the research. Six universities from four Australian states accepted.

In phase 2, which was the largest phase of the research, both qualitative and quantitative data was collected from 332 willing third year nursing students in their final semester of study. Qualitative data investigated students’ feelings and personal comment about their time in the operating suite or lack thereof; students’ attitudes toward their model of operating room education; transferable skills acquired that may assist them in surgical nursing care, and attitudes towards further experience or possible future employment in the operating suite. Concurrently, a quantitative investigation explored undergraduate nurses’ knowledge of pre- and post-operative surgical nursing care. Following knowledge testing, student results were compared to the model of operating room education the students had experienced. Score comparisons were also made regarding the possible value of guided versus non-guided practical experience and total time spent in the operating suite.

In Phase 3 the six curriculum co-ordinators who presided over the operating room education models that were compared in Phase 2 were invited to participate in personal interviews to further investigate their model of education. Four curriculum co-ordinators consented to participate. Questions surrounded the development of the model of operating room education, the strategies employed in setting up the model with collaborating hospital operating suites (if applicable) and the possible impact on recruitment of nurses to the operating suite.

Phase 4 was the follow-up study, which tested graduate nurses at the completion of their first year of practice following their Graduate Nurse Program. Although not compulsory, most nurses undertake a Graduate Nurse Program which bridges the gap between university and the workplace, providing professional and
educational support for first year nurses. This analysis was undertaken as there was a belief amongst nursing academics that there may be gaps in student knowledge following graduation, and these deficits should be rectified during the students’ Graduate Nurse Program year (Professor Marie Botti, personal communication at colloquium process, 22nd February 2008). There was great value in exploring this assumption as much learning is achieved during these 12 months and so to re-test students after this additional period of education would provide greater insight into the long-term surgical knowledge of our young nursing workforce.

1.2 Summary

Surgical adverse events are not uncommon (Bellomo et al. 2004). Australian research has shown that adverse surgical events were highly preventable in 47.6 per cent of cases (Kable, Gibberd & Spigelman 2002). The key to preventing deaths in the first 48 hours after surgery is in timely, high quality pre- and post-operative patient care (Mullen et al. 2012).

It is well known that a dwindling number of undergraduate nurses are provided with practical experience in the operating suite and this has led to decreased interest in nurses choosing this specialty, which in turn has caused a staffing crisis in Australian operating suites (Allanson & Fulbrook 2010; Bull & Fitzgerald 2004a). What is not so well known is the impact of this change on the educational preparation of our undergraduate nurses and the effects of this on pre- and post-operative surgical ward nursing knowledge and patient care. This research will explore these issues.
CHAPTER TWO

Chapter 2: Surgical Ward Nursing

The effectiveness of early warning systems for deteriorating surgical patients’ depends on the ward nurses ability in ‘monitoring and recognizing the patients condition, including taking interpretive vital signs and making the clinical decision to activate the medical emergency team’. (Liaw et al. 2011, p. 297)

Introduction

Several concerns have been raised surrounding decreased exposure of undergraduate nurses to the operating suite. This chapter will review Australian and relevant overseas literature regarding care of the surgical patient and undergraduate education in surgical ward nursing. Discussion will be presented under the following headings and sub-headings:

2.1 Adverse surgical events
2.2 Surgical ward nursing
   2.2.1 Patient education
   2.2.2 Pre- and post-operative nursing care
   2.2.3 Asepsis 5
   2.2.4 Pain management
   2.2.5 Miscellaneous
2.3 The acquisition of surgical nursing knowledge
2.4 Competency standards surrounding surgical ward nursing
2.5 Summary

2.1 Adverse surgical events

Surgery is a major contributing factor to patient morbidity and mortality (Pinney, Pearce & Feldman 2010). Surgical complications are estimated at between 50 per cent and 75 per cent of all adverse medical events (Pinney, Pearce & Feldman 2010). There is consensus that adverse surgical events constitute a serious

5 Asepsis - Is a term used to describe a sterile area or environment and literally means ‘without infection’ implying that there is an absence of micro-organisms.
problem, killing more people annually than breast cancer or AIDS (de Vries et al. 2008). In Australian literature an adverse event may be defined as ‘an unintended injury or complication which results in disability, death or prolongation of hospital stay, and is caused by healthcare management rather than the patient’s disease’ (Wilson et al. cited in Kable, Gibberd & Spigelman 2002, p. 270).

In 2002 a study on adverse events in surgical patients from 22 Australian hospitals revealed that 47.6 per cent of these events were highly preventable (Kable, Gibberd & Spigelman 2002). Further research was conducted by de Vries in 2008 with a meta-analysis of eight studies on adverse surgical events from the USA, Canada, the UK, Australia and New Zealand. It was reported that the median overall incidence of in-hospital adverse events was 9.2 per cent, with the majority of patients being surgical and with almost half of these found to be preventable (de Vries et al. 2008).

Although most of the adverse events lead to minor or temporary disability, between four per cent to 21 per cent resulted in death (Zegers et al. 2011). Aside from the direct harm suffered by patients, adverse events in the United States cost the health care budget between 17 and 29 billion dollars annually (de Vries et al. 2008). Zegers et al. (2011) reports that adverse events occur at all stages of the operative process, pre-operatively, operatively and post-operatively. It should be noted that surgical ward nurses are only involved in events that occur in the pre- and post-operative phases. These rates of adverse surgical events provide a basis for reviewing surgical nursing skills.

### 2.2 Surgical Nursing skills

Specific operating theatre theory and practice have been limited in most undergraduate nursing courses worldwide and many academics have questioned the impact of this decline in experience (Callaghan 2011; Girard 2004; Mitchell 2011a, 2011b; Peters & Frazer 1999).

In 1751, realising that post-operative patients were vulnerable, the first Post Anaesthetic Care Unit was documented (American Society of Peri-Anesthesia
By the 1940s it was realised that patients first recovered from anaesthesia, not the surgery, and that it was essential to provide a room close to the theatre, where the patient could be cared for by nurses to reduce the deaths from respiratory failure immediately after surgery (American Society of Peri-Anesthesia Nurses 2012). The Post Anaesthetic Care Unit/Recovery Room is a unique learning experience for undergraduate nurses as it provides the ability to observe experienced nurses who are watching for alterations in patient observations, and who know when these could be life threatening events (Touzeau 2005).

The belief that operating theatre experience is only useful to nurses working in the operative area has been refuted by many authors (American periOperative Registered Nurses (AORN) Guidance Statement 2007; Callaghan 2011; Sigsby & Yarandi 2004; Sykes 1997). Sykes (1997), when reporting on a program of operating theatre experience stated that benefits had been achieved by all the nursing students, the healthcare community, and most importantly, the surgical patient. More recently these sentiments have been echoed by Callaghan (2010), who reported that students felt the skills they had learned in the operating room had assisted them to understand clearly how the surgical experience impacted on pre- and post-operative care on the wards. They also believed these skills were important even if nurses chose not to work in theatre (Callaghan 2011). A participant explained:

Students who have not experienced this (perioperative placement) have missed out on a very important chunk of nursing…it gives you a better understanding of what the patient has been through…(Callaghan 2011, p. 857)

In the 25 years since the removal of operating room nursing from the core curriculum of undergraduate nursing courses in Australia, questions have been raised about the impact of limited, or no exposure to surgical procedures performed in the operating suite and the subsequent effects this diminished experience may have on knowledge and understanding of pre- and post operative surgical ward nursing care (Long, George & Gulledge 1995; Walker 1998). Areas of nursing expertise that have raised concerns have included pre- and post-
operative patient education, pre- and post-operative nursing care, asepsis and pain management.

These questions were addressed by one of the cohort groups who participated in the study for my Master of Professional Education and Training, conducted in 2005. That research project provided a pilot study for this doctoral work. Despite extensive literature searches, there has unfortunately been no other research conducted that investigates this specific problem. For this reason, findings from my previous research will be drawn on significantly in this chapter.

In one arm of this research, a specific group of surgical ward nurses were sought. They were nurses who may have visited the operating suite briefly during their undergraduate years but were not involved in any guided or structured education, and who after graduation chose to take a structured graduate position in the operating suite before returning to the surgical wards. This group was of particular interest as they had worked on a surgical ward as undergraduates without guided operating room experience, and as graduates in the surgical ward following guided operating room experience. Inquiries were made as to whether they found any difference to the patient care they were able to provide following their experience in the operating suite. Data collected from this group showed that knowledge gained through guided operating room experience fell into five themes. Four themes matched exactly the areas of concerns raised in the literature, namely pre- and post-operative patient education, pre- and post-operative nursing care, asepsis and pain management, whilst the fifth was labelled ‘miscellaneous’ (Touzeau 2005, p. 35). Further research findings surrounding surgical nursing care will be presented under the five themes.

### 2.2.1 Patient education

In recent years, with advances in anaesthesia and surgical techniques, patients who would have previously had long periods of hospitalisation are being discharged earlier (Boughton & Halliday 2009). Whilst earlier discharge may assist in fiscal issues for the hospital, it also results in a shift in patient care from trained nurses in the hospital environment to the patient and their carers at home
Early discharge requires surgical nurses to have a greater emphasis on patient education at a time of vulnerability for many patients (Taylor & Burch 2011). Case study evidence suggests that there is a need for improvements in pre-operative and post-operative discharge education for family members because it has been shown that not only is the patients’ health and recovery affected by poorly planned discharge information, but their carers have also suffered adversely (Ganske 2006). In a study conducted by Taylor and Burch (2011) discharged surgical patients revealed that they required a clearer process for home support as most required subsequent advise on patient care after leaving hospital and before the first outpatient appointment.

Broughton and Halliday (2009) report that pre- and post-operative education has not kept pace with shorter hospital stays, given that the patients are often discharged home with residual care needs that require not only ongoing nursing care but emotional and physical support from informed carers, typically the family. This has produced anxiety for patients and caregivers who often feel uncertain and unsupported, revealing they require significantly more patient education (Boughton & Halliday 2009). These concerns are not new. Fears have previously been raised by health professionals regarding the ability of surgical ward nurses to provide accurate and up-to-date pre- and post-operative patient education without having formally been exposed to the surgical process in the operating suite (Brenner 2000; Davidhizar, Dowd & Bowen 1998; Fox 1998; Long, George & Gullidge 1995; Mitchell 2000, 2011b; Sherwood et al. 2003; Walker 1998).

Surgical ward nurses who had experienced guided operating room experience stated that they had a greater understanding and more intimate knowledge of surgical procedures after working in the operating suite and that this, in turn, meant that they were better able to answer questions and provide more accurate, up to date education on the likely expectations of the patient’s surgery (Touzeau 2005). It also allowed accurate explanation of common minor side effects suffered by patients post-operatively (Touzeau 2005).
The 1996 American Joint Commission on Accreditation of Healthcare Organisations lists patient and family education as one of the roles critical to patient care. Fortner (1998) explains that a tremendous amount of mental strength is required when facing surgery, and by providing understandable and accurate patient education nurses may be able to prevent the patient from feeling overwhelmed and fearful. Fortner (1998) goes on to discuss that simply providing information is not the same as teaching, with the later being an active process that considers the needs of each patient. Patient education also needs to be detailed and the provider must be able to answer patients’ questions. Fortner (1998) illustrates the detail required in three areas of patient education:

- **Procedural information**
  This is concrete factual information that will explain to the patient what is actually going to occur in the sequence of anticipated events. Procedural information will include insertion of intra-venous lines, monitoring devices that may be used and the process of the surgery itself.

- **Sensory information**
  Sensory information is designed to focus on the viewpoints and experiences of the patient; what may be seen, heard, smelt and felt. Providing interactive discussion on the cold room temperature of the area, the lovely warm blanket that will be provided, and the feeling of pain-free pressure that will be experienced if the patient is having a local anaesthetic (anaesthetic provided for a specific area when the patient is still awake).

- **Psychological information**
  Information in this area endeavours to provide skills to assist in the alleviation of anxiety; teaching the patient how to visualise himself/herself in another more pleasant setting or how to use relaxation techniques such as deep breathing. Achieving cognitive control is made much easier when one is able to accurately anticipate the event (Fortner 1998, pp. 5-6).

To provide the level of detailed explanation and patient education suggested by
Fortner, nurses require a sound understanding and knowledge of the operative process.

Research conducted over the last thirty years has confirmed that anxiety is a major issue for patients about to undergo surgery, with a lack of information being viewed as a contributing factor (Mitchell 2000). More recent research by Mitchell (2011b) echoes his previous sentiments, adding that patient anxiety prior to modern surgery should not be underestimated, with 85 per cent of pre-surgical patients articulating fear for one to four weeks before their procedures.

Pre- and post-operative education and the ability to answer questions pertaining to surgery is an essential surgical nursing role (Walker 1998). However, if undergraduate nurses are not provided with formal education in the operating suite, are they able to provide accurate information and education to their patients (Long, George & Gulledge 1995; Walker 1998)? One of the aims of this research will be to address this question.

2.2.2 Pre- and post-operative nursing care

The last decade has seen many researchers investigating the problem of adverse surgical events and making recommendations for improvement (Barnett & Moonesinge 2011; de Vries et al. 2008; Kable, Gibberd & Spigelman 2002; Kievit, Krukerink & Marang-Van de Mheen 2010; Pinney, Pearce & Feldman 2010). ‘Track and trigger patient scoring systems’ that help nursing staff identify deteriorating patients on the ward areas have been introduced in the United Kingdom (Donohue & Endacott 2010, p. 10) and in Australia (Australian Commission for Safety and Quality in Healthcare 2010), however recent research has revealed that in 2011 the problem still exists with 3.6 per cent of surgical admissions (representing 65 per cent of all adverse events) had suffered complications and of those 41 per cent were considered preventable through appropriate training and quality assurance measures (Zegers et al. 2011).

Clearly adverse events are a multifactorial problem that cross both nursing and medical disciplines, however nurses have the most direct patients contact; they are responsible for ongoing monitoring of the patient’s physiological signs and play a
crucial role in detecting and reporting clinical deterioration to medical staff from the ward level (Liaw et al. 2011). The importance of a skilled nursing workforce that can recognise and respond to patient deterioration has been increasingly addressed in trying to improve patient outcomes in surgical wards (Liaw et al. 2011).

Qualitative analysis from Touzeau (2005) revealed that participants in that research stated that, following guided operating suite experience, they believed their patient planning skills were improved and they were better able to prepare surgical patients for their procedures. The list of skills reported by this cohort revealed a much deeper level of understanding of anaesthesia and surgical practices (Touzeau 2005). With understanding comes the ability for early recognition and treatment of changes in the patients’ condition, which may prevent poor outcomes in patient care. When caring for a patient post-operatively, the patient is recovering from both a surgical intervention and an anaesthetic intervention which all carry possible complications. Consideration must be given to the provision of close follow-up assessments looking for possible complications in all post-operative patients (Pinney, Pearce & Feldman 2010). Another important skill learned via guided operating room experience that was noted was the ability to more accurately make an overall assessment of the general condition of the patient (Touzeau 2005). This is a vital skill, as knowing when an alteration in patient observations (such as is often seen in blood pressure, heartbeat or breathing) could become a life threatening event allows prompt treatment, alleviating a possible adverse event (Touzeau 2005).

2.2.3 Asepsis

Post-operative wound infections can be very serious and increase morbidity and mortality (Walsh, Greene & Kirshner 2011). Such infections accounted for almost 40 per cent of surgical patient adverse outcomes (Zegers et al. 2011), revealing the importance of regular hand washing and using a good aseptic technique6 in the operating suite and when dressing surgical wounds. Surgical nurses confirmed

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6 Aseptic Technique - Procedures and techniques used to support prevention of infection.
that the concept of asepsis was only learned and understood following operating theatre experience (Touzeau 2005).

This is not surprising as the use of an aseptic technique in the operating suite is easy to understand, as it is very black and white. For example, if a person who was not wearing a sterile gown and gloves were to accidentally touch the very corner of a sterile trolley containing surgical instruments, the entire trolley and instruments would be considered contaminated and discarded (Berry & Kohn 2004). This would occur even if the turnaround time to re-sterilise these instruments would take hours (Touzeau 2005). Operating room nurses develop what is referred to as ‘surgical conscience’, which gives them the skills to own up and report observation of such a breach in sterility (Australian College of Operating Room Nurses 2010a). When nurses are able to grasp the concept of asepsis in black and white terms, it is then easier, on return to the ward setting, to establish the levels of grey which occur in a less clean environment (Touzeau 2005). Data collected from surgical ward nurses supported this by revealing more than half of the participants stated that they had improved knowledge and understanding of asepsis and aseptic technique following operating suite experience (Touzeau 2005).

### 2.2.4 Pain management

Experiencing post-operative pain has been found to be the most common fear for surgical patients (Samarae et al. 2010). Effective pain management is considered to be both a right and an expectation of care for all patients following surgery (Bucknall, Manias & Botti 2001). Despite this, the practice of providing adequate post-operative pain relief continues to be inadequate (Hartog et al. 2010; Samaraee et al. 2010), and clinical studies reveal that the undertreatment of pain is recognised as a significant health care problem (Brenner 2000; Bucknall, Manias & Botti 2001; Sherwood et al. 2003; Solca 2002; Wu & Casey 2002).

Pain was once thought to be simply an unfortunate side effect of surgery with no detrimental effects (Samarae et al. 2010). However Samaraee et al. (2010) present recent research that proves this to be incorrect. Inadequate pain relief has been shown to alter the body’s metabolic responses which can lead to delayed
recovery, longer periods of hospitalisation, increased morbidity rates, and the development of a chronic pain state (Samaraee et al. 2010). In turn, Samaraee et al. (2010) suggest that effective pain control reduces post-operative complications, facilitates rehabilitation and provides a more rapid recovery from surgery.

An increasing focus on pain management has lead to the development of national and international standards and recommendations for care and many hospitals in Australia and around the world have introduced Acute Pain Services made up of specialised doctors and nurses to manage post-operative pain (Hartog et al. 2010). Unfortunately even after a generation of multiple acute pain management guidelines that provide strong and clear recommendations for treating acute pain (Reynolds 2009), post-operative pain continues to be undermanaged (Hartog et al. 2010; Reynolds 2009).

Looking back over the last 18 years we note that in 1994 it was reported that 87 per cent of post-operative patients experienced moderate to severe pain (Samaraee et al. 2010). In 1997 the United Kingdom Audit Commission responded to these figures and introduced standards that included targets of improvement for pain management suggesting that after 1997 they anticipated fewer than 20 per cent of patients should experience severe pain, and by the year 2002, the percentage should have fallen to less than five per cent (Samaraee et al. 2010). Clearly this has not been achieved as in the year 2000 it was concluded that despite major improvements in pain assessment and pain management techniques, post-operative patients were still experiencing moderate to severe pain (Samaraee et al. 2010), and in 2008 Sommer et al. (2008) reported that 41 per cent of 1490 patients had moderate to severe post-operative pain. In recent years there has been a major focus on education surrounding pain management but sadly even after these measures post-operative pain remains suboptimal (Samaraee et al. 2010).

Nurses play a major role in patients’ post-operative pain management because, although the medical staff may order the medications, it is the nursing staff who
are responsible for administering them (Samaraee et al. 2010) ‘Frequently the doctor prescribes the analgesic and the nurse does not administer it’ (Bell 2000, p. 66). It has been found that whilst the nurses had the theoretical knowledge surrounding pain management, they seemed to lack the ability to transfer this into action (Samaraee et al. 2010). Reasons for this were that their knowledge was superficial or was not well integrated into their practice (Samaraee et al. 2010). There is a reluctance on the part of nurses in giving narcotic pain relief medication due to a fear of causing respiratory depression\(^7\) and an outdated belief that patients may become addicted to narcotics, even though this has only been found to occur in one per cent of narcotic administrations (Bell 2000).

Despite new teachings, nurses followed the old tradition habits of the ward rather than reflecting on their own new knowledge and understanding (Samaraee et al. 2010). A Verbal Analogue Score (VAS) is an assessment of severity of pain where the nurse asks the patient to rate their pain from zero to ten, with zero being no pain and ten being the worse pain imaginable. This allows nurses to choose the most appropriate analgesia for the patient. Ene et al. (2008) found that 40 per cent of nurses did not use the VAS to assess pain requirements, confirming that the nurses relied heavily on their own judgement of patients’ pain rather than actually asking the patients. A recent initiative to increase the awareness and importance of pain management was to include pain assessment as the fifth vital sign alongside blood pressure, heart rate, respirations and temperature; however, recent research suggests that this, too, has failed (Nworah 2012).

Several theories have been hypothesised to explain the barriers to effective post-operative pain management. These include:

- a lack of priority that nurses attribute to pain management (Twycross 2008),
- many of the personnel believing that pain is a natural, inevitable, acceptable and harmless consequence of surgery (Samaraee et al. 2010),

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\(^7\) Respiratory Depression – Narcotic medication can act on the brainstem and slow down the rate of breathing (Bell 2000).
nurses relying heavily on the own personal judgement of the patient’s level of pain, with 40 per cent admitting to not asking the patient about their pain and making their own estimation (Ene et al. 2008; Samaraee et al. 2010).

One significant assessment issue relates to nurses preoccupation with physical indicators, such as increased heart rate, compared to subjective indicators (Bucknall, Manias & Botti 2001). An Australian study conducted by Thomas et al. (cited in Sherwood et al. 2003) highlighted that nurses’ estimations of the level of pain fell well below those of the patients’. Recent research has again demonstrated nurses’ perception of pain is significantly different to that of their patients’ (Riva et al. 2011). Riva and Cherubini (2011, p. 265) suggest that one psychological barrier to pain assessment is ‘anchoring’. This refers to the ‘extent an impression formed before knowing the patient’s pain rating could serve as an anchor for judgements made after learning the patient’s rating’ (Riva et al. 2011, p. 266). This recent research has shown that when estimating patients’ pain, nurses are driven by anchoring, and this may have ‘pernicious consequences’ in terms of initial impressions overriding relevant evidence that may disconfirm these initial beliefs (Riva et al. 2011, p. 265). These findings help to understand those by Hartog et al. (2010). In this study it was found that nurses and doctors frequently either underestimated or overestimated acute pain (Hartog et al. 2010). In particular, the underestimation of pain following laparoscopic procedures underlines this issue as this type of surgery was shown to be one of the most painful (Hartog et al. 2010).

Following research into the conditions that influence nurses’ decisions to adopt evidence-based pain management practices, Carlson (2010) suggested that further exploration was required into the large, unexplained variance in post-operative pain assessment.

In examining the findings provided by the surgical ward nurses, it was interesting to note that ‘an understanding of pain and pain management’ was knowledge gained following guided operating room experience (Touzeau 2005, p. 38).
Participants stated that following the ability to observe actual surgical procedures they had a better understanding of why patients have pain, of pain relief requirements and of the process of how analgesia medication alleviates this serious post-operative occurrence (Touzeau 2005).

An Australian study conducted by Thomas et al. (cited in Sherwood et al. 2003) revealed that a common problem in pain management was the underestimation of patients’ pain by nurses. A comment by a surgical ward nurse stated that following operating suite experience he/she could better understand the concept that pain requirements would vary from patient to patient (Touzeau 2005). This concept is vital in providing accurate individualised pain assessment and appropriate pain management. Pain is subjective; no two patients having the same procedure will respond in the same way. When this concept is understood, nurses may then be able to fully understand the complexities of pain management. If nurses do not have a deeper knowledge of individualised pain management there is a risk that they may compare patients (Touzeau 2005). For example, if a nurse cares for a patient who has had his/her appendix removed and has minimal pain requiring very little pain relief, and subsequently cares for another patient who has extreme pain following appendicectomy and requires large amounts of pain relief, there is often the assumption that the second patient should not receive any more pain relief than the first as they have both had the same procedure. This in turn leads to under treatment of acute post-operative pain.

The findings provided in this research showed that when nurses observe surgery, they are better able to comprehend the multifactorial variables in surgery and pain management physiology, which in turn provide a greater understanding of why patients have pain, of the individuality of pain and of how to provide appropriate pain relief (Touzeau 2005).

There is a pressing need for improved post-operative pain management to enhance recovery and patient safety and to reduce morbidity (Samaraee et al. 2010). This could be achieved with the appropriate education backed up by robust guidelines.
and policies that are supported by recent research (Bucknall, Manias & Botti 2001; Samaraee et al. 2010).

### 2.2.5 Miscellaneous

Undergraduate participants from my Master of Professional Education and Training study listed several skills that had not been identified as areas of possible deficit in the literature. These skills included caring for an unconscious patient, management of advanced airway equipment, teamwork, communication, time management and management of complex monitoring equipment (Touzeau 2005). Nurses felt they had learned much about teamwork, and were better able to communicate with medical colleagues following guided operating room experience. (Touzeau 2005).

In the USA, considerable funding has been allocated by the Federal Government to implement continuous patient monitoring on the acute surgical ward (Jeskey et al. 2011). These types of patient monitors have previously only been available in critical care areas such as Accident and Emergency, Intensive Care and the Post Anaesthetic Care Unit (PACU) which is housed within the operating suite; however, recently more advanced monitoring is being implemented in acute surgical wards (Jeskey et al. 2011). This initiative is hoped to provide better detection of post-surgical patient deterioration, although the success of the monitor use is dependent on the nurses using and understanding the new technology (Jeskey et al. 2011). An understanding of, and an ability to use, continuous electronic patient monitoring systems was articulated by participants as a learned skill following operating suite experience (Touzeau 2005). Skills are required in the interpretation of data provided by technical monitoring systems and how this information can be integrated into the whole patient assessment (Lomas & West 2009b). Relying on patients’ vital signs as provided solely by technical monitors can lead to nurses failing to spot signs of deterioration in their patients (Lomas & West 2009b).

Airway management (assessment of breathing and where necessary the instigation of assistance by use of medical devices and or oxygen therapy) was also stated to
be learned in the operating suite (Touzeau 2005). Valuable knowledge was also gained by undergraduate participants during their operating suite experience in understanding how to care for an unconscious patient. In the operating suite all patients who require a general anaesthetic are rendered unconscious. In the PACU within the operating suite, unconscious patients are cared for by specialist nursing staff until they have regained consciousness and are stable. Generally unconsciousness is associated with extreme illness. To be able to learn the concepts of caring for an unconscious patient in a controlled environment on an otherwise well patient is extremely useful and specific only to the operating suite experience (Australian College of Operating Room Nurses 2004, 2010a; Touzeau 2005).

Participants in my Master of Professional Education and Training study were also asked two further questions. The first was if their theatre experience made them a resource person for other ward staff in the surgical ward. Eleven out of the thirteen nurses stated that their operating suite experience had made them a resource for other staff members on the surgical ward. The second question surrounded the usefulness of the operating suite experience. A 5-point Likert scale was constructed with responses ranging from ‘not useful’ to ‘extremely useful’ and participants were asked to circle the most appropriate response. Findings revealed the two most popular responses where that operating suite experience was ‘very useful’ and ‘extremely useful’ to pre- and post-operative surgical nursing skills, being both chosen by six participants. ‘Occasionally useful’ was chosen by one participant and ‘not useful and ‘useful’ were not selected (Touzeau 2005, p. 34).

2.3 Acquisition of surgical nursing knowledge

Although no one has challenged the concerns raised by Long, George and Gulledge (1995), Walker (1998), and Touzeau (2005) regarding a decrease in surgical knowledge and skills resulting from limited exposure to the operating suite, the question still emerges do undergraduate nurses actually require operating suite experience to gain the appropriate knowledge and skills to support
a high standard of pre- and post-operative surgical nursing care or is it possible for these skills to be acquired via another arena?

Data from the primary cohort group who participated in the study for my Master of Professional Education revealed that undergraduate nurses who had been exposed to ‘guided’ operating suite experience in the form of an elective subject had acquired far greater surgical knowledge when tested at completion of their degree than students who had ‘non guided’ experience or no operating room experience (Touzeau 2005). The two groups that were compared were referred to as elective and non-elective.

1. Elective - An elective subject chosen by the students. This comprised of theoretical lectures, guided operating suite experience, clinical support by means of a preceptor and clear learning objectives for the weeklong operating suite placement.

2. Non-elective – This group is comprised of all students who did not enrol in the elective subject. Although not mandatory, many undergraduate nurses do follow a surgical patient through from the ward to the operating suite and back. This allows observation of a patient’s surgery and subsequent recovery in this specialist area.

Comparison was made between the two groups of undergraduate nursing students in the areas of overall score, pass/fail and time spent in the operating suite. A t-test analysis was used to assess differences between the overall scores of the two groups. The p-value was calculated at <0.001, being a statistically significant difference in test scores between the two groups, revealing better outcomes in the elective group (Touzeau 2005).

![Pie chart depicting pass/fail between elective and non-elective groups](image)

Figure 2.1 – Pie chart depicting pass/fail between elective and non-elective groups
A pass/fail comparison was made between elective and non-elective groups on knowledge surrounding pre- and post-operative nursing care. The pass rate was set at 10 out of 20 (Touzeau 2005).

In comparing time spent in the operating suite with student score, a positive slope of the regression line was noted as being statistically significant ($p < 0.000133$), indicating that there was an increased test score as a consequence of increased time spent in the operating suite. These results revealed that the undergraduate nurses who participated in the Master of Professional Education and Training research gained greater surgical knowledge when exposed to guided operating room experience, and those students who did not have guided experience appeared not to have learned this knowledge via other means, such as on the surgical wards (Touzeau 2005). This research highlights the operating suite as an area of learning that supports surgical ward nursing (Touzeau 2005). This study however was small and only tested two models of perioperative education offered in one university and from one state of Australia.

Research conducted by Sigsby and Yarandi (2004) also found the operating suite to be a positive learning environment supporting knowledge development for surgical ward nursing. Their research findings revealed a statistically significant difference in surgical knowledge between the experimental group (undergraduate nurses with operating theatre experience) and control group (undergraduate nurses with medical and surgical ward experience) (Sigsby & Yarandi 2004). Sigsby and Yarandi’s research differed from Touzeau’s as they compared students who had been exposed to operating theatre experience with those who had been exposed to medical surgical ward experience, whilst Touzeau (2005) compared students with guided and non-guided operating suite experience. However, both these studies have revealed the value of operating suite experience in supporting knowledge for surgical ward nursing (Sigsby & Yarandi 2004; Touzeau 2005). Sigsby and Yarandi (2004) go on to suggest that the omission of operating suite experience is a missed educational opportunity for undergraduate nurses. A recommendation of Sigsby and Yarandi (2004) was to continue research in this area and to compare different undergraduate nursing courses with different curricula.
Touzeau (2005) suggested it was clear that a larger investigation surrounding the same research problem was required to assess the magnitude of this nursing education deficit in Australia. This doctoral research was designed specifically to investigate this topic nationally. The need for a study collecting data from undergraduate nurses across Australia from different universities and different curricula, comparing the different models of operating room nursing education offered nationally was evident and has been addressed in this research.

### 2.4 Competency standards surrounding surgical ward nursing

The concept of ‘competency’ has led to some confusion in a practice-orientated profession such as nursing (Khomeiran et al. 2006). In reviewing the relevant literature surrounding competency, one can see that there have been many conflicting applications (Buckley & Caple 2004; Hoffman 1999; New 1996) and differing definitions presented (Abrahams 2001; Collins 1983; Hoffman 1999; Westera 2001). Hoffman (1999) explains that the lack of clarity in definition has caused confusion for those trying to develop competency-based standards and for those who are trying to achieve improved work performance using this method.

The history of competency development in nursing began in 1986 with the Australian Nurse Regulating Authorities Council (ANRAC) initiating the nursing competencies project which culminated in the ANRAC National Competencies for Registered and Enrolled Nurses in May 1990 (ACCNS - Nursing Advisory Committee Professional Development Sub Committee 1993). Another reform driver at this time was the National Training Reform Agenda, which was a Federal Government initiative in association with unions and employers. One part of this program was also the development of National Competencies standards for all industries and professions through the National Training Board. The ANRAC competency standards later changed their name to the ANCI (Australian National Council Inc.) competency standards and later again to the Australian Nursing & Midwifery Councils ‘National Competency Standards for the Registered Nurse’, which are currently the criteria for assessment of undergraduate nurses prior to achievement of their nursing registration.
‘Fitness for practice’ for graduating nurses as defined by the United Kingdom Central Council for Nursing Commission requires an outcome-based competency approach to curriculum design (United Kingdom Central Council Commission 1999, p. 35). Watkins (2000) reminds us that the general public has a right to safe, competent nursing care and to fulfil this expectation nurses are required to be professionally competent (Khomeiran et al. 2006). In order for this to occur undergraduate nurses on clinical placements need to have clear objectives defining the knowledge and information they need to acquire from the clinical area (Touzeau 2005). One of the issues revealed in my Master’s study was that course objectives set by the university, by design, were broad-based and so did not provide specific objectives that dealt with areas of pre- and post-operative surgical nursing (Touzeau 2005). A recommendation was to consider providing more specific guidelines or objectives so that students would know exactly what information needs to be gleaned from the clinical placements, thus assisting in maximising learning in the clinical environment (Touzeau 2005).

A review of literature surrounding clinical competency standards for nurses, and personal discussions with the Australian Nursing Federation, revealed that there is currently no set of competency standards specifically for surgical ward nursing. When reviewing the list of nursing competency standards compiled by Barralough (2002) it becomes clear that specific practice standards are developed in conjunction with the formation of specialty special interest groups within nursing, for example critical care nurses, day surgery nurses, diabetes nurses, operating room nurses and so on. The generalist areas of nursing such as surgical and medical nursing rely on the broad based ANMC competency standards.

In discussion surrounding workplace learning, the need for goals/objectives or competency standards to ensure learners understand what they need to achieve is considered essential (Billett 2001; Buckley & Caple 2004; Smith & Sadler-Smith 2006). In a learning context a goal may be defined as the desired level of achievement (Smith & Sadler-Smith 2006). Smith and Sadler-Smith report a version of earlier work by Lock and Latham and Latham on the goal setting theory that reveals a number of underlying assumptions:
• when provided with complex or challenging goals individuals perform far better than those without goals or with unchallenging or simple ones,
• specific goals are much more effective in eliciting performance than vague goals,
• goals must be set at a level of achievability for the learner in order to maintain self-efficacy,
• updates must be provided to the learner so that they are aware of the progress they are making in achieving the goals set (Smith & Sadler-Smith 2006).

Buckley & Caple (2004) also suggest that a goal driven approach to learning will stimulate and sustain motivation.

In response to the dwindling undergraduate clinical exposure to operating room nursing, the subsequent problems of recruitment and retention, and decreased surgical knowledge, the American periOperative Registered Nurses Association (AORN) has published a guidance statement ‘The Value of Clinical Learning Activities in the Perioperative Setting in the Undergraduate Curriculum’ (2007). One of the drivers for this paper was the American National Nursing Student Association House of Delegates who passed a resolution of support for both theoretical and clinical operating room nursing experience in the undergraduate curriculum (American periOperative Registered Nurses Guidance Statement 2007). Competencies suggested in the guidance statement were:

Knowledge

• applying knowledge of anatomy and physiology to aide in understanding of surgical procedures, effects on patients, and specific patient needs both pre- and post-operatively,
• recognition of the professional and ethical responsibilities, and the subsequent responsibilities to the patient of the nurse and other health professionals,
• applying nursing research to current practice in the perioperative environment.
Skills

- learning and refining ‘aseptic technique’,
- improving patient assessment, communication within a team, organization, coordination of care, critical thinking and decision-making skills in an environment where such activities must be performed quickly and accurately,
- providing the opportunity to develop an interest in perioperative nursing.

Values

- developing the role of the patient advocate,
- responding by appropriately mediating care among all health providers,
- participating in a multi-disciplinary health care team,

(American periOperative Registered Nurses Guidance Statement 2007, p. 267),

2.5 Summary

Several different models of operating room nursing education are offered in Australia. These range from a reintroduction of operating room nursing to the core curriculum of between one to six weeks, to an elective subject comprising lectures tutorials and one weeks experience, to ad hoc follow-through visits to observe a patient’s surgery, and as discussed many students receive no operating theatre experience.

Unfortunately an undergraduate clinical placement in the operating suite may be a nurse’s only opportunity to visit this specialty area, as it is a very foreign place for both patients and even other medical and nursing staff who work in other parts of the hospital (Castelluccio 2012). In an explanation of operating suite practice, several issues arise pertaining to the physical isolation of this area from other departments of the hospital. The operating suite, by design and for the prevention of infection, is a restricted area and so does not lend itself to easy visitation (Bull & Fitzgerald 2004a). In order to enter one must don theatre attire. This process includes removal of outer garments, which are replaced by a pyjama-like suit. A hairnet covers the hair, overshoes are donned and a facemask must be worn.
Assistance must also be sought from a staff member to assist unfamiliar visitors when entering, as the operating room can be a frightening place with blood, unusual smells and viewing of internal organs (Castelluccio 2012). In addition, the operating suite is not a particularly welcoming environment, with unique sights typical of a technical milieu (Castelluccio 2012).

The American periOperating Registered Nurses Guidance Statement (2007) suggests that to be able to prepare graduating nurses who can function effectively in both current and future practice arenas, nursing curriculum must undergo constant revision, updating and where needed, change. In discussing partnerships between higher education institutions and clinical placement providers, Watkins (2000) discusses the importance of undergraduate students’ ability to maximise their practice knowledge whilst in the clinical setting, and the need for a close partnership between the educators and the clinical nurses at the coalface to identify competencies that would be expected at a particular level of the program in specific clinical learning arenas.

In conclusion adverse events in hospital care are a serious problem, which occur in approximately nine per cent of all admissions, leading to death in seven per cent of cases (de Vries et al. 2008). The provision of safe nursing care to the most vulnerable of patients, namely surgical patients, is paramount to the healthcare profession and the agencies for whom they work (American periOperative Registered Nurses Guidance Statement 2007). The key to the quality of the nursing profession will be seen in the nature and quality of its undergraduate education (American periOperative Registered Nurses Guidance Statement 2007).
CHAPTER THREE

Chapter 3: 
Undergraduate operating room experience and recruitment and retention of operating room nurses

‘They arrive, obviously newcomers. Nursing students are taking their first step into the clinical arena. Nervous and tentative they desperately hope to pitch in, blend in, fit in, and otherwise live up to the attitudes and behaviours expected of them’ (Meyer 2005, p. 76)

Introduction

Several concerns have been raised surrounding the decreased exposure of undergraduate nurses to the operating suite impacting on recruitment and retention of nurses within this specialty arena. This review of Australian and relevant overseas literature will aim to address these concerns and explore the underlying issues that led to the removal of the specialty subject from the core curriculum. It will also present an overview of current recruitment and retention strategies looking at initiatives to promote the profession of operating room nursing in an attempt to encouraging new nurses to the operating suite. This chapter will be presented under the following headings:

3.1 Historical decline of operating room nursing
3.2 The invisible and forgettable nurse - misconception of the role of the operating room nurse
   3.2.1 Isolation and foreign environment of the operating suite
   3.2.2 Patient amnesia
   3.2.3 Preconceived ideas about operating room nursing
3.3 Nursing care in the operating suite
3.4 Patient advocacy
3.5 Recruitment of operating room nurses
3.6 Retention of operating room nurses
3.7 The beginnings of a resurgence of operating suite experience
3.8 Promoting operating room nursing
3.9 Summary

3.1 Historical decline of operating room education

In December 1876, a professor of surgery at Harvard Medical School, Dr Henry Barlow, invited student nurses into the operating room for clinical instruction (Metzger 1976). Perioperative nursing was the first known nursing specialty and this was thought to be the beginning of operating room nursing education (Metzger 1976).

Martha (1987) expressed concerns that the erosion of undergraduate operating suite experience would lead to a later staffing crisis. These fears were again noted in literature when Wagner, Kee and Gray (1995) reported that since the early 1950s a continuous decline in operating room education had been observed and this has had a detrimental effect on the ability to recruit new nurses to this speciality. Literature discussing these concerns first emerged from the USA, followed closely by the UK and then Australia (Peters & Frazer 1999). All these concerns were verified in more recent literature which presents a picture of chronic shortages of operating room nurses worldwide (Allanson & Fulbrook 2010; Castelluccio 2012; Messina, Ianniciello & Escallier 2011; Trice, Brandvold & Bruno 2007).

One reason for the decline in operating suite experience for undergraduate nurses was a misconception of the role of the operating room nurse (Bull & Fitzgerald 2004a; Hind 1993; Martha 1987; Menigan 2000; Trice, Brandvold & Bruno 2007; Walker 1998). This issue has been widely debated over the years and will be presented in detail later in this chapter.

Many explanations have been put forward describing the reasons for the decline in operating room nursing exposure in undergraduate nursing programs. These are summarised as follows:

- an undergraduate nursing program curriculum move to emphasise generalist rather than specialist preparation (McCausland 2002; Trice, Brandvold & Bruno 2007),
removal of operating room content from nursing due to overcrowded curricula (McCausland 2002),

- inaccurate perception of the operating room nursing role as purely technical rather than nursing in nature (Bull & Fitzgerald 2004a; Martha 1987; McCausland 2002),

- a view of the traditional role of the operating room nurse as being merely a handmaiden to surgeons (McCausland 2002; Wagner, Kee & Gray 1995),

- a shortage of nursing faculty members qualified to teach an operating room subject (McCausland 2002).

A significant driver in the removal of operating room nursing from the undergraduate core curriculum occurred following the transfer of nurse education to tertiary institutions, when several shifts were noted in the nursing paradigm (Gutierrez, McCormack & Villaverde 1989; Holmes 2004; Walker 1998). One was the move away from the thinking of ‘disease in the hospital setting’ towards ‘disease prevention and community based care’ (Jongeneel 2002, p. 18; Walker 1998, p. 44). Operating room nursing, ‘which is in essence about caring for the patient through illness by the process of surgical intervention and healing’, was a contradiction to the community and health driven model (Fox cited in Walker 1998, p. 44). Therefore, a placement in the operating suite was deemed not to be beneficial as prevention of illness was better than cure (Walker 1998).

Another alteration in thinking was that some faculty members believed operating room nursing was a specialty subject, and as nursing programs were moving to a model of preparing generalists, the need to enrol in such a subject was not considered essential (Gutierrez, McCormack & Villaverde 1989; Holmes 2004). The Nursing Board of Australia was also committed to generalist training and supported specialist units in the postgraduate but not undergraduate curriculum (Jennifer Raybach, Chairperson Australian College of Operating Room Nurses, personal communication, 26th December, 2007). Postgraduate operating room nursing courses designed for those who want to work within the confines of the
operating suite would be considered a specialist field. However undergraduate nursing experience in the operating suite is also the middle piece of a three part surgical process (pre-operative, operative, post-operative). It is unique as a learning environment in its ability to provide rich education that supports the pre-operative and post-operative phases of patient care delivered in the surgical wards (Sigsby & Yarandi 2004; Touzeau 2005).

Undergraduate nursing programs worldwide (Jones & Sorrell 1989; Long, George & Gulledge 1995) and later in Australia (Jongeneel 2002; Peters & Frazer 1999) were all also suffering the effects of overcrowding in their curricula. The Australian experience of decreased operating theatre experience has mirrored published data from the US and UK, with a curriculum coordinator revealing in an interview for my Master of Professional Education and Training study in 2005:

> Certain specialty areas lent themselves to post-graduate studies. These included operating room nursing, critical care nursing, rehabilitation nursing, aged care, and mental health nursing. If these subjects were not able to fit in the undergraduate curriculum they were offered at a post-graduate level. You can provide an introduction as a novice and if the students wish to specialise they may pursue a post-graduate course. This is based on the work of Marguerita Styles, an American nursing theorist. (Touzeau 2005, p. 44)

The Australian experience revealed that the National Review of Nurse Education in the Higher Education Sector recommended the introduction of a comprehensive curriculum which involved a significant mental health component (cited in Peters & Frazer 1999). Peters and Frazer (1999) further state that this meant that specialty units such as operating room nursing were under threat and were unable to secure a place in the undergraduate curriculum. Current literature tells us that, as a result of the changing curricula, there are now fewer acute clinical hours offered to undergraduate nurses in the hospital setting, which has added to this problem (Mott 2012). This has seen operating suite experience ‘relegated to isolated observational events’ (Mott 2012, p. 445).

Another driver in this equation is that Australian universities are struggling to secure enough acute clinical places for their undergraduate nursing students.
(Halcomb, Peters & McInnes 2012). In a practice-based profession like nursing, growth in student numbers is also hindered by the ability of clinical providers to accept students for clinical experience (Halcomb, Peters & McInnes 2012). Factors within the hospital environment such as bed numbers, ‘staffing mix and shortage of experienced clinicians to act as preceptors, clinical teachers, mentors or role models’ will all impact on the number of students a hospital can accommodate (Barnett et al. 2008, p. 55). Learning via simulation is being considered as it may help overcome the difficulties in securing sufficient clinical placements (Reid-Searl et al. 2011).

3.2 The invisible and forgettable nurse - misconception of the role of the operating room nurse

As an isolated area, misconceptions of the role of the operating room nurse are commonplace. The appropriateness of nurses in the operating suite continues to draw criticism due to the perception of the operating room nurse role as being non-nursing (Bull & Fitzgerald 2006). Although the reasons for removal of the operating room nursing subject from the core curriculum were many, role misconception was certainly a major factor. Without accurate understanding of the role of the operating room nurse, informed educational debate cannot take place regarding the value of operating suite experience for undergraduate nurses.

The evolution of operating room nursing is unique and has set it apart from other nursing specialties (Bull & Fitzgerald 2006). Operating room nursing thought to be the oldest established nursing specialty worldwide (Metzger 1976) and, since its conception, has been inextricably linked to the development of technology (Bull & Fitzgerald 2006). It was believed that the nursing role provided in the operating suite was technical in nature and not nursing in focus (Bull & Fitzgerald 2006; Trice, Brandvold & Bruno 2007; Walker 1998). Operating room nursing has dramatically changed over the past few years and has become highly complex, requiring specialist skills and knowledge of advanced surgical procedures; however, nursing care is still paramount to the role (Kelvered, Öhlén & Gustafsson 2012).
In the absence of a formal operating suite experience for undergraduate nurses, students can often accompany their patients to the operating room for an observation visit (Messina, Ianniciello & Escallier 2011). This passive observation does not provide the student nurses with ‘an in-depth understanding of the role of the operating room nurse’, leading to further misconceptions (Messina, Ianniciello & Escallier 2011, p. 181). The technical nature of the operating suite and the ways the nursing staff have shaped their practice in response to the technological changes has opened the discussion as to whether operating room nursing is a technological rather than a nursing undertaking (Bull & Fitzgerald 2006). This issue has been widely debated across the globe over the years with more recent Australian researchers revealing a more accurate picture surrounding the nursing nature of operating room work (Bull & Fitzgerald 2004a, 2004b, 2006; Callaghan 2011). A review of literature revealed several factors contributing to the reasons why the role of the operating room nurse is understated and misunderstood (Bull & Fitzgerald 2004a; Walker 1998). Factors include isolation and foreign environment of the operating suite (Bull & Fitzgerald 2004a), amnesia of patients (Bull & Fitzgerald 2004a) and preconceived ideas voiced by nurses outside this specialist arena (Walker 1998). Operating room nursing staff are also not well known outside their specialty area and even when student nurses see the operating suite staff in other parts of the hospital, they are unlikely to recognise each other without their usual surgical attire, caps and face masks (Castelluccio 2012).

### 3.2.1 Isolation and foreign environment of the Operating Suite

This foreign environment can also act as a stressor for visitors such as undergraduate nursing students (Castelluccio 2012). Several factors have been noted to cause anxiety for students visiting the operating suite, including the fear of fainting or vomiting, the fear of contaminating sterile instruments or the inability to answer a question (Castelluccio 2012). Castelluccio (2012) cites Binding and Randell in explaining that anxiety in the clinical setting is a potential barrier to students learning. Castelluccio (2012) goes on to cite both Moscaritolo and Binding and Randell in suggesting ways to decrease stress and facilitate a
better learning environment, namely providing a safe atmosphere, minimizing stress and preparing the students for the operating room environment before they arrive. Increased traffic in an operating suite can be directly correlated to increases in post-operative infection rates (Berry & Kohn 2004). In order to prevent infection due to traffic, hospital design requirements state that the operating suite should be built so it terminates at a dead end (Berry & Kohn 2004).

The operating suite is quite foreign to patients and also to medical and nursing staff in the hospital who work outside this specialty arena (Castelluccio 2012). Limited access does not allow easy understanding of the operating room nursing role. Bull and Fitzgerald (2004a) explain that the isolation of this area has meant that few outsiders are able to observe operating room nurses at work, adding to the mystique and invisible nature of the services they provide.

### 3.2.2 Patient amnesia

A common side effect of modern anaesthesia is patient amnesia (Brown & Prys-Roberts 1996). Even when operating room nurses introduce themselves and speak directly to patients, often supporting the patient during the entire procedure when local anaesthesia and sedation techniques are utilised, it is unusual for patients to remember the nursing care or any of the surgical process (Bull & Fitzgerald 2004a), due to the retrospective amnesia caused by common medications that are administered (Brown & Prys-Roberts 1996). Compounding the invisible nature of the work of the operating room nurse is the transient nurse-patient relationship (Bull & Fitzgerald 2004a; McGarvey, Chambers & Boore 2004). Despite this limited contact, operating room nurses have pride and satisfaction in providing their patient with an excellent standard of nursing care, even when the reality is that the patient may well remain unaware of it (Bull & Fitzgerald 2004a).

### 3.2.3 Preconceived ideas regarding operating room nursing

Walker (1998) explains that attempts to maintain operating room nursing in the core curriculum were hampered by perceptions of the work that operating room nurses performed. When surveying nurses from outside the operating suite,
Walker (1998, p. 44) found that the most common response to questions regarding the role of the operating room nurse was ‘to help the surgeon’ or ‘to pass instruments’. While these roles are in fact a facet of the care provided, they represent only a minor portion of what operating room nurses actually do (Walker 1998). These misconceptions have led to a belief that operating room nursing is task-focused, highly technical and non-nursing in nature (Brown as cited in Menigan 2000), hence undervalued. The subsequent lack of undergraduate nurses rotating through the operating suite has also limited the understanding of the changing role of the operating room nurse, as the undergraduate nursing group would have once kept ward staff abreast of changes to procedure and nursing practice on return to the surgical wards (Touzeau 2005).

3.3 Nursing care in the operating suite

In complete contrast with the belief that operating room nursing is non-nursing in nature, many authors over the years have presented several different facets of nursing care provided by operating room nurses to their patients in the operating suite (Bull & Fitzgerald 2004a, 2004b, 2006; Callaghan 2011; Chard 2000; Kelvered, Öhlén & Gustafsson 2012; Lindwall & von Post 2008; McGarvey, Chambers & Boore 2000). In 1998, Walker stated that it may come as a surprise to non-operating room nurses that operating room nurses perform many of the same nursing tasks as any other nurse and that operating room nursing actually evolved from ward nursing (Walker 1998).

Phenomenology and ethnographic research undertaken within the operating suite are now contributing to a more accurate understanding of the role of the operating room nurse (Bull & Fitzgerald 2004a). Ethnographic research explores the day-to-day, taken-for-granted values of a given profession and presents them to outsiders in such a way that an insightful view may be obtained (Bull & Fitzgerald 2004a). Phenomenology is the study of a living experience and aims to provide and uncover the meaning of what it is to be human in today’s world (Chard 2000). These types of research are contributing to a greater knowledge of operating room nursing within the operating suite arena (Bull & Fitzgerald 2004a).
McGarvey, Chambers and Boore (2000) explored the role of the operating room nurse suggesting it was characterised by an environment rich in patient interactions and holistic care entwined with the ability to transcend task-focused practice, thus humanising care. Chard (2000, p. 886) was a leader in providing insight into nursing care provided in the operating suite and stated that the theme of ‘caring’ contributed to the very framework of the operating room nurse. A list of ‘caring behaviours’ were developed, which included holding a patient’s hand, keeping the patient warm, clean and comfortable, and staying as physically close to the patient as is possible (Chard 2000, p. 887). Although others perceive operating room nurses to be too technically orientated and non-nursing in nature, this concept does not influence the nurses working in the operating suite and the act of caring seems to flow naturally from participants (Chard 2000). Caring behaviours of nurses in the operating suite include compassion, kindness, friendliness, cheerfulness, gentleness, the attitude that nothing is too much trouble and recognition of the patient as an individual (Bull & Fitzgerald 2006). One nurse speaks of fulfilment when performing caring acts:

I think the best part is when you go to a holding bay [patient waiting area] and you find a patient that’s very nervous and you’re able to hold their hand and talk to them and tell them that you won’t do anything without first explaining it to them. Explain what your doing, what they can expect when they get into the operating room and when they wake up from surgery and explain all those little things to them, I guess, you know, the fear of the unknown. I mean, we would all be nervous lying there in that situation, and when you explain these little routine things to them and let them know that they are all routine and what to expect, and you can visibly see someone kind of relax. I think I find that most fulfilling. (Chard 2000, p. 886)

Operating room nurses have reported that a temporary bond is forged with patients ‘as a habit and an ethical act’ where the nurses promise to be there for the patient and to assume responsibility for their care, so they do not feel abandoned on the operating table (Lindwall & von Post 2008, p. 673). One operating room nurse stated: ‘Caring, for me, is like a temporary friendship, in which, during our time together I guide the patient through the operating process’ (Lindwall & von Post 2008, p. 673).
In an ethnographic study looking at Australian undergraduates nursing students’ perceptions of operating room nursing, Callaghan (2011) reported that participants recognised that operating room nurses were considerate about the patients’ presence and that these patients were vulnerable and required dignity and privacy. One participant reported: ‘Everyone was conscious of the patient…what they said, how they said it and their tone, was very low…the patient was so vulnerable…’ (Callaghan 2011, p. 857).

In recent research conducted by Kelvered, Öhlén and Gustafsson (2012) the nursing nature of the operating room nurses’ role is illuminated in greater depth. This qualitative, interpretive research illustrates 15 overarching nursing care procedures and presents them under three motives for care. These are described as follows:

- Nursing care procedures to promote a continuous confidence-based relationship and situated-related well-being:
  - giving the patient confidence,
  - sharing the thoughts of their patients,
  - enabling the patient to be an individual,
  - helping to create a confident atmosphere.

- Nursing care procedures to guarantee patient safety and well-being by keeping a watchful eye:
  - preparing to collaborate with the surgeon regarding management
  - carrying out safe nursing care taking account of the patient’s right to professional care,
  - leading the work throughout the operation,
  - evaluating the quality of nursing care.

- Nursing care to create a secure environment that promotes wound healing, recovery and well-being:
  - guaranteeing a hygienic aseptic environment,
  - organising a sealed barrier for the wound against foreign substances,
  - maintaining tissue cleanliness,
CHAPTER 3: UNDERGRADUATE O.R. EXPERIENCE

- maintaining tissue moisture,
- maintaining normal body temperature (Kelvered, Öhlén & Gustafsson 2012, p. 4).

Research recently conducted in Norway explored reasons why nurses choose to work in the operating suite revealing that the opportunity to focus on only one patient at a time is favourable, as it allows the nurse to develop a relationship with the patient and ‘makes it possible to give satisfactory and adequate nursing care’ (Storen & Hanssen 2011, p. 582).

One of the most cardinal relationships in the operating suite is that between the nurse and their patient with the central purpose to provide safe passage through the surgical procedure (Bull & Fitzgerald 2006). Patients are often both emotionally and physically vulnerable and so rely heavily on the nurses’ ability to complement the technical aspects of their role with caring behaviours (Bull & Fitzgerald 2006). These skills are vital, with recent research reporting that 85 per cent of patients suffer anxiety prior to anaesthesia and surgery (Mitchell 2011b).

3.4 Patient advocacy

Patient advocacy has been defined in many different ways. Dictionaries have defined advocacy as the act of pleading on behalf of another (Knight & Turner 1997), whilst simply stated by Segesten (1993), advocacy is the ability to speak up for someone when they are unable to speak for themselves. One of the most commonly asked questions of operating room nurses just moments prior to the commencement of surgery is, ‘is my doctor a good surgeon?’ (Killen 2002, p. 406). Despite being faced with such challenges the notion that the operating room nurse is the patient’s advocate is at the root of all operating room nursing beliefs, and nurses reported that they would like the wider community to know that operating room nurses would stand up for their rights and the rights of all their patients (Chard 2000). Patients are at their most vulnerable when they are sedated or asleep as is seen in the operating suite and so subsequently a major role of the professional operating room nurse is to provide a voice for these patients (Holmes 2004).
Virginia Henderson, a nursing theorist, in discussing patient advocacy describes operating room nurses as follows:

The nurse is temporarily the consciousness of the unconsciousness, the love of life for the suicidal, the leg of the amputee, the eyes of the newly blind, a means of locomotion for the infant, knowledge and confidence for the young mother, a ‘mouthpiece’ for those too weak or withdrawn to speak (cited in Scott 2011, p. 16)

An example of advocacy seen in the operating room is presented by Bull & Fitzgerald:

The first incision makes the patient [who is conscious] flinch. All three nurses say ‘she can still feel it’. The surgeon asks the patient if she can feel it and touches the operation site with the blade, she flinches again. The surgeon moves to touch again. The scrub nurse quietly places a gauze square over the site, preventing any further activity and further local anaesthetic is prepared. The anaesthetic nurse squeezes the patient’s hand and tells her what is happening. (Bull & Fitzgerald cited in Bull & Fitzgerald 2004b, p. 1267)

In a study by Callaghan (2011), patient advocacy in the operating suite was indentified by undergraduate nurses as being explicit as the patient was so vulnerable. Two participant’s transcripts follow:

They were talking about her past history [sedated patient], one of the nurses said ‘look guys; could you take this outside, the lady is awake!’... I was really glad to see the nurse standing up for the patient. (Callaghan 2011, p. 858)

He was a Jewish man [the patient] they had left his hat on [orthodox cap] and when he was unconscious they took it off. The anaesthetic nurse said ‘this man doesn’t want to be shaven below the ears because he didn’t want his locks cut off’.... The surgeon seemed annoyed but he only shaved the top of his head. (Callaghan 2011, p. 858)

Another example of patient advocacy is cited in a transcript by Killen:

I work in a small community hospital. I had a female patient who was haemorrhaging. We tried to control the bleeding for four to five hours without success. The patient family wanted to come to the O.R. and speak to her in case she died. The surgeon and the anaesthetist did not want the family present. I asked the family if there was anything I could do. They asked me to say the ‘Our Father’ in her ear. I did. Miraculously, her vital signs began to stabilise and she was transferred to the intensive care unit. Although she never regained consciousness, the family was able to spend time with her. They believed that she knew that they were present and that she heard all their conversations. (Killen 2002, p. 414)

Excellent communication skills are required as many patients now undergo surgery with anaesthetic blocks that enable the them to be awake but feel no pain (Walker 1998). The operating room nurse must establish a trusting relationship
with the patient in a short space of time in order to offer emotional support (Walker 1998). Acting in the role of moral agent for the patient, operating room nurses accept accountability and take responsibility for nursing actions that safeguard the rights of patients who undergo invasive procedures and surgery (Killen 2002). Advanced levels of advocacy are required in the operating suite environment and this needs to be a factor in educational preparation of undergraduate nurses (Callaghan 2011).

The Australian College of Operating Room Nurses, Standard Statement 6 states that ‘the nurses shall act as the patient advocate during the period of surgery’. Criteria within this standard go on to state that the nurse shall:

- respect the patients right to privacy,
- preserve the patients dignity,
- maintain patient confidentiality,
- provide culturally appropriate care (Australian College of Operating Room Nurses 2010a, p. 4).

There is increasing recognition and a clear expectation that a patient’s dignity must be maintained in healthcare and this is vitally important in the operating suite where dignity is most vulnerable (Baillie & Ilott 2012). Privacy, dignity and respect are linked to patient care (Chadwick 2012). Chadwick references a 2010 definition from the British Department of Health as follows ‘Privacy is the freedom from unauthorised intrusion, Dignity is the quality of being worthy of respect, Respect is the regard for the feelings and rights of others’ (cited in Chadwick 2012, p. 187).

During surgery patients are at risk of losing their privacy and dignity because, in order to undertake surgery, bodies must be exposed and are then invaded; patients are sedated or anaesthetised and so relinquish power over their bodies, and all this control is given to complete strangers (Baillie & Ilott 2012). Australian operating room nurses are aware of the importance of providing privacy, dignity and respect and this is evidenced by the inclusion of these patients’ rights in the nursing competency standards (Australian College of Operating Room Nurses 2010a).
3.5 Recruitment of operating room nurses

Over the past two decades, leaders in operating room nursing have written about the need to recruit more nurses (Messina, Ianniciello & Escallier 2011). In the next 20 years, the demand for operating room nurses will far outstrip our current supply (Head 2010; Messina, Ianniciello & Escallier 2011). Since the move from hospital to university education, operating theatre clinical experience has been gradually phased out of most nursing schools curricula (Mott 2012) and a clinical rotation is rarely offered to undergraduates (Castelluccio 2012). Since the beginning of this degenerative clinical process, grave concerns have been voiced about deterioration of nursing skills if undergraduates do not have experience in the operating suite (Callaghan 2011; Jongeneel 2002; Mitchell 2011a, 2011b; Mott 2012; Peters & Frazer 1999), as presented in Chapter Two.

However, most research, attention and concerns have been directed to the problem of recruitment and retention of staff in this specialist field of nursing, as it was firmly believed that if undergraduate nurses did not visit the operating suite during clinical placements they would not consider operating room nursing as a possible career when they reached graduation (Allanson & Fulbrook 2010; Girrard 2006; Happell 2000, 2002; Jongeneel 2002; Martin 2011).

The shortage of operating room nurses is well chronicled (Head 2010; Messina, Ianniciello & Escallier 2011; Thompson 2007) with operating room nursing in Australia and overseas experiencing a staffing crisis (Bull & Fitzgerald 2004a; Trice, Brandvold & Bruno 2007). Trice, Brandvold and Bruno (2007) presented several compounding causative factors that have affected the shortage of operating room nurses worldwide. These include:

- the aging population of operating room nurses, with 50 per cent of current staff aged between 50 and 59 years,
- a limited pool of experienced trained operating room nurses,
- technological advances creating an ever-changing and demanding workplace,
the absence of in-depth operating room nursing component and experience in the undergraduate nursing curriculum (Trice, Brandvold & Bruno 2007).

Most graduate nurses will secure a position in the medical or surgical wards following graduation and so universities are now focusing their curriculum on the popular postgraduate choices of their students (Mott 2012). Due to limited exposure to the operating theatre, undergraduate nurses have became less likely to consider operating room nursing as a possible career choice (Happell 2002; Mott 2012). This has made universities even more reluctant to include operating room nursing in their undergraduate curricula, thus compounding this issue (Mott 2012).

In virtually every state and territory of Australia, a shortage of operating room nurses has been noted (Allanson & Fulbrook 2010). According to a 2004 Australian Health Workforce Advisory Committee report, whilst only 5631 undergraduate nurses completed their education in 2004, Australia will need up to 13,500 new registered nurses each year over the next ten years to cope with forward predictions of service demand (Shanahan & Karvelas 2007). Shortages of graduate nurses equate to even greater deficiencies in specialty nursing areas where staffing shortages are already impacting on services provided, and this issue is estimated to be a particular challenge to nursing leaders of surgical services in future years (Trice, Brandvold & Bruno 2007). As the Australian population ages, demand for surgical services will increase (Birrell, Lesleyanne & Virinia 2003). The average age of the operating room nurse globally is estimated to be between 47 an 52 years (Messina, Ianniciello & Escallier 2011) and 50 per cent of this group are expected to retire in the next five years (Trice, Brandvold & Bruno 2007). As retirement looms, the profession must look ahead to cultivate replacement staff in order to meet future projections whilst providing safe and efficient surgical services (Bull & Fitzgerald 2004a; Head 2010).

To facilitate these future demands there has been a plethora of peer-reviewed literature surrounding recruitment of operating room nurses (Allanson & Fulbrook 2010; Castelluccio 2012; Hamlin 2010; Messina, Ianniciello & Escallier 2011). It
has long been feared that decreased exposure to operating room nursing by undergraduate nurses would lead to decreased interest in choosing operating room nursing as a career path (Bull & Fitzgerald 2004a; Girard 2004; Happell 2000; Holmes 2004; Jongeneel 2002; Martha 1987; Menigan 2000). If undergraduate nurses are not formally exposed to this specialty area it would be very difficult for them to make informed career choices regarding operating room nursing (Jongeneel 2002; Martin 2011).

Martin (2011) explains further by suggesting that the limited exposure to this area of specialty nursing does not give undergraduates enough time to assess if they have the skills to make operating room nursing a viable career choice. Messina, Iannicello and Escallier (2011) also report on the short number of contact hours undergraduate nurses have in this area, suggesting that it does not allow undergraduates enough time to develop an in-depth understanding of the role of operating room nurses. Graduates who pursue operating room nursing may have had little or no exposure as an undergraduate and so, on commencement, may be disillusioned with the role (McCausland 2002; Trice, Brandvold & Bruno 2007) as the operating suite and operating room nursing is completely foreign to nurses from outside the area (Castelluccio 2012).

A growing body of research now supports the belief that undergraduate nurses enter their educational program with firm ideas about the career direction they wish to take following graduation (Happell 1999, 2000, 2002; Stevens & Dulhunty 1992, 1994). In a three-year longitudinal study, Happell (1999) commenced a similar study to that conducted by Stevens and Dulhunty (1992, 1994). In this study Happell (1999) collected data from 793 first year undergraduate nursing students at the beginning of their degree and then again just prior to graduation. This research examined the specific areas of practice students intended to pursue after graduation (Happell 1999) and mapped out the career preferences as they emerged over time (Happell 2002). Operating room nursing featured favourably with the nursing students at the commencement of their degree (Happell 1999). This research refutes the notion that interest in operating room nursing needs to be cultivated; rather, it suggests it needs to be maintained,
as the operating theatre ranked as the third most popular choice for first year nurses (Happell 2000). Final data analysis revealed that career preferences are not static, and are surely influenced during the three years of nursing education (Happell 2002). Happell (2002) revealed that all of the top five preferences had altered during the three years of nurse education. The two most notable changes were seen in surgical nursing and operating room nursing. Happell’s 2002 findings mimicked those of Stevens and Dulhunty (1994) as, in both studies, surgical nursing rose from its initial ranking of fifth to first place by the time of completion of the nurses’ education. The main casualty in the top five positions was operating room nursing, which fell from third to fifth place with a statistically significant change in the mean score (p<0.001). Happell (2000) expressed concerns that if operating room nursing fell in ranking, this would support fears that, over the three years of nursing education, a lack of exposure could decrease nurses’ interest in working in the operating suite. Happell’s research does not state the amount of exposure to the specific nursing areas; however, it does state that after graduation nurses generally choose to work in areas where they have had the most experience. It is interesting to note that in the top rankings, surgical nursing (with the largest undergraduate exposure) was the clear winner in student preferences by the completion of their education.

Happell’s research (Happell 1999, 2000, 2002) has strengthened the resolve of operating room nursing special interest groups to lobby for an increase in operating suite experience. Few researchers have however looked at the broader ramifications of operating room nursing experience and its ability to provide valuable nursing knowledge for those who care for patients on the surgical wards outside this specialist area.

### 3.6 Retention of operating room nurses

Attracting nurses, and importantly retaining them in acute clinical environments such as the operating suite, is becoming increasingly difficult worldwide (Gillespie, Wallis & Chaboyer 2008). Holmes (2004) states that over the last 40 years operating room nursing has been eliminated from university core curricula.
worldwide, even as the demand for nurses in this specialty has increased, and will increase further (Head 2010; Holmes 2004).

Dwindling numbers of operating room nurses have caused an increase in workload and stress level for the remaining staff (Allanson & Fulbrook 2010; Young 2009). These stressors have been shown to cause nursing attrition (Hegney, Plank & Parker 2003). The Australian Workforce Advisory Committee (2006) reported that the decreased number of nurses in the operating suite has led to an increased workload for remaining staff who are working more overtime, are being called back more frequently and are working double shifts. Operating room nurses today are faced with heavy workloads, high acuity of patients, staff shortages and thus low morale (Young 2009). As a result of this situation, many operating room nurses are ‘experiencing burnout, increased sick time, or making the decision to leave the operating room’ for either professional or personal reasons (Young 2009, p. 14).

Another stressor added to the overworked operating room nurse is the added pressure to act as a preceptor for new students or hires (Young 2009). Undergraduate nurses and most newly hired nurses have little or no previous experience in the operating theatre, so they require:

- extensive orientation to the environment and routines of the area,
- explanation on how to apply operating nursing education to the practical setting,
- assistance in building a sound practical knowledge base,
- one to two weeks of supernumerary time working with training staff to help develop their skills (Young 2009).

Currently in Australia there is a level of discontentment heard in nursing discourse surrounding the pressures of precepting students and this has been captured in an anonymous letter to the Royal College of Nursing newsletter, The Australian Nursing Review. This letter summarises the issues seen at the coalface of clinical nursing in the following way:

- clinical nurses are not asked but are obligated to teach,
at the completion of the shift, staff are required to complete a student performance appraisal but no extra time is allocated for this,
• there are no current incentives to teach by either a reduction in workload whilst teaching or by way of financial remuneration (Anonymous letter to the editor 2011).

The author goes on to explain that there is a great deal of stress surrounding the teaching role; not about teaching per se, but the fact that teaching takes their time away from patient care, and when they provide better patient care they are concerned that their teaching might have been better if they were given more time (Anonymous letter to the editor 2011).

These sentiments echo those of Young (2009), who suggests that the added pressures of precepting students and new staff increases the already heavy workload of operating room nurses, and implies that if these issues are not addressed more stress and staffing casualties will be seen.

In reviewing research literature surrounding retention of nurses to the operating suite, one notices that ‘recruitment and retention’ appear together as though they were either connected or synonymous terms. Much is written about recruitment of nurses to this specialty but little research has addressed the issue of retaining the staff that are already working in the field. A gap also exists in the literature in exploring the relationship between the different models of undergraduate operating room nursing practical experience and any possible impact these may have on retention of staff within the field. For this reason this research will explore the possibility of a connection between the different models of operating room nursing offered in Australia and retention of staff working in the operating suite.

3.7 The beginnings of a resurgence of operating suite experience

The current lack of guided operating theatre clinical experience in undergraduate nursing programs makes it imperative for leaders in operating
room nursing to initiate educational strategies that will entice the next
generation of nurses to commence a career in operating room nursing
(Castelluccio 2012). Managers of operating suites face great challenges as
they try to fill vacancies caused by nurses retiring or leaving the profession,
all in a market where there are few available experienced operating room
nurses (Mott 2012).

In the early 1980s, the then American Operating Room Nurses association (now
American periOperative Registered Nurses) launched an initiative to promote
operating room nursing and to encourage nursing student exposure to the
operating suite (McCausland 2002). Since that time various courses have been
reintroduced into undergraduate nursing core curricula or as an elective subject to
try and address the recruitment problem (Hamlin 2010; Messina, Ianniciello &
Escallier 2011; Mott 2012; Trice, Brandvold & Bruno 2007). Some course
designs have seen universities and hospitals partner together in setting up
programs (McCausland 2002; Messina, Ianniciello & Escallier 2011; Peters &
Frazer 1999); some universities are offering a component of operating room
nursing as a choice in their high dependency subject for senior students (Mott
2012); some hospitals have taken the initiative of writing education programs and
proposals and have ‘persuaded’ the university to participate (Castelluccio 2012, p.
484), whilst some hospitals, in a desperate attempt to recruit staff, have returned
to in-house hospital training in the form of extended post-graduate orientation
programs (Martin 2011). It is believed that these types of nursing programs might
offer a partial solution to the shortage of nurses in this area, thus reducing attrition
of staff already working in the operating suite (Messina, Ianniciello & Escallier
2011).

Martin (2011) suggests that operating suite managers, realising that few newly
registered nurses are choosing operating room nursing, have three choices in
replacement strategies to make up for staffing shortfalls created by the retiring
baby boomers (Martin 2011). Options include running their departments
short-staffed until experienced operating room nurses fill the vacant positions,
hire from the small number of interested new graduate nurses, or hire nurses
who are experienced in other nursing specialties but have no operating theatre experience (Martin 2011).

Even experienced nurses from other nursing disciplines become novices again when they enter this new domain and will require operating room nursing staff to invest large amounts of time, energy and talent in providing extended periods of orientation prior to the nurse being able to begin autonomous practice (Martin 2011; Stobinski 2008). Loss of newly hired nurses following the lengthy orientation process is very costly for the hospital and frustrating to the operating room managers and staff (McCausland 2002; Messina, Ianniciello & Escallier 2011). Martin (2011) reported the loss of three out of four newly orientated staff who resigned after their orientation, suggesting they would like to work in a less stressful area. Two of the three nurses reported that they still felt unprepared following their orientation, revealing that greater education was required for new hires and prompting the hospital to look at new, more detailed models of preparation for new staff (Martin 2011).

3.8 Promoting operating room nursing

Recognising the growing demand for operating room nurses, special interest groups worldwide are acting to promote their profession (Messina, Ianniciello & Escallier 2011). Promotion strategies have included representatives from the local special interest groups presenting at National Student Associations; the offer of discounted memberships to special interest groups, and the offer of free or discounted registration for students to national operating room nursing conferences (Castelluccio 2012; Messina, Ianniciello & Escallier 2011). Other initiatives include Perioperative Nurses Week, and International Perioperative Nurses Day (Girard 2006).

In 2004 the American periOperative Registered Nurses group made several recommendations to promote their profession by providing more information to university faculty members, so that they would fully understand what operating room nursing may offer (Girard 2004). This information can be summarised as:
awareness of the full range of clinical nursing opportunities the operating suite can offer to undergraduates,

- information about the way that knowledge and skills required for general nursing can be achieved through operating suite experience,

- sharing strategic ideas on how to expose more undergraduate nurses to the operating suite without putting more strain on an already crowded curricula,

- re-educate the nursing community in general on the notion that operating room is ‘real’ nursing, just like intensive care nursing or accident and emergency nursing. It is just in a different setting (Girard 2004, p. 827).

Due to the nature of working in an isolated area like the operating suite, outsiders know very little about the role of the operating room nurse (Messina, Ianniciello & Escallier 2011). It is vitally important to decrease the anonymity and increase the visibility of this nursing role, or operating room nurses will remain ‘anonymous in our successes, yet famous in our failures’ (Graling 2007, p. 501).

It is suggested that operating room nurses offer to provide presentations at international business organisations, local Rotary groups, civic organisations and local community groups (Girrard 2006). Medical specialists are experts in presenting to the public on what they do and so too could operating room nurses (Girrard 2006).

3.9 Summary

The long list of skills performed by the nurses in the operating suite does not hope to capture the rich complexity of the role of the operating room nurse (Bull & Fitzgerald 2004a). Operating room nursing is under scrutiny from interested health care managers who are keen to know what happens in the operating suite behind closed doors, and it is clear that in order to secure funding for nursing positions the true role of the operating room nurse needs to be clarified and exactly articulated (McGarvey, Chambers & Boore 2000). Thus, the operating room nursing role may also be seen for its true caring and nursing nature and
viewed more favourably by curriculum coordinators, undergraduate nurses and the wider community.

Rognstad (cited in Storen & Hanssen 2011, p. 578) states that the main motivator for entering a career in nursing has altered from being a ‘calling’ to satisfying personal interests and desires. These interests need to be developed through exposure (Happell 2002). It is well documented that little or no exposure to the operating suite has a profound effect on new nurses choosing operating room nursing (Castelluccio 2012; Happell 2002; Jongeneel 2002; McCausland 2002; Mott 2012). The decrease in numbers of new recruits and the subsequent increased workloads has been a factor in causing stress and burnout for experienced operating room nurses, which in turn has led to more nurses leaving the profession (Allanson & Fulbrook 2010). Allanson & Fulbrook (2010) suggest that the obvious way to address the shortage of operating room nurses is to attract new graduates by providing specialist education programs that facilitate transition into this area of nursing practice.

Grealish and Smale (2011) remind us that clinical nurses today are confronted by students from different universities, different curricula and varying levels of preparation. Whilst recruitment of nurses has been explored in great depth, there is a gap in the literature in exploring a connection between student nurses from different models of education and the impact that they may have on the staff providing clinical supervision in the workplace. For this reason the relationship between students from different education models and any possible impact on clinical operating room nurses will be explored in this study.
Chapter 4: 
Learning in the workplace

Much if not most, learning in the course of working lives will be acquired, refined, and developed in workplace settings (Billett 2003; 2006, p. 31)

Introduction

This chapter will review Australian and relevant overseas literature on learning in the workplace. It will explore how adults learn at work, presenting literature surrounding guided and non-guided learning and workplace curriculum.

This chapter will be presented under the following headings and sub-headings:

4.1 The concept of workplace learning
4.2 Classifications of workplace learning
4.3 Constructivism
4.4 Guided versus non-guided experience
4.5 Cognitive load theory
4.6 Constructivist ideas and learning in the workplace
  4.6.1 Workplace experience
  4.6.2 Direct guidance in workplace learning
  4.6.3 Indirect guidance in workplace learning
4.7 Workplace curriculum
4.8 Summary

4.1 The concept of workplace learning

Workplace learning has moved to centre stage in the discussion surrounding the training and ongoing development of healthcare professionals and with this has come the need to better understand the processes of informal learning in the workplace (Billett 2001; Swanwick 2005). The clinical work environment is the setting for workplace learning and a vital influence in the development of nursing
competency (Stobinski 2008). Educational theorists who have studied learning at work reject the notion that learning that has taken place in an educational institution is inherently superior to that which occurs in the workplace (Billett 2001; Buckley & Caple 2004; Fuller & Unwin 2005) and suggest that each should be valued in its own right and appreciated for its own specific contribution to knowledge acquisition (Buckley & Caple 2004).

Fuller and Unwin (2003, p. 410), in a review of informal learning, suggest that ‘learning as participation’ has become the dominant metaphor to understanding workplace learning. Fuller and Unwin (2005) later went on to state that people appear to learn at work in a relatively naturalistic manner, through participation in activities such as interactions with co-workers and undertaking workplace tasks. In the workplace the learning is also authentic, as it is not constrained by the difficulties of constructing a false environment (Billett 2001). However an important starting point for the understanding of workplace learning is the recognition that teaching and learning are not the primary goal of the workplace, rather they are a by-product of the engagement in activities and relationships seen in the production of the service provided (Fuller & Unwin 2005). Newton (cited in Billett 2003; see also Smith 2003) suggests that as financial reductions occur in training budgets, a shift in responsibility for workplace education may be seen from training personnel to staff at the coalface in the form of coaching or preceptorship.

4.2 Classifications of workplace learning

Dreyfus (1982) developed a model for the development of expertise that may be applied to learning at work. In this, Dreyfus describes the intellectual dimensions of skill acquisition and the transitional progress from the novice level through to the expert practitioner. Since its conception this model has been adapted to accommodate several different professions, with examples seen in the work of Benner (1982) in nursing and Evans (1994 cited in Smith, P 2003) in workplace apprenticeships. The stages of development reveal two distinct aspects of skilled performance, one being a movement from reliance on abstract principles to the ability to rely on knowledge gained via their own experience, and the second a
change in interpretation and understanding of workplace tasks from being a compilation of equally relevant bits to the ability to see the task as a whole procedure, where only certain pieces are relevant (Benner 1982). Despite its age, this model has stood the test of time and provides great insight into the development of knowledge in workplace learning. An adaptation of the Dreyfus model, ‘From Novice to Expert Knowledge’, is presented below.

- **Stage 1 – Novice**
  This level is characterized by behaviours that are governed by rules, with limited and inflexible work practices (Smith 2003). As beginners have no experience they have an inability to use discretionary judgment and so must be task orientated (Benner 1982).

- **Stage 2 – Advanced Learner**
  The advanced learner, whilst still working within the given rules, is now able to learn some important situational components of the task, referred to as ‘aspects’ (Benner 1982). Aspects may be defined as the overall global characteristics of performance and will require previous exposure to a situation to enable future recognition (Benner 1982). It must however be noted that at this level the learner may not be able to differentiate the important features of these situational aspects (Smith 2003), thus the need for guidance remains (Benner 1982).

- **Stage 3 – Competent**
  The learner is now able to recognise his or her actions in terms of goals and plans (Benner 1982; Smith 2003). Aspects are guided on the selection of important features of the particular situation (Smith 2003; Smith & Sadler-Smith 2006).

- **Stage 4 – Proficient**
  Characteristically, the proficient performer is able to sum up a situation quickly and choose the best plan of action in a seemingly unconscious fashion (Smith 2003; Smith & Sadler-Smith 2006).

- **Stage 5 – Expert**
  At the expert level, there is no need to rely on analytical principles or rules to connect the worker with an understanding of the situation.
(Benner 1982). Work performance is fluid, flexible and highly proficient, and undertaken intuitively from a deeper understanding of a given situation (Smith 2003; Smith & Sadler-Smith 2006).

Stobinski (2008) suggests that the completion of undergraduate nursing yields what Benner classifies as an ‘advanced learner’. Following the establishment of a knowledge base, the nurse enters the workplace which will then become the primary learning environment (Stobinski 2008). Understanding the different ways people gain knowledge through the work environment is then vital in determining education structures to facilitate workplace learning (Billett 2001). A failure to adequately recognise these different types of workplace learning can not only effect the quality of training and assessment but also be a cause of workplace tensions (Smith & Sadler-Smith 2006). Over the past thirty years educational theorists have presented different conceptualizations of workplace learning (Billett 2003; Gott 1988; Mezirow 1991). The evolution of these ideas has seen Billett (2001) formulate his cognitive view of knowledge that underpins performance. In this Billett illustrates the three types of knowledge that may be acquired during workplace activities:

**Propositional or Conceptual Knowledge**

- Propositional or conceptual knowledge has also been referred to as ‘declarative knowledge’ or ‘knowledge that’ (Billett 2001, p. 51). Conceptual knowledge includes information, facts, propositions, concepts and assertions related to workplace knowledge. Its levels range from simply knowing the names of procedures and instrumentation to understanding the complex workings of a set of procedures and a rich understanding of a particular vocation. The acquisition of deep conceptual knowledge will enable staff to be involved in complex problem-solving tasks via not only an understanding of the nature of the problem, but also an understanding of other interrelated work considerations, which will be altered by the impact of the initial problem. As the workplace environment is ever changing, conceptual knowledge is not static and thus the depth of
understanding within a specific vocation is probably limitless (Billett 2001).

Procedural Knowledge

- Procedural knowledge may be defined as the knowledge we use to act, which encompasses skills, techniques and the ability to secure goals within the working environment. For these reasons it is also often referred to as the ‘knowledge how’, as it involves the cognitive skills that assist in the performance of a task and is gained through practical or on-the-job experience (Billett 2001, p. 52). The understanding of this type of knowledge inspires further investigation into undergraduate education as it questions the ability of undergraduate nurses’ knowledge if practical experience has not been provided.

Billett (2001) cites two independent works by Evans and Stevenson, both published in 1991, which divide procedural knowledge into three specific levels. The first order or specific procedures are used to allow staff to perform goals or tasks. Specific procedures may be defined as ones that are performed seemingly without any conscious thought. In the second order further knowledge is developed, which not only allows the tasks to be performed but also facilitates the manipulation of knowledge to adapt to new equipment or tasks as they arise. Such activities may require prior preparation to allow procedures to be broken down into sub-tasks, permitting a means-ends analysis in order to know what interacting facts need to be considered. Both first and second order skills are said to require a third level of overseeing or management that strategically monitors and organises work applications. Higher order procedural knowledge is one particular quality that distinguishes the expert from the novice as it allows problem solving by transfer of knowledge to new or challenging situations (Billett 2001).
Dispositional Knowledge

- Dispositional knowledge describes areas of practice that cannot be fully explained in conceptual or procedural knowledge such as personal or behavioural attributes. Such behaviours may include courtesy to customers, manners, work ethic, values, attitudes and identity associated with work. This type of knowledge requires individuals to value their work in such a way that this type of learning occurs in an effortless manner. Work culture and values are also most important, as they will determine the standards of workplace etiquette required. Dispositional knowledge will differ enormously when comparing different types of work or even variations within a specific field of employment. An example of this may be seen when we look at the relaxed environment afforded to patrons by waiters at a sidewalk café, which will be in stark contrast to the highly attentive and formal service provided by a waiter in a silver service restaurant. Consequently, dispositional knowledge alters dimensions according to individuals (attitudes and beliefs), amongst differing professions (the confidentiality of the nursing profession, the caution taken by airline pilots) and those factors that pertain to specific values at work (Billett 2001).

Another area of knowledge acquisition presented by Gott (1988) and Mezirow (1991) not addressed by Billet’s work, is the area of strategic knowledge.

Strategic knowledge

- Strategic knowledge may be described as knowledge on how to decide what to do and when (Smith 2003). This concept was further explained by Shavelson et al. (2005), describing strategic knowledge as the learner’s ability to know when, where and how their knowledge should be applied in a given situation. Strategic knowledge develops with experience. For example, experts trying to solve a problem dealing with force and motion would know this is the time to apply Newton’s first law, whereas novices seem only to be attracted to the surface
features of the problem, unable to know when to apply appropriate theoretical concepts (Shavelson, Araceli Ruiz-Primo & Wiley 2005). Learners need strategic knowledge, not only to evaluate, formulate and choose courses of action at work, but also in a broader sense beyond the learning content, to facilitate understanding and management of their own knowledge development (Smith & Sadler-Smith 2006).

Smith and Sadler-Smith (2006) remind us that the real value in understanding the conceptualisations of workplace knowledge is the ability to then separate out tasks in more detail, allowing appropriate methods to be instigated that support knowledge development in each specific domain.

4.3 Constructivism

The term constructivism is derived from the terms ‘construe’ or ‘construct’ and builds on prior knowledge that the learner may possess (Peters 2000). Experience, both past and present, will reinforce the process of interpretation and construction of new learning (Ferrara 2010; Levin 2010; Smith & Sadler-Smith 2006). A constructivist approach suggests that students will come to a learning environment with prior knowledge, which will assist in the constructing and development of new learning (Ferrara 2010; Peters 2000).

In order to promote deep learning, constructivists believe that learners will process novel information in a profound way and contextually integrate it with their prior knowledge (Vogel-Walcutt et al. 2011). A constructivist theory proposes that humans are active in understanding their environment or world which encompasses learning (Billett 2001). Individuals will make sense of information in a constructive and interpretive fashion, rather than simply internalizing knowledge that has been externally provided (Smith 2003). Ferrara (2010) reminds us that many nurses come to the workplace with previous experience, and the use of a constructivist approach in workplace learning facilitates both new knowledge and assists in bridging the gap between what is taught in classrooms and what is done in practice.
Constructivism maintains that communication between the learner and teacher is much more than just a one-way communication, rather it is a dynamic two-way interplay where knowledge emerges in the space between the learner and more expert facilitator (Smith 2003). The recognition that new knowledge builds on pre-existing knowledge is an important realization for the teacher as it will determine the template for the teacher’s role in the learning process (Peters 2000).

4.4 Guided versus non-guided learning

Educational debate regarding the impact of guidance during teaching have been discussed for over a century (Kirschner, Sweller & Clark 2006; Mayer 2004). On one side are those who believe that all learners, both novice and expert, learn more effectively when they are asked to interpret information for themselves by providing unguided or partially guided learning methods (Clark, Kirschner & Sweller 2012). In this discussion there is the belief that unguided or minimally guided experience will allow students to discover and construct essential knowledge for themselves, firstly by allowing students to solve real life problems, and secondly by acquiring knowledge through experiences within the desired discipline (Kirschner, Sweller & Clark 2006).

Others believe experts and novices differ whilst experts are able to learn effectively with minimal guidance, novice learners require full explicit instructional guidance to thrive (Kirschner, Sweller & Clark 2006; Mayer 2004; Sweller 1994; Vygotsky 1978). Those in favour of guidance suggest that in order for novice learners to gain knowledge they will need to be provided with direct instructional guidance (Billett 2001; Kirschner, Sweller & Clark 2006; Klahr & Nigrum 2004; Vygotsky 1978), which encompasses a full explanation of procedures that students require to learn and learning strategies that are compatible with human cognitive architecture (Kirschner, Sweller & Clark 2006). Undergraduate nursing courses in Australia offer varying types of practical operating room experience. This experience ranges from guided practical learning provided in some core or elective curriculum subjects to unguided ‘follow through’-style operating room experience.
Teachers of educational models designed to provide partial or minimally guided instruction believe their students will discover concepts and skills independently in a form of discovery learning (Clark, Kirschner & Sweller 2012). The origins of discovery learning have stemmed from works including that of Piaget (Rittle-Johnson 2006), Bruner in 1961 (Kirschner, Sweller & Clark 2006) and more recently Steffe and Gale in 1995 (Kirschner, Sweller & Clark 2006). The Piaget theory believes that in order to understand, one must discover and reconstruct knowledge so that it may be utilised in a creative and productive manner. Many theorists in psychology and educational reform assert that discovery learning is more effective than direct instruction as it supports greater transfer and conceptual knowledge (Rittle-Johnson 2006). Steffe and Gale (cited in Kirschner, Sweller & Clark 2006) support this notion and suggest that knowledge is best construed by providing goals and minimal information, because learning is idiosyncratic and commonly used instruction strategies are not effective.

In contrast, Vygotsky (1978) supported guided learning in his Sociocultural Development Theory. This theory describes a Zone of Proximal Development (ZDP) in which learning scaffolding is put in place, encompassing adult guidance and collaboration with more expert peers (Vygotsky 1978). The ZDP occurs in four stages and, as the learner becomes more proficient, the level of scaffolding is decreased in line with the level of ability and need (Vygotsky 1978). Other theorists who maintain the need for a guided learning approach support a processing and cognitive load theory, suggesting that the effectiveness of unguided or minimally guided learning should be questioned (Kirschner, Sweller & Clark 2006; Mayer 2004; Rittle-Johnson 2006; Yates 2005).

A study by Dean and Kuhn (2007) replicated a study conducted by Klarhr and Nigam in 2004 but extended it by making comparisons between direct instruction and discovery learning over a longer period of time. Three groups of fourth grade science students were observed. These groups were ‘direct instruction’, ‘practice only’ and ‘direct instruction and practice’ (Dean & Kuhn 2007, p. 386). Findings revealed that in the initial assessment the direct instruction group showed far better results (confirming the findings of Klarhr and Nigam), however over time
this diminished, and by 12 weeks ‘practice only’ and ‘direct instruction and practice’ revealed the higher scores, suggesting that direct instruction without practice was not sufficient to sustain knowledge over 12 weeks (Dean & Kuhn 2007). Dean and Kuhn (2007) go on to state that their study does not purport to demonstrate the merits of engagement/practice methods compared to direct instruction in establishing how fast strategic understanding was gained, rather how well knowledge could be acquired and retained.

### 4.5 Cognitive load theory

Kirschner et al. (2006) argue strongly in favour of guided instruction, stating that an important problem with unguided or minimally guided experience lies in its incompatibility with the manner in which our cognitive structures are organized, referred to as ‘human cognitive architecture’. They suggest that the understanding of long term memory function has altered significantly in the past twenty years and rather than being seen as a passive repository of discrete fragments of knowledge being stored for later use, is it now viewed as a central, dominant structure of human cognition critically influencing all we see and do (Kirschner, Sweller & Clark 2006).

Cognitive load theory, as described by Sweller (1994) is based on the hypothesis that the brain uses two types of memory; short term, which has limited storage capacity, and long term, which has almost unlimited capacity. The rationale for this theory discusses the concept that whilst the working memory (which refers to structures and processes used for temporarily storing and manipulating information) processes and stores information for a short time, the aim of learning is to provide knowledge which will eventually be stored in the long term memory for later use (Kirschner, Sweller & Clark 2006). In non-guided or minimally guided learning heavy demands are placed on the working memory as it searches to find problem solutions; Kirschner, Sweller and Clark (2006) suggest that this work does not leave the working memory free to be available to contribute to the accumulation of knowledge in the long term memory, thus limiting learning.
Novice learners are of particular concern as the heavy demands that free exploration of complex environments place on the working memory may in fact be detrimental to learning (Clark, Kirschner & Sweller 2012; Kirschner, Sweller & Clark 2006). The advantages of guided practice only begin to recede when the learner possesses enough higher prior knowledge to provide their own internal guidance, and certainly this is not attainable in novice learners (Kirschner, Sweller & Clark 2006). Clark, Kirschner and Sweller (2012, p. 7) state that ‘there is overwhelming evidence that, for everyone but experts, partial guidance during instruction is less effective than full guidance’. This theory is supported by data provided by Touzeau (2005) who compared two groups of novice learners gaining nursing experience in the operating suite. Knowledge testing revealed that students who were provided with guided learning scored higher on a knowledge test compared to those who had unguided learning (Touzeau 2005).

Direct instruction is also important in the novice group as it assists in the formation of well organized knowledge structures or ‘schema’ in a domain that assists the coordination of information in the working memory (Rittle-Johnson 2006). Schema assist us in solving problems we have not previously encountered by linking them to similar problems we have solved in the past (Martin 2012). Expert problem solvers may have developed large numbers of schemas that will be stored in the long term memory (Paas & Sweller 2012). These schemas allow problem solvers to recognise a specific problem and to decided what the best cause of action should be (Paas & Sweller 2012), further revealing the importance of direct instruction in its ability to assist in schemas development.

### 4.6 Constructivist ideas and learning in the workplace learning

When reviewing literature pertaining to workplace learning, it is observed that the constructivist paradigm strongly advocates the use of proximal guidance particularly for novice employees (Billett 2003; Gott 1988; Mezirow 1991). Vygotsky’s (1978) Sociocultural Development Theory discusses social interaction with more experienced others and the necessity of proximal guidance in the development of knowledge. Billett (2001) suggests that the quality of workplace learning is determined by factors which include the varied types of experiences.
the learner will be exposed to, the ability to access situational assistance including support and guidance, and the way in which the learner is able to interact and interpretively construct knowledge from the workplace setting. In addition, the types and quality of workplace experience that students are exposed to and the amount of guidance and support received are all pivotal to the acquisition of rich learning (Billett 2001).

Billett (2001) further proposes that these types of situational factors may influence learning in three ways. In the first kind of activity where individuals are seen to engage, there is identification of problems to be solved, new knowledge to be constructed and goals to be achieved (Billett 2001). Secondly the direct guidance available in the workplace provides the foundation for collaborative learning between the student and a more experienced member of staff (Billett 2001). The final influence is seen when the workplace also provides ‘indirect guidance in the form of opportunities to observe other workers, contributions of the physical workplace setting and its tools’ (Billett 2001, p. 33). These factors will be explored in further depth.

4.6.1 Workplace experience

Fuller and Unwin (2005) cite Lave and Wenger when they state that the concept of workplace learning is underpinned by a process that is primarily social and situated. This meaning was echoed by Fuller and Unwin (2005) when they reported research findings from workers who stated that they learned their jobs from participating in work activities and from guidance and assistance from their colleagues. In parallel, Billett (2001) reports the findings of research he conducted in 1993, which involved six open cut mining companies. The aim was to establish the mechanisms for learning within this field in the absence of formal training. Findings revealed that ‘just doing it’ (everyday work), observing more experienced miners performing their tasks and the guidance and support provided by other workers were all salient to gaining knowledge (Billett 2001, p. 68). Billett (2001) explains these findings by suggesting that learning and working are interdependent. People learn constantly as they strive to achieve work-related goals; as we think, we act and we subsequently learn and that the quality of this
learning will be supported by guidance from more experienced others (Billett 2001).

In looking at the ways that operating room nurses learned their craft, McGarvey (2004) supported this argument stating that the majority of learning in operating room nursing takes place in the clinical environment whilst working in the operating suite. Therefore the type and breadth of experiences that students are exposed to will clearly determine what and how much they are able to learn (Billett 2001).

4.6.2 Direct guidance in workplace learning

The most significant basis for workplace learning is the provision of access to guidance from more experienced others, and the lack thereof may well inhibit the ability to learn (Billett 2001). Billett (2001) reminds us of long-standing evidence of efficient learning in the workplace as he discusses the fact that most vocations learned their craft long before the establishment of universities or vocational colleges. Examples of effective learning at work have been seen as far back as the Middle Ages where master craftsman apprenticed young men (Dorsey & Baker 2004). Everyday participation in the workplace has been shown to contribute to the formation of procedural knowledge (means of securing goals) which is quite visible and accessible, as opposed to conceptual knowledge (understanding) which is observed to be more opaque thus limiting its acquisition via workplace experience (Billett & Rose 1996; Fuller & Unwin 2005).

The socio-cultural constructivist literature suggests that knowledge is socially mediated (Billett & Rose 1996). What we learn and the way in which we do so is mediated by cultural and social contexts (Alfred 2002). From a socio-cultural perspective knowledge is influenced and developed by the social and cultural relationships that learners have with experienced staff (Barker 2011). Close social interaction, as seen in proximal guidance by a more experienced staff member, is more likely to provide an expedient means of uncovering and accessing conceptual knowledge, which is embedded in social practice (Billett & Rose 1996; Fuller & Unwin 2005). The second highest need requirement in Maslow’s
five levels of hierarchy is that of socialization and belonging to a valued group. This has been shown to provide greater group cohesion by reducing the variability of members which in turn has provided cohesion, linking of members satisfaction and workplace productivity (Smith 2005).

Another construct often used in workplace learning can be found under the metaphor of On-the-Job-Training (OJT) or Structured On-the-Job-Training (S-OJT). This training method was originally developed in the 1980s in response to new demands for higher levels of quality and productivity, a fundamental issue that is still relevant today (Jacobs & Bu-Rahmah 2012). In workplace learning S-OJT may be defined as ‘the planned process of having experienced employees train novice employees on units of work in the actual work setting’ (Jacobs 2003 cited in Jacobs & Bu-Rahmah 2012, p. 76). This process of guided workplace learning was first used in industry however more recently it has been trialled in other disciplines such as education (Shoho, Barnett & Martinez 2012) and nursing specifically in Japan (Fujitani 2012).

Similarly, in structured operating room education a preceptor is assigned to each student to assist in the formulation of his or her individual learning needs and to make students feel part of the group. Inspiration, information and knowledge may be derived by individuals from a variety of social and work-related environments, however those who fail to make the transition from being an ‘outsider’ to an ‘active participant’ may never become an effective team member (Smith 2005, p. 9). Peter Smith (2003), in discussing literature on constructivism and transformation of learning, proposes that knowledge acquisition and concept development are in part dependent on access to a more expert other. Smith (2003) goes on to hypothesize that, in order for a worker to move reliably beyond the procedural level there is likely to be a requirement for more resources than simple training manuals which do not allow knowledge exploration through human questioning and discussion. This discussion supported previous work by Kak, Burkhalter and Cooper (cited in Stobinski 2008), who stated that nursing competency would only be achieved by university education, workplace inservice
education and hands-on guided practice in the clinical environment with a preceptor or coach.

The terms preceptor and mentor are often used synonymously, however they are quite different and have their own individual roles (Wensel 2006). When new or novice nurses are introduced to the clinical area they are provided with a period of orientation which introduces the new hires to policies, procedures and the social milieu of the department (Roth 2011; The Health Alliance of MidAmerica 2009). This is designed to ensure the acquisition of skill sets so that safe, competent patient care will be provided (Roth 2011; The Health Alliance of MidAmerica 2009). During this time they are intentionally paired with a preceptor who is a more experienced staff member encompassing several roles such as educator, socialiser, friend and confidant whilst assisting to develop new clinical skills (The Health Alliance of MidAmerica 2009).

The main function of the preceptor is to provide the new staff or students with the most accurate clinical practice and real workplace experience whilst being supported by a more experienced staff member (Earle-Foley et al. 2012). This relationship is usually short-term and aids in the acquisition of well-defined tasks in the workplace. One key premise of this educational relationships is that the preceptor is skilled and knowledgeable and also committed to the role (Haggerty, Holloway & Wilson 2012).

Recent research by Haggerty, Holloway and Wilson (2012) revealed that education and support for preceptors has not always received the attention it warrants and that this failure has led to ad hoc selection and allocation of preceptors who were neither trained nor eager to participate. Education offered in-house at hospitals is often hampered by rostering difficulties, high acuity of very ill patients, and heavy workloads which often prevent preceptors leaving the clinical area to attend education sessions, adding to the lack of clarity surrounding the role (Haggerty, Holloway & Wilson 2012). Using unprepared and untrained preceptors can be detrimental for both the preceptor and the novice (Haggerty, Holloway & Wilson 2012). Conversely, when preceptors are educated and
prepared for their role the relationship works well, with novices reporting they have a greater feeling of self worth, have achieved a greater skill base, and have increased job satisfaction (Morgan, Mattison & Stephens 2012). Preceptors can also benefit from the process as providing education for more junior staff during episodes of patient care can stimulate learning for both the existing workforce and the nursing students (Henderson et al. 2011).

Essentially, mentoring is a nurturing process (Dorsey & Baker 2004). A mentor relationship differs from that of preceptor in that it is not prearranged; rather, it develops over time and is a naturally formed ‘one-on-one’ bond where implicit knowledge can be learned surrounding ethics, professionalism and values (Rose, Rukstalis & Schuckit 2005 p. 344). Both Rose, Rukstalis and Schuckit (2005) and Smith and Sadler-Smith (2006) suggest that traditionally the relationship would be between a less experienced novice and an older experienced veteran, whilst Rose, Rukstalis and Schuckit go to explain that the mentoring relationship facilitates personal and professional development beyond any specific curriculum or institutional goals. Dorsey and Baker (2004) claim that mentoring has been a very effective strategy to increase retention rates of undergraduate nurses as it addresses problems raised as being causative factors in attrition, namely, lack of understanding about social or academic resources, inadequate academic preparation and absence of a comfortable milieu. For the mentor, there is a great sense of passing on knowledge gained through experience, the opportunity for ongoing professional growth and the gaining and updating of new skills in the changing practice of nursing (Scott 2005). An international meta-analysis of 16 articles written on the mentoring process for undergraduate nurses reported that all protégés revealed positive benefits, with several reporting increased socialization to nursing, greater self-esteem and a decrease in anxiety and stress (Dorsey & Baker 2004). Mentors stated their participation had strengthened their self-worth and leadership skills and given them the motivation to want to help further students (Dorsey & Baker 2004). Benefits of mentoring may also be observed for the health care institution, as mentoring has been shown to be a cost-effective and proactive method of assisting in staff retention (Scott 2005).
Whilst both these relationships differ, they are both important when we view workplace learning in a socio-cultural context (Smith & Sadler-Smith 2006). Both play an important role in workplace learning as they involve the learner (together with a more experienced person) in skill and knowledge development, learning-related social interaction, and relationships with fellow workers (Smith & Sadler-Smith 2006). More experienced nurses can offer assistance with interpersonal challenges and workplace guidance to novice or undergraduate nurses who are vulnerable, and at the highest risk of burnout and turnover when they are first exposed to the clinical environment (Scott 2005).

4.6.3 Indirect guidance in workplace learning

In addition to direct guidance, indirect guidance is observed in workplace learning. There is much value in being able to observe experienced workers performing their craft and listening to discussions pertaining to workplace issues (Billett 2001). The physical environment of the workplace is also salient to the learning process (Billett 2001). Undergraduate nurses who have had experience in the operating suite will have first-hand knowledge and understanding of this foreign environment, allowing them to provide accurate pre-operative patient education that may assist in alleviating the natural stress that patients feel prior to having surgery (Touzeau 2005). Billett (2001) states that from a constructivist approach, learning is ongoing and unavoidable and that we could no more shun learning as we could shun breathing. Smith and Sadler-Smith (2006, p.134) would support this statement suggesting that ‘learning is as much an informal and unplanned process as it is a planned process’. To adopt this thinking means that one must face the reality that undesirable or inappropriate practices may be learned and that there is a great need to protect novice learners from acquiring undesirable knowledge (Billett 2001). In suggesting ways to guard against the acquisition of inappropriate learning Billett (2001) suggests that a process of close monitoring and guidance from more experienced others may assist in preventing the shortcomings of observing dangerous work practices or hazardous shortcuts (Billett 2001).
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4.7 Workplace curriculum

In an attempt to provide the highest standard of workplace learning, workplaces will need to be conceptualized more clearly as recognized learning environments by identifying the main characteristics, qualities and capacities that assist the development of learning required for work (Billett 2006). Heath et al. (2002) in their national review of nursing education remind us that since the move from hospital to university education there has been an ongoing debate surrounding the preparedness of new graduate nurses entering the workforce. Stobinski (2008), in discussing nursing competence, suggests that clinically relevant competence is not present in nurses at the time of graduation but will develop over time in combination with hospital in-service education and guided practical experience in the workplace. Recent anecdotal evidence suggests that the healthcare industry is beginning to question current educational delivery models and their effectiveness in achieving future workforce demands, due to the difficulty some training participants are having in integrating their learning into daily work practice (Barker 2011).

In the twentieth century, clinical education in nursing continues to be contested; not in regards to pre-registration clinical placements per se, but rather concerning ‘how much emphasis in curriculum should be on practice and how to best facilitate learning in the workplace’ (Grealish & Smale 2011, p. 52). One of the most common criticisms of undergraduate nurse education addresses the limited amount of time given to students’ clinical placements and how this deficit is salient in the creation of the ‘theory-practice gap’ (Vittrup & Davey 2010, p. 88). The discipline of nursing, which has always been practice-based, now finds itself grounded in research-based academy and is challenged by the theory-practice gap (Grealish & Smale 2011). Tickle, Davys and McKenna (2010, p. 238) define the theory-practice gap as the difference between ‘what is taught’ and ‘what is practised’ and question whether or not the actual reality of practice can be accurately translated into an academic curriculum. Concerns have been voiced by those in practice that some university educators have not kept pace with the current clinical setting (Brooker et al. cited in Tickle, Davys & McKenna 2010) and that new nurses are ‘not work-ready’ (Newton et al. 2011, p. 120). The
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The theory-practice gap is further exacerbated by the rapid changes seen clinically in the healthcare setting (Tickle, Davys & McKenna 2010). Literature also suggests a need to bridge the gap between competent practitioner and student with the provision of workplace educational support during this transition period (Morgan, Mattison & Stephens 2012).

Following the initial move from hospital to university, hospitals and education institutions partnered locally to provide student nurses with clinical experience, but over time the skilled nursing shortage and the partial deregulation of the higher education sector saw many health agencies partner with multiple universities (Grealish & Smale 2011). Currently, clinical nurses who support students in the workplace are often confronted with students from different universities who have different curricula, different assessments to be completed, and different levels of preparation (Grealish & Smale 2011). This has created confusion and frustration for clinicians who are trying to support learning in the workplace (Grealish & Smale 2011). Grealish and Smale (2011) found in their research that the aim of the nursing transfer was ‘to create critical thinking graduates’ (Grealish & Smale 2011, p. 51), however this had been diluted by the implicit clinical education practices that developed over time. The National Review on Nursing Education (Heath et al. 2002) recommended that novice practitioners be provided adequate practice and education and that partnerships be developed between educational institutions and healthcare services to facilitate this process. In addressing this challenge many different models of clinical placement have been developed (Newton et al. 2011). Grealish and Smale (2011, p. 51) suggest a ‘national clinical curriculum’ that provides details of student requirements from a social and cognitive learning approach. Other suggestions have been put forward by Newton et al. (2011) who recommend a clinical partnership model that closely link hospital and university. Advantages are seen in these unions as educational institutions can provide current staff with accessible opportunities for their own learning whilst fostering the learning of students (Henderson et al. 2011).
Whichever path nursing takes, Billett (2006) suggests that there is an urgent need to identify, elaborate and evaluate the principles and practices of workplace curriculum that have arisen from the acknowledgement that the workplace is crucial both for initial learning and for the continuing education of staff in a working environment. Without identification and acknowledgement of a workplace curriculum, the workplace will remain easily open to criticism, be misunderstood and be delegitimized as an area of important knowledge acquisition (Billett 2006).

4.8 Summary

This chapter is significant in understanding the need for guided operating room experience for undergraduate nurses.

The chapter reviews Australian and international literature informing workplace learning and presents a significant overview of the theoretical underpinnings framing this inquiry. It has highlighted the classifications of workplace learning, noting the significance of knowledge development from novice to expert. A way of conceptualising workplace learning has been presented, drawing attention to knowledge learned via workplace experience as being conceptual, procedural, dispositional (Billett 2001) or strategic (Smith 2003).

Literature has also been analysed to better understand constructivism in workplace learning in an attempt to highlight the ongoing debate surrounding guided learning (structured operating room experience) and non-guided (follow through visits) with respect to the cognitive load theory. This chapter considers the potential for cognitive load theory as a mechanism to advance thinking around this discourse, particularly within the context of this research. The type and quality of workplace guidance has been described including discussion on preceptors and mentors.

Specific literature presented in this chapter was chosen as it was salient in providing a framework in which to answer the research questions. These theoretical designs informed the research questions which are:
1. Do undergraduate nurses need to be involved in guided operating suite practical experience in order to achieve skills and knowledge that will support a high standard of nursing care in the pre- and post-operative surgical wards?

2. What are the different models of operating suite education offered to Australian undergraduate nursing students? Which of these models yields the best educational outcomes and what are the transferable skills acquired from operating suite experience that assist in pre- and post-operative surgical nursing care?

3. How might these differing models of operating suite education impact on recruitment and retention of nurses to this specialist area?

Finally the literature was tied together with a discussion on workplace learning in the context of a workplace curriculum.
CHAPTER FIVE

Chapter 5: Research Method

‘Nursing is both a science and an art, and as such, it is well served by both qualitative and quantitative research techniques’  
(Myers & Kosinski 2005, p. 37)

Introduction

This chapter will present the objectives of the research and discuss the chosen research method, which is a mixed methods paradigm incorporating a triangulated / convergent parallel research design. Methodology will be discussed under the headings of the three phases of the research where data were collected (Phase 2, Phase 3 and Phase 4). Whilst this chapter discusses methodology, chapter six presents a detailed explanation of the development of the research tools used in this research.

The chapter is organised in the following way:

5.1 Research questions and research objectives

5.1.1 Data analysis plan

5.2 Research plan

5.2.1 Phase 1 - University curriculum co-ordinators of operating room /surgical nursing

5.2.2 Phase 2 - Final year undergraduate nursing students in their final semester

5.2.3 Phase 3 - Curriculum co-ordinators of the participants tested in Phase 2

5.2.4 Phase 4 - ‘Follow-up study’ Graduate nurses following their first year of practice

5.3 Phase 2 - Phase 2 methodologies – mixed methods paradigm

5.3.1 Concurrent data collection
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5.3.2 Validation – qualitative inquiry
5.3.3 Validation – quantitative inquiry
5.3.4 Analysis of mixed methods research

5.4 Phase 3 - University curriculum coordinators – qualitative narrative

5.5 Phase 4 - Follow-up study – mixed methods paradigm

5.6 Research sites and approaching potential participants

5.6.1 Phase 1 – University curriculum coordinators for operating room /surgical nursing

5.6.2 Phase 2 – Final year undergraduate nursing students in their final semester

5.6.3 Phase 3 – Curriculum coordinators of the participants tested in Phase 2

5.6.4 Phase 4 – Follow-up study – Graduate Nurses following their first year of practice

5.7 Ethics

5.7.1 Preventing coercion

5.7.2 Protecting anonymity of participants, universities and hospitals

5.8 Summary

5.1 Research questions and research objectives

Given the historical, but nevertheless fairly recent changes in nursing curriculum, there was value in investigating several questions that inform undergraduate operating room nursing experience in Australia. The three research questions and an overview of the methods used to facilitate their answers will be presented below. The research questions were:

1. Do undergraduate nurses need to be involved in guided operating suite practical experience in order to achieve skills and knowledge that will support a high standard of nursing care in the pre- and post-operative surgical wards?
4. What are the different models of operating suite education offered to Australian undergraduate nursing students? Which of these models yields the best educational outcomes and what are the transferable skills acquired from operating suite experience that assist in pre- and post-operative surgical nursing care?

5. How might these differing models of operating suite education impact on recruitment and retention of nurses to this specialist area?

To facilitate the answer to Research Question One, there needed to be a measure of surgical nursing knowledge designed to compare undergraduate nurses who had been involved in guided operating room practice experience and participants who were involved in non-guided operating room practice experience. As information was sought on final semester student nurses’ knowledge of pre- and post-operative care, a quantitative assessment tool was developed to provide data on the participants’ knowledge level in these areas. Data were also collected on the models of operating room education the students had been involved in (which included either guided or non-guided practice), allowing comparison between students’ test scores and guided and non-guided practice.

Research Question Two was addressed in three parts. The first part of the question asked about the models of operating suite education that were available in Australia for undergraduate nurses at the time of investigation. To elicit this information a phone survey was conducted (Phase 1). All Australian universities that offered undergraduate nursing were contacted and asked about their undergraduate operating suite education. From this information a taxonomy and selection criteria for invitation into the research were developed. The results of this analysis are presented in depth in Chapter Six ‘Development of Research Tools’.

The second part of Research Question Two asked if any of the operating room models were able to yield a better educational outcome than others. To facilitate
this answer, statistical comparisons were made between participants’ test scores and:

- the models of operating room education that the participants were involved in,
- the education pattern mix students participated in,
- the time spent in the operating suite.

The third part of Research Question Two inquired about transferable skills that may have been learned during operating room education. To facilitate this investigation, qualitative data were collected in the form of short answer questions that asked participants about possible transferable skills learned in the operating suite that would assist their nursing care in the pre- and post-operative surgical wards.

In answering Research Question Three, which focused on the recruitment and retention of nurses to this specialist area, recruitment of new nurses to the operating suite was addressed by asking participants if they had enjoyed their time in the operating suite and why, and if they would consider working in this specialty area after graduation. Retention of nurses within the operating suite involves the ability to retain staff already working in the field. The possible impact that the different models may have on staff supervising students in the operating suite was addressed via a focus group of experienced operating room nurses educators.

In line with the research questions the following research objectives were developed:

1. To explore the possible value of guided operating room experience for undergraduate nurses in achieving skills and knowledge that support a high standard of nursing care in the pre- and post-operative surgical wards.
2. To investigate possible transferable skills learned via operating room experience and avenues for acquisition of surgical knowledge for undergraduate nurses, comparing different models of operating room education offered in Australia.
3. To compare these differing models and their possible impact on recruitment and retention of nurses to this specialist area.

### 5.1.1 Data analysis plan

Quantitative statistical analyses were conducted using both Microsoft Excel and SPSS version 20.0 for Windows (SPSS Inc, Chicago) and XLStatistics 2008. In the assessment of differences between only two groups an independent t-test analysis was conducted. For assessment of differences between more than two independent groups, where the assumptions associated with the application of parametric statistical methodologies were met, overall differences were identified using a one-way analysis of variance (ANOVA). As ANOVA is an omnibus test statistic and cannot tell you which specific groups were significantly different from each other, subsequent post-hoc analysis was conducted using Tukey’s Honestly Significant Difference (HSD) test. Where assumptions were not met, the nonparametric analogue to the ANOVA, the Kruskal–Wallis rank test was also used, with subsequent post-hoc analysis conducted using the Mann–Whitney test. All post-hoc analysis probabilities were adjusted for with the Bonferroni test. In addition to ANOVA when making comparison between time spent in theatre and participant score, a Pearson product-moment correlation coefficient was computed and a linear regression model was constructed. Qualitative data were manually coded and themed and validation of emergent themes was undertaken by a group of expert peers. This will be presented in depth in Chapter Six. To ensure the sentiments of all participants were presented equally, only one comment per student was recorded in the findings chapter of this research. Transformation merged analysis of qualitative data were also presented.

In addressing Objective One, quantitative statistical analysis was performed using a t-test. The two groups for comparison were those who had been involved in guided practical operating room experience and those who had not been involved in guided practical operating room experience (non-guided practice). Guided practice as described by Billett (2001) refers to learners who have the provision of access to guidance from more experienced workers, allowing collaborative thinking and interaction between the expert and novice. Non-guided practical
experience, also referred to as unguided or minimally guided practice, may be defined as learners who are not subject to guidance or control (Kirschner, Sweller & Clark 2006).

Undergraduate nurses who were involved in guided operating room practical experience participated in the following pattern mixes:

- theory, guided practice and extra experience,
- theory and guided practice,
- guided practice.

Undergraduate nursing students who were involved in non-guided operating room practical experience participated in the pattern mixes of:

- theory and non-guided practice,
- theory,
- non-guided practice,
- nothing (neither theory nor any form of practice).

‘Extra experience’ was not reported independently. Full details of the models of education and education pattern mixes are presented in Chapter Six.

The second objective was achieved in two parts. Quantitative analysis were utilised to provide statistical analysis on comparisons between participants test scores and:

- students’ education pattern mix,
- the differing models of operating room education students had participated in,
- time spent in the operating suite.

In answering the second part participants were asked if they found information they learned during operating room experience assisted them in the care of surgical patients outside the operating suite. Qualitative data analysis and transformation merged analysis was performed on the participants’ responses on transferable skills learned via operating room experience.

Research Objective Three was addressed via qualitative inquiry and transformation merged analysis. The parameter on recruitment was addressed by
asking participants if they had enjoyed their time in the operating suite and why, and if they would consider working in this specialty area after graduation. Retention of operating room nurses was addressed at a focus group of 22 experienced perioperative educators in February 2011. Focus group participants were asked if they may have noted any connections between the students they were clinically supervising from different models of education and staffing issues that may impact on workforce retention. To ensure privacy and accuracy of individual participants’ comments a follow-up email was sent after the meeting asking for comments in writing. The email read:

At our recent focus group meeting one participant raised a comment about possible stresses different models of operating room experience may place on the staff who are supervising the students. Some group members suggested that the students with no preparation can be more time consuming and stressful for staff. I am wondering if this may be a stressor and an issue in retaining perioperative nurses in your unit. I would be very grateful for your comments on this for my thesis. Your comments will be anonymous. Please feel quite free to agree or disagree, there is no correct answer.

Written responses were de-identified and are presented in the Research Findings chapter.

5.2 Research plan

The research data were collected in four phases. These were:

- **Phase 1** – Information was sought from all Australian universities that offered undergraduate nursing inquiring about their learning opportunities in operating room nursing.
- **Phase 2** – Final year undergraduate nursing students in their final semester of university were involved in both quantitative and qualitative data collection.
- **Phase 3** – Curriculum co-ordinators of participants involved in Phase 2 were involved in qualitative data collection.
- **Phase 4** – Follow up study – Nurses following their first year of practice were tested to compare the knowledge from graduating student to graduate nurse.
Chapter 5: Research Method

Table 5.1 – Depiction of the four different phases of the research

The focus of the research was to first collect data on the differing models of operating room education offered to undergraduate nursing students nationally. Once completed, a taxonomy of these models and selection criteria was developed. Differing models of operating room education were selected for Phase 2 where statistical comparison of the models and their ability to provide surgical knowledge for undergraduate nurses working in surgical ward areas was made. Concurrently, qualitative data were collected on the students’ comments about their operating suite experience, skills learned, and their attitude to future employment in this nursing specialty. Phase 3 investigated the development and effects of the differing models assessed in Phase 2, and Phase 4 was the follow-up study where graduate nurses were re-tested at the completion of their first year of practice and graduate nurse training program.

5.2.1 Phase 1 - University curriculum co-ordinators of operating room /surgical nursing

The focus of the initial phase was to collect data via a telephone survey (Appendix 2) on the differing models of operating room education offered to undergraduate nursing students nationally. Chapter Six will present in detail the methods used to collect information on these models, the taxonomy and selection criteria that were developed to select specific university models for inclusion in the research, and the development of the research questionnaire incorporating qualitative research questions and a quantitative assessment tool.
5.2.2 Phase 2 - Final year undergraduate nursing students in their final semester

Phase 2 was the largest phase of the research. Qualitative data were collected from nursing students across Australia investigating:

- the amount of time they spent in the operating suite,
- the students’ feelings and personal comment about their practical experience or lack thereof,
- transferable skills learned in the operating suite that may assist them in surgical nursing care,
- their attitudes towards further experience or possible future employment in the operating suite.

Quantitative data were collected at the same time from the same students who participated in the differing models of operating room education. Knowledge testing was undertaken on areas surrounding pre- and post-operative surgical ward nursing care. The participants’ results were then related back to the model of operating room education the students had participated in to determine if there was a relationship between the type of operating room education and experience they received and their knowledge of surgical nursing care.

5.2.3 Phase 3- Curriculum co-ordinators of the participants tested in Phase 2

In Phase 3 the six curriculum co-ordinators who had responsibility for the operating room education models that were compared in Phase 2 were invited to participate in a personal interview to further investigate their model of education. Four curriculum co-ordinators consented to participate. Questions focused on:

- the driving forces that led to the development of the model of operating room education offered at their university,
- the strategies employed in setting up the model with collaborating hospital operating suites (if applicable),
- feedback from hospital staff and students about the model of education,
- if they envisaged any future changes to their education model.
5.2.4 Phase 4 - Follow-up study - Graduate nurses following their first year of practice

Although not compulsory, following graduation at the Bachelor level most nurses enrol in a Graduate Nurse Program which provides professional and educational support for first year nurses (Cubit & Ryan 2011). This program closes the gap between a novice nurse and a safe and competent practitioner (Casey et al. 2004). This second analysis was undertaken as there was a belief amongst nursing academics that there may be some gaps in student knowledge following graduation; however, these deficits should be rectified during the students’ Graduate Nurse Program year (Professor M Botti, personal communication at colloquium process, 22 February 2008). Stobinski (2008) also speaks about this issue stating that clinically relevant competency is not expected at graduation, but will develop in conjunction with further inservice education and guided clinical practice. There was therefore value in exploring these assumptions as learning is achieved during these 12 months of additional education and practical experience. To re-test students after this time provided a useful further data set to assist in developing a greater understanding of the long term surgical knowledge of our graduate nurses.

5.3 Phase 2 methodologies – mixed methods paradigm

Rigorous research designs are essential as they guide the methods and decisions made by researchers and set the logic by which assumptions and interpretations are made at the end of studies (Creswell & Plano Clark 2007). When developing the research questions posed in this study, it was clear that both qualitative and quantitative inquiry were required to uncover full and accurate answers, thus the methodology chosen for this research was a fixed mixed methods paradigm incorporating a triangulated/convergent parallel research design (Creswell & Plano Clark 2011). Mixed method designs may be ‘fixed’ (where a mixed methods approach is planned at the design phase of the research) or ‘emergent’, where the decision to use mixed methods was made after the design phase of the research due to issues that developed during the project (Creswell & Plano Clark 2011, p. 54). The term parallel was used as both qualitative and quantitative data were collected concurrently (Teddlie & Tashakkori 2009).
Johnson and Onwuegbuzie (2004) suggested mixed methods research as the third research paradigm and this sentiment has been echoed by Teddlie and Tashakkori (2009) and Creswell and Plano Clark (2007, 2011). Mixed methods research has been emerging as an alternative to the dichotomy of qualitative and quantitative traditions over the past twenty years (Teddlie & Tashakkori 2009). However, in the last decade a massive growth in its popularity has occurred, due in part to the increasing number of publications using this paradigm (Nagy Hesse Biber 2010). Pressure has also been exerted from external stakeholders such as government agencies and private funding bodies who increasingly want researchers to utilize both qualitative and quantitative data to explore social policy issues (Nagy Hesse Biber 2010). Also in recent times the use of both quantitative and qualitative methods in a single research study have been viewed in a more positive fashion (Slonim-Nevo & Nevo 2009). Mixed methodologies have presented an alternative to traditional quantitative or qualitative methods by advocating the use of any methodological approach that enables a researcher to answer a research question (Teddlie & Tashakkori 2009).

However, there may be risks and challenges associated with triangulated/convergent designs (Creswell & Plano Clark 2007, 2011). Much expertise and effort is required in the collection and analysis of concurrent quantitative and qualitative data, and care must be taken to provide equal weight in methods and findings (Creswell & Plano Clark 2007, 2011). It can be challenging to merge two very different sets of data and to present findings in a meaningful way (Creswell & Plano Clark 2011). Another problem may occur when qualitative and quantitative findings are contradictory (Creswell & Plano Clark 2007, 2011; Slonim-Nevo & Nevo 2009). These differences can be difficult to resolve and may require the re-examination of all existing data and possibly the collection of additional data (Creswell & Plano Clark 2007). The question then arises as to what data to re-analyse or what additional data should be collected to address this challenge (Creswell & Plano Clark 2011).

Many definitions of mixed methods research have been developed and it would be fair to say that the definition is still evolving (Creswell & Plano Clark 2011).
Teddlie and Tashakkori (2003) defined mixed methods research as one where both qualitative and quantitative approaches are used in the types of research questions, research methods, data collection, data analysis and conclusions. The first issue of the Journal of Mixed Methods Research further developed the definition by suggesting it is when an investigator collects and analyses data, integrates the findings and draws inferences from the use of both qualitative and quantitative approaches from a single study or inquiry (Tashakkori & Creswell 2007). Onwuegbuzie and Turner (cited in Wolf 2010) elaborate further on the definition by suggesting the purpose of a researcher combining elements of qualitative and quantitative approaches would be to add breadth, depth of understanding and corroboration to an inquiry (Wolf 2010).

Creswell and Plano Clark (2011) have observed this evolution, watching how researchers have used both qualitative and quantitative methodologies over many years, and have developed six core characteristics they believe adequately describe this paradigm. They are:

- to collect and analysis both qualitative and quantitative data persuasively and rigorously based on the research questions,
- to mix integrate or link the two forms of data concurrently by combining or merging them sequentially by having one build on the other or embedding on in the other,
- to give priority to one or to both forms of data depending on what the research emphasizes,
- to frame mixed methods procedures within philosophical worldwide theoretical lenses,
- to combine the procedures into specific research designs that direct the plan for conducting the research.

These core characteristics have been observed and have informed the research reported in this thesis.

Under a fixed mixed methods paradigm sits a triangulated/convergent parallel research design. The convergent parallel design, which collects both qualitative and quantitative data at the same time, was initially conceptualized and referred to
as a ‘triangulated’ design. Whilst there is general consensus on a definition of the mixed methods paradigm, there is considerable disagreement surrounding the term triangulation (Wolf 2010). Depending on their epistemological standpoint, some reserve this term for the independent evaluation of different studies on the same subject, while some use the terms mixed methods and triangulation synonymously. Others argue that triangulation differs from mixed methods as it seeks convergence, whereas mixed methods alone is said to be open to divergence (Wolf 2010). Creswell and Plano Clark (2007) cite Morse’s definition of a triangulated design as one that collects different but complementary data on the same subject to increase understanding of the research problem. Creswell and Plano Clark (2011, p. 70) have newly renamed their triangulated design (rather paradoxically) as ‘convergent parallel research design’ as it could be used for purposes other than to triangulate findings, and to avoid the confusion that surrounded the use of this method in solely qualitative research. Despite the name, a methodological triangulation or a convergent design occurs when the researcher collects and analyses qualitative and quantitative data at the same time and then merges the findings into an overall interpretation (Creswell & Plano Clark 2011).

For the purpose of this research and to ensure understanding for future readers, the terms ‘methodological triangulation’ and ‘convergent parallel design’ will be used synonymously and the design will be referred to as a triangulated/convergent parallel research design.

Methodological triangulation is the use of multiple research methodologies to explore the same research problem (Nagy Hesse Biber 2010; Teddlie & Tashakkori 2009). This method has been chosen for this research to add richness, depth and reliability to the findings. Benner, Tanner and Chesla (1996) suggested that research designs exploring nursing need to mirror the multidimensionality and complexity of practical nursing knowledge. Methodological triangulation has the ability to provide such a multifaceted view with a combination of research strategies (Foss & Ellefsen 2002). The term triangulation gains its origin from the sciences of land surveying and navigation, referring to a simple method of assessing the position of a particular point by using observations from two additional points (Farmer et al. 2006).
Johnson and Onwuegbuzie (2004) suggest that triangulation can both maximize the strengths and minimize the weaknesses of a single method study, whilst the combination of methodologies can complement each other and make a stronger research design, resulting in more valid and reliable findings (Duffy 1987). This method can also serve to deepen and enrich findings (Bowen 1996; Risjord, Dunbar & Moloney 2002) and also allows findings to be cross-checked against each other, helping to balance the advantages and disadvantages of the individual methods, and obtaining a spectrum of views at different levels of objectivity (Flick 2006; Langdon 2003). There is a completeness yielded by triangulation as each of quantitative and qualitative methods can be further developed by the addition of the other (Risjord, Dunbar & Moloney 2002). Using alternative methods also provides a diversity of viewpoints, exposes researchers to different and wider bodies of knowledge and allows investigation of the research question in a complete manner (Slonim-Nevo & Nevo 2009). This concept is discussed further by Robson (2002) when he states that the interpretation of quantitative data can be enhanced by the addition of a qualitative account. Another advantage may be the reduction of ‘inappropriate certainty’ (Robson 2002, p. 370). That is, if very clear-cut results are found using one method, the introduction of an additional method could illuminate alternative findings (Robson 2002). A methodological triangulation/convergent parallel research design makes intuitive sense and was not only the first type of triangulation discussed in the literature, but it is now the most popular design approach in mixed methods studies (Creswell & Plano Clark 2011). It ultimately fortifies and enriches research findings and can make the results more acceptable to advocates of both qualitative and quantitative methods (Nagy Hesse Biber 2010).

5.3.1 Concurrent data collection

This research utilised a triangulated / convergent parallel research design incorporating a quantitative analysis of undergraduate nurses’ surgical knowledge and a qualitative narrative on student views.

Both qualitative and quantitative data were collected concurrently from willing nursing students in their final semester of study at participating universities. This
period was chosen to allow all students to have gained as much practical experience as possible in their three years of education. An earlier time in the year may not have represented all participants fairly because many hospital clinical placements involving follow-through visits occur at the end of the academic year. If participants were tested prior to their final semester, and were involved in clinical placements after data were collected, it may have misled the findings of this research.

Undergraduate nurses from the six universities were invited to complete a voluntary, anonymous questionnaire (Appendix 3). Identification and selection criteria of universities will be discussed in Chapter Six. Four short answer questions of qualitative nature were developed to investigate the students’ feelings and personal comment about their time in the operating suite or lack thereof. Questions explored the time students spent in theatre, whether they enjoyed their practical experience, the transferable skills learned in the operating room that may assist them in surgical nursing care, and their attitudes towards further experience or possible future employment in the operating suite. In order to measure surgical knowledge, a quantitative research tool (developed and piloted for my Master of Professional Education and Training study) incorporating 20 multiple-choice questions was utilized. The content of the multiple-choice questions related to areas of practice that were considered essential for all surgical nurses and that fell within the national guidelines of competency expected for surgical nursing practice (Australian Nursing & Midwifery Council 2006). Whilst knowledge was being assessed, the aim was to produce data that would allow measurement and comparison of the differing models of operating room experience. It was also hypothesised that the subsequent statistical analysis would reveal valuable information surrounding variations in learning outcomes in surgical ward nursing.

5.3.2 Validation – qualitative inquiry

Although validation techniques differ in quantitative and qualitative approaches, a vital part of all good research is to utilise procedures to ensure the quality and validity of data, results and interpretation (Creswell & Plano Clark 2011).
In qualitative research the focus leans more toward validity rather than reliability in determining if the accounts provided by the researcher and participants are accurate, can be trusted and are credible (Creswell & Plano Clark 2011). Reliability plays a minor role in qualitative approaches, as it primarily refers to the reliability of codes when a team of multiple coders have been used (Creswell & Plano Clark 2011). Establishing qualitative validity is vitally important but as there are so many commentaries and different approaches described in the literature it can be difficult to know which method to use (Creswell & Plano Clark 2011). Overall qualitative validity refers to the checking and assessment of whether the information provided via qualitative data collection is accurate, and typically researchers use more than one technique to ensure this process (Creswell & Plano Clark 2011). The two approaches chosen to guarantee validity in this research were the reporting of disconfirming data and the external examination of data by expert peers (Creswell & Plano Clark 2007). Disconfirming evidence may be defined as information that presents a contrary perspective to that indicated by the established evidence (Creswell & Plano Clark 2011). Reporting of this evidence actually confirms the accuracy of the data analysis, because in real life situations we expect evidence on themes to diverge and to include more than just positive perspectives (Creswell & Plano Clark 2011).

The second approach to ensure validity was external examination of the qualitative data by other peers in the field who were not affiliated with the research (Creswell & Plano Clark 2011), using their own criteria (Creswell & Plano Clark 2007). Creswell and Plano Clark (2011) suggest graduate students or faculty members who may be experienced with qualitative data. This research engaged 20 experienced operating room educators, all with postgraduate qualifications and five with Master’s degrees to examine the raw data.

Prior to this process, qualitative data were prepared for analysis by transcribing data from the participants’ questionnaires into separate computer documents, one for each qualitative question. Generally qualitative data analysis consists of various forms of narrative, possibly stored in video or audio tape formats that are initially prepared for analysis by converting raw material into partially processed
word documents which are then subjected to manual or computer analysis (Creswell & Plano Clark 2007). Rather than large narrative accounts the qualitative data in this phase of the research consisted of answers to four short answer questions, making data analysis more straightforward.

In October of 2010, a focus group was held comprising of 20 experienced operating suite educators. Only raw, un-themed data were presented to the group. The 332 participants’ questionnaires were presented with the corresponding, un-coded and un-themed computer documents displaying the participants’ responses. To provide greater rigor in validity the un-coded and un-themed documents were provided so that my own ideas would not colour those of the focus group. The group was asked to compare the questionnaires to the printed computer documents displaying the qualitative findings to ensure accuracy of transcribing from questionnaires to computer documents. As the group was also asked to scrutinise the raw qualitative data for emergent themes, ample time was given for attendees to read and absorb the data before assessing for themes. This process was followed by group discussion on each individual question allowing different themes to be presented and discussed. The same themes were discovered by me and by the focus group; however, focus group participants revealed one important theme that I had not noted. This was a connection between the different models of practical education and the subsequent effects of these models on retention of staff already working in the operating suite. As a result of this finding a further focus group was held in February of 2011 with 22 experienced operating room nurses to investigate this issue further.

Manual analysis over computer analysis such as NVivo was chosen as it was felt that the manual process demanded that the data be read many times, allowing the researcher to be immersed in the participants’ responses and facilitating a greater feel for, and understanding of the data. The data were examined and emergent themes were identified. Emergent themes are the dominant ideas, features or characteristics of the data (Creswell & Plano Clark 2007). This was established by first colour-coding the student responses into broad categories and then into emergent themes.
All transferable skills reported by participants are presented in the Research Findings Chapter. If an individual skill or set of skills surrounding the same topic were reported ten times or more it was classified as an individual theme. Less frequently reported skills or ones that did not fit into the eight main themes are presented under the ‘skills not so easily classified’ theme.

5.3.3 Validation – quantitative inquiry

In quantitative research concern must be given to the validity at two levels; the quality of the scores from the instruments used and the quality of the conclusions that are drawn from the subsequent analysis (Creswell & Plano Clark 2011). Creswell & Plano Clark (2011) suggest that quantitative validity means that the scores presented (participants’ scores) are a meaningful reflection of the construct being measured (surgical ward knowledge of Australian undergraduate nurses in their final semester of study). The first level of validity looked at the instrument used to measure undergraduate nurses’ surgical knowledge, namely the quantitative assessment tool. Methodology of the questionnaire design, validity of the questions and the pilot study of the assessment tool are presented in detail in Chapter Six.

Choosing the right statistical test may be one of the most difficult tasks in the research process and so it is essential for the researcher to read other research papers and books extensively to ensure the correct choice is made (Pallant 2007). For this analysis, an experimental design was chosen. An experimental design contains both independent and dependent variables and refers to a structured plan to test hypotheses in which the research controls or changes more than one variable (Black et al. 2010). Statistical tests were chosen on their ability to answer the research questions and the ability to provide reliable results. Different statistical tests were used in the research. These were:

- t-test analysis,
- One way analysis of variance with Tukey HSD,
- Kruskal Wallis with Mann-Whitney,
- Pearson product-moment correlation coefficient,
- Linear regression model.
To compare the differences between the scores of those who had been exposed to guided practical experience and those who had not been exposed to guided practical experience, an independent sample t-test was utilised. This parametric statistical test was chosen because it provided results that would assist in answering the first research question inquiring about the comparison between guided and non-guided practical experience. Pallant (2007) provides criteria for choosing an independent t-test which were all appropriate for the desired analysis. These included:

- two groups where it is desired to compare a mean score on some continuous variable,
- two different independent groups that were tested at the same time but from two different sets of people (Pallant 2007).

The second statistical analysis was required to compare the mean scores of more than two groups of an independent variable, so a one-way analysis of variance (ANOVA) was chosen (Coates, Steed & Ong 2009; Pallant 2007). For assessment of differences between more than two independent groups, where the assumptions associated with the application of parametric statistical methodologies are met, a one-way analysis of variance (ANOVA) is employed, with subsequent post-hoc analysis conducted using Tukey’s HSD. An important distinction to make, and one that assists in choosing an appropriate test, is whether the analysis required is to explore relationships between groups or differences between groups (Pallant 2007). In this research the difference between groups was required. Multiple regression theory was considered for these comparisons. However as this test was designed to measure relationships between two or more independent variables (Black et al. 2010) against a dependent variable (Anderson, Sweeney & Williams 2009; Scott & Mazhindu 2005) rather than the mean of more than two groups of one independent variable, ANOVA was chosen.

Comparisons using ANOVA were performed between participants’ test scores and the differing models of operating room education, and the education pattern mix. Whilst the ANOVA revealed a statistical significance in both comparisons, there was a concern that the sample size of some groups in the comparison of score and pattern mix may be too small to support the application of parametric
statistical methodologies. Where assumptions were not met, the non-parametric analogue to the ANOVA – the Kruskal–Wallis rank test – was used, with subsequent post hoc analysis conducted using the Mann–Whitney test. A Pearson product-moment correlation coefficient, ANOVA and a linear regression model were used to compare participants’ test scores and the time in hours spent in theatre.

Quantitative data must also be assessed for reliability, meaning that scores are consistent and stable over time. For example, if knowledge testing was repeated, would the findings be the same (Robson 2002)? Previous use of the assessment tool for my Master of Professional Education and Training study in 2005 allowed a pilot or retest of the tool to ensure reliability. Similar findings were found in both statistical analyses.

In measurement the possibility for error is ever-present and it is the primary role of the researcher to design a study with as little ‘error’ component as possible (Forgasz, Smith & Henry 2004). In order to conduct inferential statistical analysis a hypothesis must be put forward. In order to obtain probabilities about collected data a research hypothesis and a null hypothesis \((H_0)\) have been formulated. This is vital as it bridges the gap between statements made regarding actual issues and what probabilities tell us by statistics (Williams & Monge 2001).

Hypotheses for the proposed inquiry were:

- **Research Hypothesis** Undergraduate nursing students who have been exposed to guided operating suite experience will achieve a higher score than undergraduate nursing students involved in non-guided operating suite experience on the questionnaire testing knowledge regarding surgical ward nursing.

- **Null Hypothesis** There will be no difference in test scores between groups of undergraduate nursing students who have experienced the different models of operating room experience.
In the research hypothesis it is assumed that the difference between groups may be statistically significant. However this must be tested to prove whether or not this is accurate (Forgasz, Smith & Henry 2004; Gravetter & Wallnau 2005; Levine & Stephan 2005). Boundaries must be established between ‘low probability’ and ‘high probability’ samples. This is accomplished by selecting a level of significance, or alpha level (Gravetter & Wallnau 2005). The alpha level throughout the study was set at 0.05 except were a Bonferroni adjustment was required.

In statistical analysis it is also necessary to know how many participants will be required from the given population to ensure accuracy of findings (Weiss 2009). Using a sample size calculator, with a confidence level of 95%, it was found that 218 participants needed to be recruited from the total population size (1155, all the third year undergraduates students from the six participating universities) to ensure the findings were valid. As 332 participants were recruited to the study, with a confidence interval of 5.98, the confidence level increased to 99%.

5.3.4 Analysis of mixed methods research

Mixed methods data analysis consists of applying analytical techniques to both qualitative and quantitative data sets and then mixing the two forms together for further analysis (Onwuegbuzie & Teddlie 2003). In a convergent design, after concurrent collection of data and separate analysis of both data sets, data merging can occur (Creswell & Plano Clark 2011). Creswell and Plano Clark (2011) provide three techniques for merging data in a concurrent study. These are:

- side by side comparison for merged data analysis. Qualitative findings and quantitative results are presented together in a summary to allow comparison,
- joint display. Involves a table or figure where the research arrays both qualitative and quantitative data in a way where they can be directly compared,
- transformation merged analysis. In this form of merging the researcher transforms one form of data into another so it can be easily compared and analysed.
The chosen technique for this research was transformation merged analysis. Data transformation is the conversion or transformation of one type of data into another so that they can be merged and analysed together (Creswell & Plano Clark 2011). This can be achieved by transforming qualitative data into quantitative data or vice versa (Onwuegbuzie & Teddlie 2003). In this research certain qualitative responses lent themselves to conversion and also facilitated full discovery of the research questions. These were ‘yes’, ‘no’ questions inquiring about enjoyment, future employment, learning in the operating suite and transferable skills learned. These responses were coded numerically and entered into SPSS version 20.0 for Windows (SPSS Inc, Chicago) allowing comparison. Transformed merged analysis was used to compare enjoyment in the operating suite with guided versus non-guided practice, and future employment in the operating suite with guided versus non-guided practice.

5.4 Phase 3 – university curriculum coordinators – qualitative narrative

In Phase 3 of the research, qualitative data were collected from curriculum coordinators who presided over the different models of operating room education assessed in Phase 2 of the research. This data was sought as it would add richness to findings surrounding the different educational models and provide knowledge and insight into the setting up and logistics of running an undergraduate operating room program. The six curriculum co-ordinators from participating universities were invited to participate in a personal interview to further investigate their model of education. Four curriculum co-ordinators consented to participate.

This inquiry followed a flexible qualitative approach (Robson 2002). Robson (2002) outlines three interview styles; fully structured, semi-structured and unstructured. The choice of interview style was a semi-structured interview. This was chosen as it would provide a flexibility not offered in the structured interview, whilst providing a framework to work with. Within this framework interview questions were constructed and were sent to the participants prior to the session; however, a set order did not need to be followed, and other discussions
could be stimulated from the participant’s responses allowing the uncovering of rich information (Robson 2002).

There are two basic types of interview questions, open-end and closed-end (Peterson 2000). Open-end questions are those where the participant is free to answer in any way they see fit, whereas in a closed-end question a selection of possible answers are provided (such as multiple choice questions) (Peterson 2000). As it is the job of an interviewer to get interviewees to talk openly and freely (Robson 2002), open-end questions were chosen for this part of the research. The interview questions were:

- What were the driving forces that led to the development of this perioperative (operating room) model of education offered at your university?
- Was any resistance encounter whilst setting up this model and if so, what strategies were you able to employ to facilitate the success of the project?
- How many years has the model been running and what feedback have you received from your students and the participating hospital staff?
- Do you envisage any changes to your style of perioperative education and if so why?

Phase 1 provided information on the universities’ models of operating room education whereas Phase 3 data investigated more deeply the specific educational delivery of the models, the setting up process and the feedback received.

Robson’s (2002) discussion on how to reduce threats to validity in flexible designs informed this study design. The interview process took approximately 50 minutes and with consent from participants was audio taped to ensure accuracy and completeness of the data (Robson 2002). To further increase the validity of the data, the audiotapes was converted to text and sent back to each participant for editing to ensure that his/her sentiments had been captured accurately (Robson 2002). The edited transcripts were presented in the research.
5.5 Phase 4 - follow-up study – quantitative analysis

Whilst not compulsory, the majority of nurses enrol in a Graduate Nurse Program in the year following their graduation. In Australia a ‘Graduate Nurse Program is currently accepted as the bastion of support for new nurses’ (Cubit & Ryan 2011, p. 65). This transition education includes a range of formal and informal programs to boost confidence and competence of new graduates (Levett-Jones & Fitzgerald 2005).

Participants of Phase 2 of the research were invited to participate in the follow-up study. In the plain language statement of the Phase 2 undergraduate nurse questionnaire (Appendix 4), the invitation to participate in the follow-up study was presented. The concept was explained and students who were interested in participating in the follow-up study 12 months after their Graduate Nurse Program were asked to provide their email addresses so contact could be made after one year. It was always a concern that recruitment of the original Phase 2 cohort would be difficult, so provision was made in the ethics application to also invite other graduate nurses who were at the same level as those from Phase 2 to participate in the research.

The suggestion to include a follow-up study was raised in February 2008 at the colloquium process for this research. A senior nurse academic on the colloquium panel discussed the belief that it may not be unusual to see some gaps in nursing student knowledge following graduation; however these deficits should be rectified during the students’ graduate nurse year. It was suggested that if knowledge deficits were noted after nurses had completed this post-graduate year it would reveal a more significant problem and be of greater concern (Professor M Botti, personal communication at colloquium process, 22 February 2008). Testing participants following their Graduate Nurse Program provided greater insight into the long-term surgical knowledge of the nursing workforce.

The two groups to be compared were:

- graduate nurses who had been exposed to guided practical operating room experience as an undergraduate or postgraduate nurse,
• graduate nurses who had not been exposed to guided practical operating room experience as an undergraduate or postgraduate nurse.

As it was required to compare two groups an independent t-test was used.

5.6 Research sites and approaching potential participants

5.6.1 Phase 1 - University curriculum coordinators for operating room/surgical nursing

The aim of this phase was to determine what models of operating room education were available nationally. In 2006 when this inquiry was commenced there was no formalised data providing this information. Chapter Six provides an in-depth account of the educational models offered nationally.

Initially all Australian universities were contacted to formulate a list of which of them offered undergraduate nursing degrees. Once this was established, contact was made by telephone with a clerical staff member in the Nursing School at each university. Inquiry was made into the name and contacts details of the staff member who could best provide details of the undergraduate nursing operating room/surgical nursing education program offered at their university. The appropriate staff member was then contacted, I introduced myself to the staff member, provided details of the research being conducted and asked if they could provide some information about their universities nursing course. If the staff member agreed a suitable time for the telephone survey was arranged.

The telephone mode was chosen as it allowed, when required, discussion or clarification on the finer points of the model of operating room education offered at the participant’s university. The fear in using a postal survey was that there was not the opportunity to ensure appropriate understanding of any new models. In discussions on the construction of successful telephone surveys, Dillman (2008a) suggests that a concise introduction is required to engage the recipient and to ensure the person you are speaking to is able to provide you with the required information. It is also suggested that a telephone survey should ideally be 18 minutes or less (Dillman 2008a). The telephone survey in this research had an
average time of eight minutes, and the introduction followed Dillman’s discussions.

5.6.2 Phase 2 - Final year undergraduate nursing students in their final semester

Following a selection criteria process described in Chapter Six, ten Australian Universities with specific operating room nursing programs were invited to participate in the research. Whilst it was considered to invite universities with no formal perioperative program to participate in this research, it was felt it would be unethical as all the other universities were invited because of their innovative programs; universities with no program would have been invited to act only as a comparison.

A letter of invitation asking for permission to invite students and curriculum co-ordinators to participate, plain language statement and consent form (Appendix 5) was sent to the Head of School, Nursing Faculty at each of the ten chosen universities. There was no power relationship between me and any of the universities and they were welcome to decline the offer to participate. Of the ten universities invited to participate in the research, six accepted. From those six universities and on a voluntary basis, final year nursing students in their final semester of study were invited to participate. By completing the anonymous questionnaire participants consented to be a part of the research, therefore a signed consent form was not required.

Voluntary status of the undergraduate students was emphasised at all times; the right of any person not to participate in the study was respected. Recruitment of participants followed guidance from the participating universities and two different approaches were employed. University number 2 and 4 requested that the questionnaires (including the plain language statement) be supplied with a stamped addressed envelope for the questionnaire return. The university in turn addressed these and sent one to all of their final year nursing students. There was no advantage for the student to complete the questionnaire and the anonymous status ensured their privacy.
University number 5, 7, 8, and 9 requested that the questionnaires be sent to the participants’ curriculum co-ordinators who then passed the questionnaires on to possible participants. At one university this was following a lecture on nursing research and the students were invited, on a voluntary basis, to complete the questionnaire. At another university questionnaires were passed out at the start of the day and a box was left out for possible returns. These four universities were provided with an addressed, postage paid mailbag for returning the questionnaires. As the questionnaires were anonymous there was no possibility for the university or me to know the identity of the participants, thus there was no advantage for students to participate other than to have a voice in the research process.

5.6.3 Phase 3 – Curriculum co-ordinators of the participants tested in Phase 2

Curriculum coordinators who presided over the different models of operating room education assessed in Phase 2 were invited to participate in a semi-structured interview to allow discussion surrounding the reasons that led to the development of the model of operating room education offered at their university, the strategies employed in setting up the model with collaborating hospital operating suites (if applicable), feedback from hospital staff and students about the model of education, and whether they envisaged any future changes to their education model.

The initial invitation to participate was sent to the respective head of nursing school. Once the head of school had agreed, the curriculum co-ordinators were invited. If the curriculum co-ordinators were agreeable to be involved, a suitable time was made for interview. Plain language statements and written consents were obtained from both the curriculum co-ordinator and the head of school at the participating university. I had no relationship to the curriculum co-ordinators. Although the head of school had consented to their invitation, this by no means ensured the curriculum co-ordinators’ involvement in the research, because the co-ordinators needed to individually consent. It was emphasized to the curriculum co-ordinators that they were welcome to decline the offer to participate should they wish to.
### 5.6.4 Phase 4 - Follow-up study - Graduate nurses following their first year of practice

Nurses who had just completed their Graduate Nurse Program were invited to participate in the follow-up study where they would be tested using the same assessment tool from Phase 2. Participants from Phase 2 of the data collection were all invited to consider participation in the follow-up study via the plain language statement provided in the first phase. Email contact was chosen as the preferred mode of contact because it was likely that, although the students may change their residential address on graduation, their email address would be more likely to remain the same. The invitation to participate in was sent via email (Appendix 6) requesting a postal address. The participants were then sent a plain language statement and a questionnaire (Appendix 7) and a post paid, addressed envelope to return the questionnaire.

From the outset of the project there was concern that finding the same participants after 12 months would be difficult. This potential problem was discussed in the ethics application for this research. The proposed solution was to recruit nurses of the same educational level, i.e. nurses who had graduated 12 months earlier and who had just completed a Graduate Nurse Program. As the response rate to the email invitation was very poor, this solution was adopted.

Recruitment of graduate nurses (other than those who were in the initial research) was undertaken in two ways. I presented the early findings of this research at one state and one national conference that occurred at the end of the academic year. Graduate nurses about to complete their Graduate Nurse Program who were present were invited to participate by collecting a questionnaire. Attendants who knew nurses about to complete their Graduate Nurse Program were invited to pass on the anonymous questionnaire to them for consideration and possible completion. A self-addressed envelope was provided. Upon return of the questionnaire, I would have no knowledge of the identity of the participant, where the participant was educated or of their place of employment.
Further recruitment was undertaken via nursing colleagues working in hospitals nationally who, following hospital approval, invited staff nearing completion of their Graduate Nurse Program to participate in the follow-up study. The hospital where the graduate nurses were undertaking their program was supplied with information about the research and approval was sought by either the Head of Education or Director of Nursing. In most cases the research was presented to the hospitals’ respective research committee. Two factors protected the anonymity of the employing hospitals firstly, participants were not asked about their current place of work; and secondly the anonymous nature of the questionnaire prevented any connection between the hospital and the participants, so signed consent from the hospital was not required. The nursing colleagues were supplied with questionnaires and a return post paid bag for the completed anonymous questionnaires. By using a third person, the nurses would feel no obligation to participate other than assisting in further nursing research.

5.7 Ethical considerations

Ethics approval was sought and provided from the Deakin University Human Ethics Advisory Group in August 2008 (Appendix 8).

Despite there being no actual connection between the project and my place of employment, members of the ethics committee felt that there may be a perceived connection. This point was well taken, particularly as with subsequent presentations or published papers my place of work may be known to conference attendants or readers. To ensure completeness of the ethical process, consent was sought and obtained from the Director of Nursing, at my place of employment. A plain language statement accompanied the consent form.

5.7.1 Preventing coercion

- **Phase 1 - University curriculum coordinators for operating room/surgical nursing**

I have an honorary appointment with one Australian university who participated in the research, however this relationship provided no power relationship. This appointment deals with postgraduate, not undergraduate studies. Specialised
postgraduate operating room nursing is a small specialty area. Although professional contacts had been made at various conferences, there was no power relationship with any other Australian university or their staff.

Once the name and contact details of the appropriate curriculum co-ordinators were obtained, an email or telephone call was made out of hours allowing a message to be left. The message explained the research and asked if they would be able to provide information regarding the operating room subjects offered at their university. My name and contact details were left and the co-ordinator was asked to return the call at a time convenient to them. This method gave every opportunity for staff to decline by simply not returning the call or email. As this was simply course consumer information, no consent was required.

- **Phase 2 - Final year undergraduate nursing students in their final semester**

Following ethics approval, consent was sought and obtained from the Head of School, Nursing Faculty from each of the participating universities to invite participants from both the final year undergraduate nursing cohort and the surgical/perioperative curriculum co-ordinator. A plain language statement and consent form were provided to the Head of School (Appendix 9). The undergraduate nurses’ participation was still voluntary, despite the approval from the head of school. A plain language statement and invitation to participate was provided with the anonymous questionnaire (Appendix 3).

By completing the anonymous questionnaire undergraduate nursing student participants consented to be a part of the research, therefore a signed consent form was not required. There was no power relationship between the proposed student cohort and me. I am a staff member at a Victorian public hospital where there is a possibility that some of the cohort group may have had clinical placements, but I work primarily with trained staff and post-graduate nurses, not undergraduate students, so I had no professional relationship with the participants or their families. Potential power imbalance in this group may mean that the students would have felt obligated to become involved. To minimise this, the voluntary status of the project was emphasised on the plain language statement.
• **Phase 3 - Curriculum co-ordinators of the participants tested in Phase 2**

Consent to invite the curriculum co-ordinators to be involved was first sought and obtained from the Head of School, Nursing Faculty from the participating universities. Once the Head of School’s consent was secured, the curriculum coordinators were invited to participate. The curriculum co-ordinators participation was still voluntary, despite the approval from the Head of School. A plain language statement and consent form (Appendix 10) accompanied this request. One co-ordinator was professionally known to me but there was no power relationship or known ethical connections. The invitation to participate came from a third party at the university to give every opportunity for the participant to decline the offer.

• **Phase 4 - Follow-up study - Graduate nurses following their first year of practice**

Participants in the follow up study, on a voluntary basis, completed an anonymous questionnaire. Consent was assumed when the participant returned the anonymous survey. Graduate nurses from the hospital I am employed at were invited to participate. This was done strictly via the graduate nurse educators who invited all the graduates to participate on a voluntary basis. Graduates who were interested in involvement in the research collected a questionnaire and returned it to their educator when completed. I had no professional connection to, or power balance over graduate nurse participants from other hospitals.

5.7.2 *Protecting anonymity of participants, universities and hospitals*

• **Phase 1 - University curriculum coordinators for perioperative/surgical nursing**

To prevent any connection between the universities and the research, universities were coded and the numbers were scrambled so no identification could be made. Hospital names were not presented in the research. If the name of a university or hospital were mentioned by a participant, the name and any other identifiable data were not reported in this thesis.
Phase 2 - Final year undergraduate nursing students in their final semester

Participants’ names were unknown as the questionnaire was anonymous. The anonymity of the university was protected in several different ways. As one university was the only university in their state to offer undergraduate nursing, if the state were reported a possible breach of confidentiality could have occurred. To avoid this situation it was simply stated in this thesis and in any subsequent presentations or published papers that there were six universities from four Australian States. If undergraduate participants’ comments had alluded to any particular university or hospital they were not presented in the thesis.

All references to individual universities, for example personalised letters of invitation were stored on secure computer files on my laptop. At the completion of the project these will be deleted. All identifiable paper data, such as participate questionnaires and consent forms have been stored in locked filing cabinets at my place of employment. These will be kept for six years after final publication and then destroyed.

Experienced nurse educators involved in a focus group to discuss retention of staff in their unit provided comment via email. All identifiable comments about their hospital were removed prior to presentation in the thesis and in any subsequent presentations or published papers.

Phase 3 - Curriculum co-ordinators of the participants tested in Phase 2

The names of the curriculum co-ordinators were not revealed in the thesis or in any subsequent presentations or published papers. The names were coded numerically and coding information was stored on secure computer files on my laptop. At the completion of the project these will be deleted. Curriculum co-ordinators interviewed in Phase 3 of the research were able to edit their transcripts, however any identifiable comments were de-identified.
Phase 4 - Follow-up study - Graduate nurses following their first year of practice

Graduate nurse questionnaires had no reference to the name of the participant, where they studied or where they were currently employed so no connection could be made. Following the recruitment phase, graduate nurses questionnaires were sent back from either their hospital or individual post paid letters. I had no way of knowing the identity of the participant.

5.8 Summary

In this chapter the research objectives were presented and the research questions were restated, with a view to informing the research approach used for this inquiry. The research plan was unpacked in four phases:

- **Phase 1** – Information was sought from all Australian universities that offered undergraduate nursing inquiring about their learning opportunities in operating room nursing.
- **Phase 2** – Final year undergraduate nursing students in their final semester of university were involved in both quantitative and qualitative data collection.
- **Phase 3** – Curriculum co-ordinators of participants involved in Phase 2 were involved in qualitative data collection.
- **Phase 4** – Follow up study – Nurses following their first year of practice were tested to compare the knowledge from graduating student to graduate nurse.

The research methodology was discussed and the data collection and analyses were presented under the research questions that were posed.

This chapter also considered ethical issues arising from this research including data collection methods and validation of both qualitative and quantitative data under a mixed methods paradigm. It has also explained how the different universities and participants involved in the research were approached and any potential ethics issues related to their recruitment into the project.
CHAPTER SIX

Chapter 6: Development of Research Tools

Unless a researcher asks the right questions in the right way, a research project will not produce useful information, no matter how well other research aspects are designed and executed (Peterson 2000, p. 13)

Introduction

This chapter will discuss methods used to collect information on the models of operating room education offered nationally, the taxonomy and selection criteria that were developed to select specific university models for inclusion in the research, and the development of the research questionnaire incorporating qualitative research questions and quantitative assessment.

The chapter is organised under the following headings:

6.1 Phase 1 – Telephone survey
6.2 Taxonomy of undergraduate operating room nursing in Australia
6.3 Models of operating room education offered nationally
6.4 Participating universities and their operating room model
6.5 Participating universities and their educational pattern mix
6.6 Questionnaire Design
   6.6.1 Qualitative data collection
   6.6.2 Pilot study of quantitative assessment tool
   6.6.3 Evaluating the assessment tool
6.7 Validity of doctoral questionnaire
   6.7.1 Transformation from Master’s degree questionnaire to doctoral questionnaire
6.8 Evaluating the doctoral questionnaire

6.9 Summary

6.1 Phase 1 – Telephone survey

According to a senior member of the Australian College of Operating Room Nurses (N. Lundy, personal communication, 30 July 2008), there was no formalised data available that described the differing models of operating room education offered nationally for undergraduate nurses. Furthermore, no research had been conducted into the possible educational implications these models may have on the acquisition of surgical nursing knowledge required to support a high standard of pre-operative and post-operative surgical nursing care. In addition there had been no research into the possible impact these models may have on recruitment of young nurses and retention of existing staff working in the operating suite.

Phase 1 sought information on the differing types of undergraduate operating room education offered in Australia via a telephone survey. A list of Australian universities was obtained from the Australian Education Network (http://www.australian-universities.com/list/). All Australian universities were contacted to firstly formulate a list of those who offered undergraduate nursing degrees. Inquiry was then made to the listed universities regarding the type of operating room education offered.

Phase 1 data included:

- model of operating room education offered at each university, for example, elective, on line, core curriculum,
- whether or not structured or guided clinical placements in the operating suite were offered to students and if so what percentage of students were able to access this experience,
- the number of theoretical hours instruction in operating room nursing, if any, given to students prior to their clinical placements,
- the number of hours in a clinical placement.
At the time of data collection (August 2008) there were a total of 39 universities in Australia and 31 of these offered undergraduate nursing degrees. Information regarding operating room education was not provided by nine of the 31 universities that offered undergraduate nursing. After a maximum of three phone calls made and messages left with no information forthcoming, it was decided that the university did not wish to provide this information and these universities were labelled ‘data not provided’.

Initial data revealed that differing models of undergraduate operating room education included an:

- **Elective model**
  Two Australian universities offered this educational model. Both provided a mix of theory and practice. As an elective choice not all students participated in this subject due to limited places or students may have been undertaking double degrees where elective subjects were not required.

- **On-line model**
  One university offered this style of delivery where third year nurses were offered this subject as an elective choice. It incorporated theory in the form of on-line lectures and tutorials. Students may or may not have accessed a practical placement in the operating suite.

- **Mixed model**
  Ten universities initially advised in the telephone survey that their university offered a core operating room subject. For the purpose of this research, a core subject is one that all students participate in. During the telephone discussions there was the opportunity to probe more deeply into the details of the universities’ models, which revealed that although many were called a ‘core’ operating room nursing subject, they were generic in nature and either did not offer specific operating room education or the students had to choose between the high dependency nursing subjects, meaning that not all students participated in the operating room stream. These education models were renamed and referred to as a ‘mixed model’.
Core curriculum model

Five of the 10 universities offer a specific operating room nursing theoretical component in the core curriculum. Associated practical experience may be arranged but due to difficulties in availability of practical hospital placements not all students were able to access practical experience.

No formal operating room program

Nine universities did not offer any formal operating room education. However students may have been involved in a ‘follow-through’ experience. This allows students to care for patients pre-operatively in the surgical ward, observe the patient’s surgery and subsequent recovery in the operating suite and travel back to the surgical ward to care for the patient during the post-operative phase.

6.2 Taxonomy of undergraduate operating room nursing in Australia

An initial taxonomy of Australian universities offering undergraduate nursing was developed. Table 6.1 is a visualisation showing that of the 31 universities that offer undergraduate nursing in Australia; nine did not offered a formal undergraduate program; two offered an elective subject; one offered an on-line subject; five offered a mixed curricula subject and five offered a core curriculum subject that all students accessed.
<table>
<thead>
<tr>
<th>University</th>
<th>Data not provided</th>
<th>No formal operating room program</th>
<th>Elective</th>
<th>On-line</th>
<th>Mixed</th>
<th>Core</th>
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</thead>
<tbody>
<tr>
<td>University 1</td>
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<td>University 29</td>
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<td>University 30</td>
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<tr>
<td>University 31</td>
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</tr>
</tbody>
</table>

Table 6.1 - Taxonomy of Australian universities offering undergraduate nursing
6.3 Models of operating room education offered nationally

A second taxonomy was developed looking only at the universities that offered a model of operating theatre education. The universities were recoded with a new code number for each different category to ensure anonymity of the university.

<table>
<thead>
<tr>
<th>University</th>
<th>Elective</th>
<th>On-line</th>
<th>Mixed</th>
<th>Core</th>
<th>Theory prior to practice</th>
<th>Practicum hours in a theatre</th>
<th>Percent of students involved</th>
<th>Invited into the research</th>
</tr>
</thead>
<tbody>
<tr>
<td>University 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24 days surgical placement</td>
<td>100%</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>University 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 hours</td>
<td>40 hours</td>
<td>Choose 1 speciality</td>
<td>Yes</td>
</tr>
<tr>
<td>University 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 hours</td>
<td>32 hours</td>
<td>100%</td>
<td>No</td>
</tr>
<tr>
<td>University 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 hours</td>
<td>40 hours</td>
<td>14%</td>
<td>Yes</td>
</tr>
<tr>
<td>University 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Self directed package</td>
<td>80 hours</td>
<td>Choose 1 speciality</td>
<td>Yes</td>
</tr>
<tr>
<td>University 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No theory</td>
<td>1st yr 10 days 2nd yr 16 days 3rd yr 39 days</td>
<td>50% - choose 6 of 12 subjects</td>
<td>Yes</td>
</tr>
<tr>
<td>University 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24 hours theory</td>
<td>80 hours</td>
<td>On Demand</td>
<td>Yes</td>
</tr>
<tr>
<td>University 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 hours</td>
<td>96 hours</td>
<td>100%</td>
<td>Yes</td>
</tr>
<tr>
<td>University 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On-line</td>
<td>Variably 80 hours</td>
<td>30%</td>
<td>Yes</td>
</tr>
<tr>
<td>University 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 hours</td>
<td>40 hours</td>
<td>Choice of specialty</td>
<td>Yes</td>
</tr>
<tr>
<td>University 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 hours Core theory</td>
<td>75 hours if chosen</td>
<td>Choose 1 speciality for practicum</td>
<td>Yes</td>
</tr>
<tr>
<td>University 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24 hours</td>
<td>80 hours</td>
<td>11%</td>
<td>Yes</td>
</tr>
<tr>
<td>University 13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No theory</td>
<td>80 hours</td>
<td>Choose 1 speciality</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 6.2 – Taxonomy of differing models of operating room education offered to undergraduate nurses in Australia
In order to ensure the most appropriate models of education were involved in the research, selection criteria were developed to assist in selecting universities to invite into the study. Using the data from the second taxonomy, selection criteria were developed observing:

- Innovation of model - looking for innovation and individuality in educational delivery such as the on-line learning model, which was the only one in Australia.

- Geographical location of university - as a national project it would have been undesirable to have all universities from only one or two states of Australia. Every effort was made to gain a spread of universities nationally with six universities from four states of Australia recruited into the research.

- Differing types of models of operating room education – such as elective, mixed, on-line or core curriculum subjects.

- Specific operating room education as opposed to surgical ward nursing education. Some subjects labelled as ‘perioperative’ focused solely on surgical ward experience and theory, not specifically operating suite.

A letter of invitation, plain language statement and consent form were sent to the Head of Nursing School in the Faculty of Nursing at each of the ten chosen universities.

Table 6.3 shows the universities who were invited to participate in the research and their response. Of the ten universities invited to participate in the research six accepted. These included one elective model, two mixed models, two core curriculum models and one on-line model. Four acceptances were provided immediately by the Head of School and a further two accepted following the research being passed by the universities respective research committees. Of the others, two universities did not respond to my invitation (an initial letter and a follow up reminder letter was sent) and two universities did not accept the National Ethics Application Form (NEAF) and Deakin University’s ethics approval and asked that I submit to their respective university ethics committee. Unfortunately this was problematic because I was neither a student nor a staff member at those universities, and thus could not access the forms or submit an
application. As similar models of education were offered at other universities it was not pursued.

<table>
<thead>
<tr>
<th>University</th>
<th>Elective</th>
<th>Online</th>
<th>Mixed</th>
<th>Core</th>
<th>Invited</th>
<th>Accepted</th>
<th>Did not respond</th>
<th>Comment</th>
</tr>
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<td>1</td>
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<td>Yes</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>Ethics issue</td>
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<td>2</td>
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<td>Yes</td>
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<td>3</td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>✓</td>
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<td>6</td>
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<td>Yes</td>
<td>No</td>
<td>Ethics issue</td>
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<td>Yes</td>
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<td>8</td>
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<td>✓</td>
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Table 6.3 – Table of universities invited to participate in the research and their response

6.4 Participating universities and their operating room model

- University number 2 - Elective model

In the elective model, offered to students in their second or third year of study, a combination of both specific operating room nursing theory and practice was provided. Prior to the clinical placement students were involved in 12 hours of practical workshops. These workshops were conducted in an actual operating suite by a senior operating room nurse who worked in that complex. The clinical placement offered 40 hours (one week) of guided practical experience with a ‘preceptor’ or ‘buddy’ assigned to each student. The university provided a workbook and educational material for preceptors to ensure the quality of the practicum. On completion of the practicum students were required to submit a reflective journal, complete a 1500 word assignment and sit an exam. As an elective subject, approximately 14 per cent of students accessed it in the year the
data were collected. Students who undertook a double degree were not required to complete an elective subject.

- **University number 4 – On-line model**
The on-line learning model was offered as one of the elective choices for students in their third year of study. This model consisted of 16 specific operating room nursing on-line lectures and 10 hours of tutorial work. On completion of the program students were required to submit two assignments. Students may or may not have accessed an 80-hour guided practical placement in the operating suite. In the year the data were collected approximately 30 per cent of students completed this subject.

- **University number 5 – Core curriculum theory**
This university offered a core theoretical subject that encompassed all high dependency nursing subjects, such as Intensive Care Nursing, Accident and Emergency Nursing and Operating Room Nursing. However this model differed from the mixed model as it provided six hours of specific operating room nursing theory to all students which incorporated three hours of lectures and three hours of laboratory work prior to the student’s clinical placement. The theory was provided by an experienced operating room nurse. If the operating suite was chosen the students received 75 hours of guided learning. A preceptor was provided by the hospital where they attend practicum. The university also allocated the students a clinical nurse educator who supervised the students on a ratio of one teacher to eight students. They were responsible for the students’ clinical portfolio which included all assessments whilst on practicum.

- **University number 7 – Mixed model**
At this university students have a core generic high dependency nursing subject that had 12 different learning opportunities. Students were required to choose six out of the possible 12 subjects of which one is operating room nursing. If chosen, the students had a layered practical experience, 10 days in first year, 16 days in second year and 39 days in third year.

- **University number 8 – Mixed model**
This model of undergraduate education provided a core generic high dependency nursing subject that incorporated a Self Directed Learning (SDL) package and six hours of theory prior to practice. Students then chose practical placements in one
of the high dependency nursing areas. If the operating suite was chosen students received at least 80 hours guided practical experience in the operating suite.

- **University number 9 – Core curriculum theory**
  This model of education offered an eight week course with 3 hours of specific operating room nursing theory per week. In the year that data were collected approximately 80 per cent of students were provided with an operating suite placement consisting of five to six weeks of guided practical experience.

- **No formal operating room education (no formal OR ed)**
  Four of the six participating universities did not offer operating room nursing as a subject that all students would participate in. In order to be involved in the operating room nursing subject at universities number 2, 4, 7 and 8, students had to choose it specifically. Students who did not enrol in a formal operating theatre program at their university made up the group of ‘students not enrolled’. These students may have however been involved in a ‘follow-through’ experience. This allows students to care for patients pre-operatively, observe the patient’s surgery and subsequent recovery in the operating suite and travel back to the surgical ward to care for the patient during the post-operative phase. However, this is on an ad hoc basis (as it is dependent on the ability of the ward to release the students). Operating suite management cannot foresee attendance by the students, so the educational infrastructure afforded to the students with guided theatre experience is not provided. In this scenario, staffing constraints and busyness of the operating suite play a major role in the ability of the students to access quality supervision and education.

### 6.5 Participating universities and their educational pattern mix

The model of education referred to the overall design and delivery of the subject, whereas the pattern mix of operating room education related to the actual different teaching/learning opportunities incorporated in the model. Included in the pattern mix were a combination of operating room nursing theory (theory); guided practical workplace experience (guided practice); non-guided practical workplace experience (non-guided practice), and extra practical experience (extra experience).

An explanation of the components of the pattern mix follows:
‘Theory’ may be defined as ‘the set of rules and ideas that a particular subject or skill is based on’ (Collins Australian Dictionary 2006, p. 881). Three university models from universities 4, 5 and 9 offered a theoretical component of operating room nursing principles with or without practicum. Where practical experience was offered the theoretical component was designed to be offered prior to the clinical placement in the operating suite.

‘Guided practice’ as described by Billett (2001) refers to learners who have the option of accessing guidance from more experienced workers, allowing collaborative thinking and interaction between the expert and novice. Students in this group were involved in practical experience under the direct supervision of an experienced operating room nurse, who was able to explain key concepts and assist the student in their practical learning experience.

‘Non-guided practice’ refers to practical experience that the university has not formally arranged for the students, i.e. an experienced operating room nurse has not been allocated to assist the student and explain key concepts. This experience usually allowed students to have an observation experience with no opportunity to participate in surgical procedures and is typical of the ‘follow-through’ style of practicum.

Extra experience was seen where students who had been involved in guided operating suite experience sought out extra practicum by making personal arrangements with the operating theatre management. This was observed as students reported having had more hours than had been arranged by the university. The same was reported in the qualitative narrative.

Seven different combinations of theory, guided practice, non-guided practice and extra experience were observed, making up the pattern mix. The different combination in pattern mix of education is shown visually in table 6.4.
CHAPTER 6: DEVELOPMENT OF RESEARCH TOOLS

6.6 Questionnaire Design

A mixed methods paradigm was employed in this research and was reflected in the questionnaire design with both qualitative and quantitative data collected through a triangulated / convergent parallel research design (Creswell & Plano Clark 2011). As advised by Robson (2002), questions within the questionnaire were designed specifically to provide data that would achieve the goals of the research and, in particular, answer the research questions. The questionnaire was divided into three parts:

- **Personal details** Students were asked if they were male or female; if they had been a participant in the ‘perioperative / operating room subject’ offered at their university, and how much time they had spent in the operating suite during their entire undergraduate education.

- **Qualitative inquiry** Short answer questions were used to collect data on students’ feelings and personal comment about their time in the operating suite or lack there of; students’ attitudes toward their model of operating room education; transferable skills acquired that may assist them in surgical nursing care, and attitudes towards further experience or possible future employment in the operating suite.

### Table 6.4 – Variations in pattern mix of operating room education

<table>
<thead>
<tr>
<th>Theory / Guided Practice &amp; Extra Experience</th>
<th>Theory &amp; Guided Practice</th>
<th>Theory &amp; Non-Guided Practice</th>
<th>Theory</th>
<th>Guided Practice</th>
<th>Non-Guided Practice</th>
<th>Nothing (neither theory nor any form of practice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Theory &amp; Guided Practice</td>
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<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory &amp; Non-Guided Practice</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guided Practice</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Guided Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Nothing (neither theory nor any form of practice)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Quantitative inquiry A 20 point multiple choice questionnaire was used to test undergraduate nurses’ knowledge on pre- and post-operative nursing care. Similarly, the study for my Master of Professional Education and Training also tested undergraduate nurses’ knowledge on pre- and post-operative surgical nursing care, but only looked at one operating room model from one Australian state.

Questionnaire design was informed by guidelines set out by (Bell 1999), Peterson (2000) and Robson (2002). Questionnaire construction is one of the most critical and delicate research skills (Peterson 2000). The ability to ask the right questions that provide valid and reliable information for testing a theory, making a decision or investigating a given topic would be considered to be as much an art as any other aspect of research (Peterson 2000). A questionnaire should be structured to facilitate its completion (Peterson 2000), so the layout and aesthetics of a questionnaire are of the utmost importance as a well presented document will lure and encourage participants (Bell 1999). Clarity of wording and simplicity of design are vital (Robson 2002). The questionnaire should also look quite easy to complete with ample space for answers to be written (Robson 2002). Peterson (2000) suggests that analogous to laying the foundations of a building, certain steps need to be accomplished in the construction of a questionnaire to ensure an effective and useful means of accurate data collection. Peterson (2000) also presented a list of seven specific tasks that must be completed to ensure success. These were:

1. Review all information required to construct a questionnaire.
2. Develop and prioritise a list of questions that will answer the research questions.
3. Make an assessment of each individual question carefully.
4. Ascertain the type of questions to be asked.
5. Decide the specific wording for each individual question.
6. Determine the overall structure of the questionnaire.
7. Evaluation of the questionnaire.
All seven steps were followed during questionnaire construction, many with the assistance of several different focus groups to provide expert input, which will be discussed later in this chapter.

6.6.1 Qualitative Data Collection

A plain language statement preceded the qualitative section of the questionnaire. Whilst the quantitative assessment tool was piloted in the study for my Master thesis, the qualitative section consisting of short answer questions was developed specifically for the doctoral research.

BRUSO is an acronym for five easy-to-apply criteria for questionnaire construction and reminds the writer to be Brief, Relevant, Unambiguous, Specific and Objective (BRUSO) (Peterson 2000). These were adhered to in question construction.

The order of questions within the questionnaire is a significant aspect as this can influence answers provided (Peterson 2000). The first questions sought descriptive information regarding the sex of the participant and whether or not they were involved in an operating room subject at their university. This was achieved by asking the participants to circle the appropriate response (male/female or yes/no). The total amount of time spent in the operating suite was asked and recorded on a separate line. Schwarz, Knauper, Oyserman & Stitch (2008), Robson (2002) and Peterson (2000) all suggest the questions must not be ambiguous. To ensure this, when answering the question regarding the total amount of time spent in theatre, respondents were asked to record the time spent in theatre in either days or hours to prevent any misinterpretation of the answer.

Three short answer questions of open-end design followed. These followed a funnel question approach, in that, questions move from the general to the specific so each subsequent question was more specific than the last (Peterson 2000). The first question asked was Did you enjoy your time in the operating suite? If so why? If not why? An easy open-end question often appears early in a research questionnaire (Peterson 2000). This is called a rapport question and is designed to
gain attention and set the scene for participants, assisting them to recall the experience that the researcher wishes to explore more deeply (Peterson 2000). The second question built on the first. As participants were recalling their time in the operating suite, they were asked *Did you find the information that you may have learned in the operating theatre assisting you in your nursing skills outside the operating suite?* Several lines were provided following this question so if participants wished to elaborate and list or explain the skills they had learned the opportunity was available; however, it also gave the opportunity for a simple yes or no answer so as not to discourage participants for whom completion time was an issue.

The final short answer question asked *Would you consider working in the operating theatre after you graduate?* This question not only elicited the desired information, but also rounded off the three questions by drawing the subject to a close and moved thinking forward from previous experience to future employment.

### 6.6.2 Pilot study of quantitative assessment tool

In both my Master of Professional Education and Training study (completed in 2005) and in this doctoral research there was a need to assess the undergraduate nurses’ knowledge of surgical ward nursing. To enable this it was essential to develop an assessment tool. This was achieved with a 20 item multiple-choice test. A total of 154 undergraduate nursing students participated in the study for my Master’s degree, which also provided the opportunity to pilot the assessment tool for use in this doctoral research. Explanation will now be provided on the initial development of this assessment tool and the subsequent modifications, culminating in the assessment tool being utilised in this work (Appendix 11). A closed-end multiple-choice question format was chosen as it is a standardised objectively-scored assessment tool (Athanasou & Lamprianou 2002). When using a self-completion method of data collection, as in this research, Robson (2002) reminds us that it is important to keep complexity to a minimum as this encourages completion. A multiple-choice test is not complex in its appearance and this format is familiar to nursing students. The order of completion of the
Advantages for using multiple-choice questions are that:

- they are quick to answer (Athanasou & Lamprianou 2002). Lynn (2008) cites the time taken to complete a questionnaire or survey as being a reason for non response by invited participants. Multiple choice questions have the advantage of requiring a shorter amount of time to complete, thus encouraging participation,
- they are often more appealing for participants to complete in comparison to short answer questions (Athanasou & Lamprianou 2002),
- they assess knowledge as well as the ability to discriminate between several possibilities (Athanasou & Lamprianou 2002),
- can test judgement and memory (Athanasou & Lamprianou 2002),
- they are versatile and can be adapted to different disciplines (Athanasou & Lamprianou 2002),
- there is no subjectivity in corrections as there is a designated answer thus removing any variability in scoring that may be seen in short answers questions (Athanasou & Lamprianou 2002).

Conversely, there have been wide-ranging criticisms of multiple-choice questions where they have been applied to inappropriate subject areas, have had technical problems with the questions used or have been poorly constructed (Athanasou & Lamprianou 2002). Limitations of multiple choice questions are that they are quite difficult to write effectively and that a single correct answer can be obtained without any knowledge of the subject matter (Athanasou & Lamprianou 2002). In addressing these concerns it must be noted that multiple-choice questions are commonly used in nursing education thus the participants would be familiar with this assessment format.
To ensure the quality and effectiveness of multiple-choice questions, construction was informed by Athanasou & Lamprianou’s text on multiple-choice construction. Only one correct answer was present for each question. Four responses were provided for each question. Three distracters were given as alternative answers, two plausible but incorrect answers and one implausible and incorrect answer (Athanasou & Lamprianou 2002). There were two very difficult questions to test for deeper knowledge (questions 1 & 6) and two very simple questions (13 & 14) to gauge whether the students were actually reading the questions or just randomly selecting answers.

The content of the multiple-choice questions for the pilot study related to areas of practice that were considered essential for all surgical nurses (Touzeau 2005) and that also fell within the guidelines of competency expected for surgical nursing practice namely the Australian National Competencies Incorporated (ANCI) standards (2002). Whilst knowledge was assessed, the aim was to produce data that would allow measurement and comparison of operating room experience, as opposed to assessment of student achievement. It was also hypothesised that the subsequent statistical analysis would reveal valuable information surrounding variations in learning outcomes in surgical ward nursing. Testing was undertaken during the students’ final semester of university studies, prior to the students’ final examinations. This period was chosen to allow all students to have gained as much practical experience as possible in their three years of education. An earlier timeframe may have disadvantaged the students who were not involved in guided or structured programs as many hospital clinical placements involving ‘follow-through’ visits occur in the students’ final semester.

As previously discussed in Chapter Two, four facets of surgical ward nursing care were identified as areas of concern in the literature when operating theatre experience was removed from the undergraduate nursing core curriculum, and these formed the initial basis for the quantitative questions. Each individual multiple-choice question began with a subject that was believed to be essential knowledge for surgical ward nurses and that could also be learned in the operating
suites. To confirm these two assumptions, two focus groups were convened in 2004 as part of the study for my Master of Professional Education and Training.

The first focus group was to confirm that the areas of concern identified in the literature were in fact areas of knowledge that were essential to surgical ward nursing in Australia. This group consisted of ten qualified experienced registered nurses from surgical wards who all had at least two years surgical nursing experience and were currently practising within this speciality. The group were given a list of 20 subject topics that fell within the four areas of concern that had been identified. The group was asked to comment on whether or not these subjects were issues of importance for safe surgical nursing practice. The ensuing discussions saw some topics removed and others added until a list of 20 topics were developed.

These topics were then used to construct the multiple-choice questions which consisted of:

- Patient education - four questions on pre-operative patient education.
- Pre- and post-operative nursing care - three questions regarding pre-operative care & eight surrounding post-operative care.
- Infection control - two questions regarding infection control. Questions on infection control were asked in lieu of ‘asepsis’. The reasoning behind this was that ‘asepsis’ is a practical technique and did not lend itself to multiple-choice examination.
- Post-operative pain management - three questions on acute post-operative pain management.

When the multiple-choice questions had been constructed they were taken back to the surgical nursing focus group for comment and further modification. The 20 multiple-choice questions and the explanation for their inclusion appear as Appendix 12.

The purpose of the second focus group was to guarantee that the questions posed surrounded information and knowledge that could be learned via operating theatre
experience. This group consisted of fifteen operating room nurses with operating suite experience ranging from one to ten years. Trialling the multiple-choice questions on these volunteers provided an insight into expected scores following experience in the operating room arena. The average score for these participants was 18 out of 20, (mean score of 18.5) confirming that knowledge on surgical ward care can be learned in the operating suite.

Gardiner and Taylor (1980) suggest that content validity can be judged by a panel of expert peers. To facilitate this a third focus group was convened in 2004 to scrutinise the content validity of the assessment tool. This group consisted of senior nursing staff from the acute hospital setting, namely Unit Managers, a Deputy Director of Nursing and an Executive Education Manager, all with interests in surgical nursing. Objectives of the group were explained, namely to assess if the multiple-choice questions were an accurate representation of knowledge needed for safe surgical nursing practice, and to make assessment of the content validity of each question. Revisions resulted in a draft questionnaire.

6.6.3 Evaluating the assessment tool

In order to test the time participants would take to complete the assessment (Bell 1999) and to check that multiple-choice questions were clear to undergraduate students, a trial of the draft questionnaire was arranged (Peterson 2000). The participants consisted of volunteer second year nursing students, who were chosen because they were not in the group from which data was to be collected, but were of similar ages and were all studying nursing. Several minor modifications were made and the approximate time for completion was added to the plain language statements for the undergraduate participants.

6.7 Validity of the doctoral questionnaire

Validity refers to the accuracy and trustworthiness of assessment results (Athanasou & Lamprianou 2002), is concerned with whether the findings are really what they appear to be (Robson 2002), and therefore refers to the extent to which a scale measures what it was intended to measure (Peterson 2000). A definition of validity as presented by the Standards for Educational and
Psychological Testing is ‘the degree to which accumulated evidence and theory support specific interpretations of test scores entailed by proposed uses of a test’ (American Educational Research Association & American Psychological Association and National Council on Measurement in Education 1999, p. 64).

There are three commonly described types of validity content, construct and criterion validity (Athanasou & Lamprianou 2002). As the quantitative assessment tool was required to measure students’ knowledge on pre-operative and post-operative surgical care, it was essential to ask questions surrounding these areas of nursing practice. It was also essential to ensure that knowledge being tested fell within competency standards and university guidelines that were considered appropriate learning for the student cohort. The transfer of nurse education from hospital to university between 1985 and 1994 was assisted by the decision to adopt a national competency standard for all Australian nurses (Percival 1995). This change gave curriculum designers the ability to develop programs that suited local requirements whilst meeting a minimal national standard (Grealish & Smale 2011).

The Australian Nursing & Midwifery Council (ANMC) is a peak body established in 1992 to facilitate a national approach to nursing and midwifery regulation (Australian Nursing & Midwifery Council 2005). The ANMC works with state and territory Nursing and Midwifery Regulatory Authorities (NMRA) in evolving standards for statutory nursing and midwifery regulation. The ANMC produces standards of practice for registered nurses. These initially were referred to as the ‘Australian National Competencies Inc’ (ANCI) standards but are now known as the ‘Australian Nursing & Midwifery Councils National Competency Standards for the Registered Nurse’ (Australian Nursing & Midwifery Council 2005).

### 6.7.1 Transformation from Master’s questionnaire to doctoral questionnaire

The study for my Master of Professional Education and Training piloted the questionnaire on 154 undergraduate nursing students. However, prior to being used for this doctoral research, the assessment tool was again scrutinised to ensure current accuracy of questions and pertinence to current practice in 2008 and 2009.
when data were collected. As all Australian Universities now work towards the same set of national competencies there was no need to check each individual university learning guidelines. Universities must provide documentation that all competencies are attained by students by the end of their university course in order to gain national nursing registration (Australian Nursing & Midwifery Council 2006). Validation occurred by ensuring all subjects areas fell within guidelines set down by the Australian Nursing & Midwifery Councils National Competency Standards for the Registered Nurse (Australian Nursing & Midwifery Council 2006). Questionnaire results from my Master of Professional Education and Training also revealed a healthy spread of scores around the mean.

In developing the doctoral research design a focus group was held in April 2009 with a group of 20 senior experienced operating room nurse educators to scrutinise the draft Phase 1 telephone survey and the draft Phase 2 questionnaires. The first task was to assess the Phase 1 telephone questionnaire. Discussion, feedback and modifications were provided regarding the Phase 1 survey on what questions needed to be asked and whether any further information would be useful. To ensure the quality of the subsequent phases of the research, appropriate data needed to be collected in the initial phase to provide a sound foundation from which to continue. Following suggestion and discussion, modifications were made to the survey. Consultation with leaders in operating room nursing education via this focus group provided a level of rigor to the initial data collection.

The second task of this focus group was to examine the draft Phase 2 questionnaire, which included qualitative short answers and the quantitative assessment tool, for both content and face validity. The group was asked to complete the assessment tool to ensure that the knowledge required for surgical ward nursing could be gained through operating suite experience. The average score for this group was 19 out of a possible 20, revealing that the subject matter was well understood by operating room nurses, and could be learned via operating room experience. Face validity as defined by Athanasou & Lamprianou (2002) is the appearance of a question and the extent to which the question looks relevant to
the participant. Focus group members were asked to comment on the design, wording and general appearance of the questionnaire.

The group was also asked to comment on the wording and validity of the short answer questions and multiple choice questions. This doctoral research incorporated undergraduate nursing students from six different universities over four Australian states. It was felt that questions regarding subject choice needed to be phrased in a fashion that all students would understand and relate to. One of the crucial aspects of questionnaire design is writing it in such a way that participants understand the information required of them whilst the question still remains true to the research task (Robson 2002). Writings on question development typically advise researchers to avoid terms that participants will find unfamiliar (Schwarz et al. 2008), such as individual or personalised university names or terms. However, perhaps more important than the words, is the ‘speaker meaning’, which refers to the ability of the participants to understand what the research is asking and provide a meaningful answer (Schwarz et al. 2008, p. 19).

The guidelines suggested by (Peterson 2000) echo Robson’s (2002) and Schwarz and colleagues’ (2008) sentiments, stating that not only should the correct question be asked, but also in the correct way. When designing the question on students’ subject choice each question was designed specifically for the students’ individual university. For example, students from university number 2 were asked if they participated in the perioperative elective subject, as this was the operating room subject offered at their university; students from university number 4 were asked if they participated in on-line perioperative subject as this was the operating room subject offered at their university; students from university number 5 were asked if they chose the operating room stream of subject B52 and so on. If all students had been asked the same question, students may not have understood the question thus answering it incorrectly.

The term ‘perioperative’ was also used if this was a term used by the university. In practice operating room nurses do refer to themselves as perioperative nurses, however the literal definition also includes surgical ward nursing. As the
definitions evolve further (Sigurdsson 2001), there is a risk in the coming years that misinterpretation of this research may occur. For these reasons the older terms of operating room nurse/nursing and surgical ward nurse/nursing have been used to separate the two areas in this research. Information on providing the exact wording of these subject choices was provided by the respective curriculum coordinators. Following the above modifications, it was felt by the group that both the quantitative and qualitative questions were well founded, easily understood and not ambiguous. This culminated in a draft questionnaire for the current doctoral research.

6.8 Evaluating the doctoral questionnaire

Despite the myriad of precautions taken during question and questionnaire construction, the finished product must be evaluated (Peterson 2000). In May 2009, 22 volunteer second year nursing students were asked to assist in trialling the draft doctoral questionnaire. This group was chosen as they were not in the group from which data was to be collected, but were of similar ages and were all studying nursing. The group were asked to comment on the general appearance of the questionnaire and on whether any questions seemed ambiguous or unclear. They were timed so that this could be recorded on the questionnaire and participants would know approximately how long it would take to complete.

In my professional teaching, I now utilise the quantitative assessment tool for the Graduate Nurse Program at my place of work. New nurses are asked to answer the 20-item multiple choice test and on completion a tutorial is given on the correct answers, allowing participants to self-correct. In 2009 a request was made from a course convenor at one of the participating universities asking for permission to use the tool in their undergraduate nursing program. Permission was granted.

6.9 Summary

This chapter has discussed methods used to collect information on the models of operating room education offered nationally, the taxonomy and selection criteria that were developed to select specific university models for inclusion in the research, and the development of the research questionnaire incorporating
qualitative research questions and a quantitative assessment tool. A questionnaire is much more than just a simple list of qualitative and quantitative questions and both logic and psychology are utilised in this process (Dillman 2008b). Peterson (2000) reminds researchers that unless they ask the right questions in the most appropriate fashion, their research will not produce useful data no matter how well the other aspects of the research are designed and executed. The validity of the research is dependent on the quality of the questions asked and the design of the questionnaire; for this reason, much time and exhaustive means have been utilised to ensure appropriate development of the research questionnaire.
In a mixed methods convergent design, after analysing both quantitative and qualitative data independently, transformation analysis can be performed by transforming qualitative data into quantitative data (Creswell and Plano Clark 2011).

Introduction

Phase 1 of the research collected course information about operating room education from Australian universities offering undergraduate nursing and has been reported on in Chapter Six.

This chapter represents the statistical analysis, qualitative analysis and findings from Phase 2, Phase 3 and Phase 4 of the research. Specific quantitative, qualitative and transformed data analyses were undertaken to provide information that would answer the research questions posed. Findings will be presented with the research question they answer.

7.1 Phase 2 - Undergraduate nursing students’ quantitative data analysis answering Research Question One
7.1.1 Pass/fail

7.2 Phase 2 - Undergraduate nursing students’ quantitative data analysis and transformation merged analysis answering Research Question Two
7.2.1 Quantitative comparison of student score and university model
7.2.2 Quantitative comparison of student score and pattern mix of education
7.2.3 Quantitative comparison of student score and time spent in the operating suite
7.2.4 Summary of quantitative findings
7.2.5 Qualitative and transformation merged analysis - transferable skills learned in the operating suite
7.3 Phase 2 - Undergraduate nursing students’ qualitative data analysis and transformed merged analysis answering Research Question Three

7.3.1 Qualitative analysis and transformation merged analysis of students’ response to enjoyment in the operating suite

7.3.2 Qualitative analysis and transformation merged analysis of students’ response to future employment in the operating suite

7.3.3 Qualitative analysis on retention of nurses to the operating suite provided by experienced operating room nurses

7.3.4 Summary of qualitative data

7.4 Phase 3 – Curriculum co-ordinators

7.4.1 University no. 2

7.4.2 University no. 4

7.4.3 University no. 5

7.4.4 University no. 9

7.4.5 Summary of curriculum co-ordinators’ comments

7.5 Phase 4 - Follow-up study - graduate nurses’ quantitative findings

7.5.1 Pass/Fail

7.6 Summary

7.1 Phase 2 - Undergraduate nursing students’ quantitative data analysis answering Research Question One

The first research question asked if undergraduate nurses needed to be involved in guided operative suite practical experience in order to achieve skills and knowledge that supported a high standard of nursing care in the pre- and post-operative surgical wards. This analysis was performed through t-test. The t-test compared students who had participated in guided practical experience with students who had non-guided practical experience. Guided and non-guided comparisons were also made between student scores as reflected by a pass and fail grade.

Table 7.1 shows that a total of 332 final semester undergraduate nursing students participated in this research with 160 in the guided practice experience group and 172 in the non-guided practical experience group. Sample sizes are sufficiently
large so the assumption that the distribution of the sample means will be approximately normal can be made (Berenson 2010). As parametric tests also make the assumption of homogeneity of variances it is important to assess this (Pallant 2007). Levene’s test for the homogeneity of variance was performed and was not significant (p < 0.854) revealing that the scores for each of the groups were similar. The alpha level of 0.05 has been used throughout the thesis as the criterion for statistical significance. Where the level of 0.05 has been exceeded in significance the actual probability level has been reported. When required, Bonferroni adjustments have been made.

<table>
<thead>
<tr>
<th>Descriptives on Guided and Non-guided Practice</th>
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<tbody>
<tr>
<td>Score</td>
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<tr>
<td>Guided Practice</td>
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<tr>
<td>N: 161</td>
</tr>
<tr>
<td>Mean: 11.01</td>
</tr>
<tr>
<td>Std. Deviation: 2.246</td>
</tr>
<tr>
<td>Std. Error Mean: 0.178</td>
</tr>
<tr>
<td>Non-guided Practice</td>
</tr>
<tr>
<td>N: 171</td>
</tr>
<tr>
<td>Mean: 9.90</td>
</tr>
<tr>
<td>Std. Deviation: 2.136</td>
</tr>
<tr>
<td>Std. Error Mean: 0.163</td>
</tr>
</tbody>
</table>

Table 7.1 – Group statistics on guided and non-guided practice

The t-test analysis revealed a p value of < 0.001. From these findings the conclusion is drawn that there is a statistically significant difference in the knowledge levels between the two groups (t = 4.743; p < 0.001), namely guided and non-guided practical experience. On this basis the Null Hypothesis (H₀) is rejected in favour of the research hypothesis and it is concluded that students who have been exposed to guided operating suite experience have achieved a higher score on the questionnaire (testing knowledge regarding surgical ward nursing).

7.1.1 Pass/fail

The concept of pass/fail is important in nursing as it indicates the participants’ ability to not only progress further academically, but also determines the ability of the student to gain nursing registration and to practice as a registered nurse. For these reasons the t-test analysis was included in this research. Results revealed a statistical significance (t = 4.304 p <0.0001). The pass rate was set at ten out of twenty.
Figure 7.1 – Pie chart depicting pass/fail between guided and non-guided groups

The pie chart illustrates the pass/fail comparisons between the two groups. Data revealed a pass rate of 76 per cent for the guided practical experience group and 56 per cent for the non-guided practical experience group.

7.2 Phase 2 - Undergraduate nursing students’ quantitative data analysis and transformation merged analysis answering Research Question Two

The second research question was addressed in two parts. The first part, which required quantitative analysis, inquired about the different models of operating room education offered to Australian undergraduate nursing students nationally, and asked which of these models yielded the best educational outcomes. To answer this question student test scores were compared against three separate independent variables. These were:

- model of university education,
- pattern mix of education,
- time spent in theatre.

7.2.1 Quantitative comparison of student score and university model

The university model of education referred to the different types of structured operating room education each university offered. Models differed in their curriculum placement and mode of delivery. From the six participating universities there was:

- one elective mode,
- one on-line model,
- two core curriculum models,
two mixed models.

Only the core curricula models offered all students the opportunity to participate in a theoretical component. In other models the students had to choose between different high dependency nursing subjects. Students who did not choose the operating room nursing subject offered at their university made up the fifth model of ‘no formal operating room education’ (‘no formal OR ed’).

<table>
<thead>
<tr>
<th>Descriptives of University Models of Education</th>
</tr>
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<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
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<tr>
<td>Online</td>
</tr>
<tr>
<td>Mixed</td>
</tr>
<tr>
<td>Core</td>
</tr>
<tr>
<td>No formal OR ed</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 7.2 – Group statistics on score and university model of education

Figure 7.2 – Mean plot comparison between score and model of education
The previous table and figure show the mean scores and the figure also reveals the associated confidence intervals for students who participated in the differing models of university education. They reveal the highest mean score was achieved by participants in the elective model of education. The elective model offered students pre-learning prior to clinical placements and guided practical operating room experience.

Levene’s test for the homogeneity of variance was performed and was not significant (p < 0.990) revealing that the scores for each of the groups were similar.

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<tr>
<td>Between Groups</td>
<td>94.601</td>
<td>4</td>
<td>23.650</td>
<td>4.836</td>
<td>.0001</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1599.070</td>
<td>327</td>
<td>4.890</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1693.672</td>
<td>331</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.3 – ANOVA on student score and model of education

Findings from a one-way ANOVA revealed a statistical significance (F=4.836, p < 0.01, effect size 0.06) but post-hoc testing was required to determine between which groups a statistically significant difference was present.

Post-hoc testing using a Tukey (HSD) revealed that the statistical significance was between the two groups at the highest and the lowest points of score, namely the ‘elective’ model and ‘no formal OR ed’ (p < 0.006).

7.2.2 Quantitative comparison of student score and pattern mix of education

The pattern mix referred to the actual educational components of the different university models that were provided to participants. Possible components of the pattern mix were theory, guided practice, non-guided practice and extra experience.
Table 7.4 – Group statistics on Pattern Mix of Education

Table 7.4 shows the number of participants who were involved in the different pattern mixes of education. The ‘nothing’ group were participants who were not involved in any components of operating room education and who did not spend any time in the operating suite during their undergraduate education. This group made up 55 of the 170 participants who fell into the ‘no formal OR education’ university model. The two largest participant groups of ‘theory & guided practice’ (n=135) and ‘non-guided practice’ (n=103) represent the two most common types of operating room education.
Figure 7.3 revealed that the three highest mean scores were achieved by students who were involved in guided practical operating suite experience, namely ‘theory, guided practice and extra experience’, ‘theory and guided practice’ and ‘guided practice’. The four lower scores were achieved by participants from non-guided practice groups ‘theory and non-guided practice’, ‘non-guided practice’, ‘theory’ and ‘nothing’.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>156.949</td>
<td>6</td>
<td>26.158</td>
<td>5.532</td>
<td>.001</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1536.723</td>
<td>325</td>
<td>4.728</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1693.672</td>
<td>331</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.5 – ANOVA on student score and pattern mix of education

Whilst findings from the one-way ANOVA revealed a statistical significance (F=5.532, p < 0.01, effect size 0.09) between groups, concerns were held that assumptions associated with ANOVA could not be met due to small sample sizes.
of some groups. To ensure accuracy of findings, the non-parametric Kruskal-Wallis test was used to assess for differences between all groups and showed a statistically significant difference between groups (p<0.001).

Several post-hoc tests using the Mann-Whitney Mu test were conducted to assess which groups showed a statistically significant difference to each other. Comparisons were made between:

- ‘theory & guided practice’ and ‘nothing’,
- ‘theory & guided practice’ and ‘theory guided practice & extra experience’,
- ‘theory & guided practice’ and ‘theory’,
- ‘theory’ and ‘guided practice’,
- ‘theory’ and ‘nothing’.

Post hoc testing using a Mann-Whitney Mu test revealed the only two groups that were statistically significantly different from each other (p<0.001) were ‘theory & guided practice’ (n=135) and ‘nothing’ (n=55).

<table>
<thead>
<tr>
<th>Score</th>
<th>Pattern Mix</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory Guided practice</td>
<td>135</td>
<td>105.70</td>
<td>14269.00</td>
<td></td>
</tr>
<tr>
<td>Nothing</td>
<td>55</td>
<td>70.47</td>
<td>3876.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.6 - Group statistics on ‘theory & guided Practice’ & ‘nothing’ (neither theory nor any form of practice)

7.2.3 Quantitative comparison of student score and time spent in the operating suite

There was a high degree of variability in the number of hours participants spent in theatre. For example, the ranges of hours were between 0 and 1600, with many variations in between.

A Pearson product-moment correlation coefficient was computed to assess the relationship between the hours spent in theatre and participant score. Initially
analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The Pearson product-moment showed that there was a positive correlation between the two variables ($r = 0.183; n = 332; p < 0.001$) revealing the relationship between test score and time (in hours) spent in the operating suite. These results were intriguing, and so further analyses were required to explore this relationship in greater depth. To enable this analysis hours were grouped together to ensure reasonable numbers of participants in each grouping. Hours were divided into eight groups and numerically rounded off to the nearest ten which provided sufficient group sizes, with the smallest having eight participants. Table 7.7 is a visualisation of the eight groups.

<table>
<thead>
<tr>
<th>Number of hours spent in operating suite</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>93</td>
</tr>
<tr>
<td>10 - 30</td>
<td>67</td>
</tr>
<tr>
<td>40 - 60</td>
<td>45</td>
</tr>
<tr>
<td>70 - 90</td>
<td>51</td>
</tr>
<tr>
<td>100 - 130</td>
<td>38</td>
</tr>
<tr>
<td>140 - 170</td>
<td>11</td>
</tr>
<tr>
<td>180 - 210</td>
<td>19</td>
</tr>
<tr>
<td>&gt; 210</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>332</td>
</tr>
</tbody>
</table>

Table 7.7 – Grouping of participants’ hours

Levene’s test for the homogeneity of variance was performed and was not significant ($p = 0.360$) revealing that the scores for each of the groups were similar.

Findings from a one-way ANOVA revealed a statistically significant difference ($F=5.491; p < 0.01$, effect size 0.11). Although statistical significance between groups was shown, and the effect size indicates the difference to be an important one, post hoc testing was required to determine between which groups a statistically significant difference was present.
Table 7.7 – Grouping of participants’ hours

Post-hoc testing using a Tukey (HSD) revealed that the statistical significance was seen between three groups:

- 0 and 40 – 60 (p< 0.001)
- 0 and 70 – 90 (p< 0.001)
- 0 and 140 – 170 (p< 0.014)

Figure 7.4 – Bar graph showing score and time in the operating suite
Figure 7.4 is a graph that illustrates that group scores increase from zero hours in theatre through the 10 – 30 hours group and continue to increase to the 40 – 60 hours group. From this point on the effect of time in theatre on participants’ scores appears to plateau, indicating diminishing returns on effort over around 60 hours. It is noted that the 100 – 130 and 180 – 210 groups do not conform to the plateau effect and, other than the effect other variables may have on score, no other explanation presents itself.

These results reveal that the relationship between time in theatre and participant score is not monotonic, meaning that score does not continuously increase as a direct function of time in the operating suite. The score difference between guided and non-guided practical operating suite experience have been shown to be statistically significant in a t-test analysis ($t = 4.743; p < 0.001$) as reported earlier in this chapter. It is also noted that participants from the four groups with the highest number of hours, 100 – 130, 140 – 170, 180 – 210 and >210 hours had been exposed to guided practical experience. The participants from the zero group had been exposed to non-guided experience, and the 10 – 30, 40 – 60 and 70 – 90 groups contained a mix of participants from both guided and non-guided experience.

A final analysis was performed because in my Master of Professional Education and Training study, which was similar, a regression analysis - used to investigate time in theatre and score - revealed a positive slope of regression ($p<0.000133$), indicating that there was an increased test score as a consequence of increased time (Touzeau 2005, p.30). A similar analysis was performed in this research for comparison reasons. The regression analysis for this research has shown similar results with the slope of the line positive ($p<0.001$).

The overall findings from the correlation between time in the operating suite and participant score showed a statistically significant relationship, revealing that time is advantageous to score. Subsequent analysis indicated that time was advantageous up to about 40 to 60 hours and then seemed to plateau, further indicating that there may be diminishing return on effort after about 60 hours.
7.2.4 Summary of quantitative findings

In summary the statistical analyses showed:

- T-test analysis revealed a significant difference (p < 0.001) between guided and non-guided practical experience,

- A pass rate of 76 per cent was achieved by participants who had been involved in guided practical operating room experience and a pass rate of 56 per cent was achieved by participants involved in non-guided practical experience,

- ANOVA revealed the highest mean score was achieved by students who had been involved in the ‘elective’ university model,

- Tukey (HSD) showed a statistically significant difference (p < 0.006) between the ‘elective’ (offering guided practice) and ‘no formal OR ed’ (non-guided practice) models of university education, again illustrating the difference between guided and non-guided practice,

- ANOVA comparing the pattern mix of education revealed that the three highest mean scores were achieved by participants who were involved in pattern mixes that involved guided practical operating suite experience,

- Kruskal-Wallis revealed a statistically significant difference (p < 0.001) when comparing pattern mix and participant score and the Mann-Whitney Mu showed that this was between ‘theory and guided practice’ and ‘nothing’,

- ANOVA, Pearson product-moment correlation and a linear regression model revealed statistically significant differences in time and score.

Graphed results of each individual qualitative multiple choice question appear as Appendix 13.

7.2.5 Qualitative and transformation merged analysis - transferable skills learned in the operating suite

The second part of Research Question Two inquired about transferable skills learned in the operating suite. A skill may be defined as ‘a type of work which requires special knowledge and training’ (Collins Australian Dictionary 2006, p. 784).
Participants were asked if they learned any skills that were transferable to the surgical ward setting, thus assisting in their nursing care outside the operating suite. In an attempt to provide a full representation of the entire cohort, only one qualitative comment per participant will be presented in these findings. All qualitative responses to the question on transferable skills appear as Appendix 14.

Figure 7.5 – Bar graph showing participants’ responses about transferable skills

Of the participants who had experienced operating room experience (n = 271), 84 per cent (n = 228) stated they had learned skills that were transferable to areas of practice outside the operating suite. Eight per cent (n = 23) felt that no learning had occurred whilst five per cent (n = 13) were unsure. 20 per cent (n = 68) of all participants (n = 332) did not answer this question. It may be worth noting that 61 of these participants (55 from ‘nothing’ and six from ‘theory’ groups) had not spent any time in the operating theatre and so did not answer this question. This was confirmed by participants stating that the time in hours spent in theatre was zero and by qualitative comments. A further five participants had four hours or less so may not have had enough time in the operating suite to comment.

In addition to providing a list of transferable skills, this qualitative data has made explicit the conceptual, procedural, dispositional, (Billet 2001) and strategic knowledge (Gott 1988; Mezirow 1991) achieved by undergraduate nurses in the workplace. This deeper level of understanding and insight, articulated by all participants who gained transferable skills and knowledge via practical experience.
in the operating room, will aid in providing a higher quality surgical nursing care. Some examples follow:

Conceptual knowledge includes information, facts, propositions, concepts and assertions related to workplace knowledge (Billett 2001). Examples of conceptual knowledge can be seen in comments from participants such as:

66 “Most definitely. Sterility is so important and working in the operating suite just highlighted its importance. Understanding preventative measures such as warming up to prevent hypothermia were extremely beneficial for insight”

Procedural knowledge may be defined as the knowledge we use to act, which encompasses skills, techniques and the ability to secure goals within the working environment (Billett 2001). This was seen when discussing pre- and post-operative care:

1 “Yes, why we perform the practices we do pre and post-op”

Dispositional knowledge describes manners, work ethic, values, attitudes and a particular identity associated with work practice (Billett 2001). An example of this was:

38 “Yes, in regards to team work and time management”

Strategic knowledge may be defined as how to do what and when (Smith 2003) and was seen in the following comment:

135 “Yes I feel my clinical judgement has been helped & I feel more confident at looking the patient to guide my nursing interventions, not just using machines”

Many of the 61 participants who had no theatre experience made comments suggesting they would have liked the opportunity to visit the operating suite. Participant comments (preceded by the participant number) included:

13 “Limited places in this course & I did not get one of them”
82 “No places, I did not spend any time in the suite”
The question regarding transferable skills gave participants the opportunity to simply answer yes or no, without listing any learned skills, however the option to comment was available for those who had more time. Many participants chose to list just one transferable skill they learned whilst others listed more than one. All the transferable skills reported by participants will be presented in these findings. If an individual skill or set of skills surrounding the same topic was reported ten times or more it was classified as an individual theme. Less frequently reported skills or ones that did not fit into the eight main topics were presented under ‘skills not so easily classified’.

Although all listed transferable skills learned would support pre- and post-operative nursing care, some participants listed ‘pre- and post-operative nursing care’ as a transferable skill in its own right, therefore it was listed as an individual theme. The transferable skill areas reported by participants’ included nine themes and were:

- pre- and post operative care,
- pain management,
- anatomy & physiology,
- what the patient goes through,
- surgical procedures,
- patient education,
- asepsis,
- technical skills and patient assessment,
- other skills not so easily classified.

Table 7.9 shows the individual number of times skills were reported by participants. Percentages of responses have also been provided to give a feel for not only ‘which’ skills were learned but how ‘regularly’ participants listed them. The percentages were taken from the number of students who had been involved in any type of operating room experience (n = 271).
Transferable skills learned via operating room experience | Number of participant responses & the Percentage of those with theatre experience (n=271) who chose that skill
---|---
Pre- & post operative care | 60 responses | 22.1% |
Pain | 32 responses | 11.8% |
Anatomy & Physiology | 30 responses | 11.1% |
What the patient goes through | 29 responses | 10.7% |
Surgical Procedures | 20 responses | 7.4% |
Patient Education | 17 responses | 6.3% |
Asepsis | 16 responses | 5.9% |
Technical skills & patient assessment | 10 responses | 3.7% |
Other skills not so easily classified | 9 responses | 3.3% |

Table 7.9 - Descriptive table of transferable skills

Qualitative comments will be presented under the nine listed groups of skills.

- **Pre- & post-operative care**

The most frequently noted response to the question on transferable skills surrounded an entire set of skills in ‘pre- and post-operative nursing care’.

Qualitative comments on pre- and post-operative care included:

9. "It was invaluable in gaining a better insight to post-operative care of patients & their needs"

90 "It made what you do on the ward make so much more sense. Certainly it gave me a rationale for certain drugs and policies of the ward. Complemented the theory excellently”

155 “Yes by being able to see procedures done helped to provide better care to patients on the surgical ward”

156 “Yes, I questioned myself about getting patients up too early. I understand more clearly the state & reason for their illness”

315 “Yes by watching the procedure it allowed me to understand why it is important to do observations and all post-op care”

Participants revealed that following the ability to observe patient surgery they had a greater understanding of the entire surgical process, which included pre-operative care, operative care and post-operative care. The addition of the middle piece of the surgical journey, namely the surgical procedure, provided insight, deeper understanding and rationale for care and a belief that their nursing care was enhanced by the experience.
• **Pain management**

Pain and its management was the single largest individual skill reported by undergraduate nurses. Comments included:

58  “Yes, I learned why patients may be so sore because I watched their procedures so I have more of an understanding of what they were going through. It also gave me the skills to prepare them for theatre procedures”

72. “Yes as I was able to understand fully what the patient has gone through and this allowed my support as a nurse to improve my trust in believing the patient and their pain improved”.

138 “Yes, I now understand why the patients are in pain or why they are on the pathways for care”

164 “Yes, helped on surgical wards knowing what actually happens in operations, why they are in so much pain”

283 “Yes, in regards to pain management, understanding why there is so much pain”

314 “Yes, it’s beneficial to our nursing to see what happens and what the patient goes through in the theatre so we can understand and address issues such as pain post operatively”

Participants reported that, following observation of surgical procedures, they had gained insight into why patients had pain, were more ready to believe the patient’s estimation of their pain, and gained understanding of pain management skills. Participant’s comments suggest that prior to operating theatre experience undergraduate nurses did not possess a true understanding of why patients had pain post-operatively or what the patient may have experienced whilst in the operating suite. One participant articulated that seeing surgery enabled a greater trust in believing the patient actually had pain. The sentiment of distrust in acute pain management is not uncommon; recent research confirms this by reporting that nurses underestimate patients’ acute post-operative pain and that this is a major contributor to poor pain management on the surgical wards (Hartog et al. 2010).

• **Anatomy and physiology**

Participants reported that the ability to see the actual anatomy in real life assisted many students in their learning. Comments included:
“Yes, understand anatomy and understand why patients have so much pain and require specific nursing care”

“It helped me understand a little more about the anatomy”

“Yes, greater understanding of anatomy, anaesthetics, how certain operations are performed”

“Yes an enhanced understanding of anatomy & physiology”

“Yes because you can better understand anatomy and physiology and appreciate pain and complications patients may have”

Textbook anatomy is a one-dimensional view and even anatomical models are built to perfect scale. The visualisation of anatomy on ‘real’ patients who may be thin or obese differs considerably from textbook anatomy. Participants reported that seeing surgery added a deeper understanding of anatomy and associated physiology. Visualisation of anatomy at the time of surgery also assists in post-operative care as it allows the nurse to see first-hand where the operation site and possible associated drainage tubes actually are. It also aids in understanding that the operative site may sit under a muscle layer, so may cause significant muscle soreness related to muscle retraction for surgical access.

- **What the patient goes through**

It was interesting that the term ‘what the patient goes through’ was stated by 29 participants as a learned skill and this was reported by participants from all six universities. Comments included:

“It provided insight into what a patient goes through during a procedure and how it takes its toll on the body – this enhances my understanding and increased my knowledge in post-op care in the wards”

“Definitely - gain a better understanding of patient & what they are going through – affects the care you give on the ward”

“Yes I am able to understand what the patient goes through before they return to the ward and am better able to make decisions based on their OT experience and treatment”

“Yes it was very interesting. I think it is good to realise what the patient goes through when they return to the ward” (comment from answering question 1)

The term ‘what the patient goes through’ relates to an understanding of the entire procedure, including not just the operation, but the insertion of monitoring lines,
how the patient goes to sleep, how they wake up and what position they are placed in for the procedure. It is also important as it can translate to empathy for the patient. Participants reported that a deeper understanding of the surgical process that the patients are exposed to, and the associated empathy that stems from this knowledge enabled them to provide more understanding and caring nursing care.

- **Surgical Procedures**

Participants found seeing the actual procedure gave them a further insight into patient care. Comments included:

6  “Yes, a better understanding of procedures, pain and recovery patients may experience post-operatively”

23  “Yes, more insight into procedures and care needed”

48  “It has been interesting and gives a greater idea of the procedures and what sort of pain or areas of pain for the person”

65  “Yes, as I understand more about the physical procedures and therefore the care they need”

86  “Yes ++. Insight into the procedures, pre- & post-op care. All information acquired specific to nursing care. Intra-op not retained on reflection. Spent time in day procedure unit as a RN Div2 but limited again. Conflict as where info was learned & skills”

Seeing actual surgical procedures allowed participants to visualise the incisions sites as these generally remain covered in the post-operative phase to prevent infection. It provided an educational link to pain management and post-operative nursing care.

- **Patient Education**

The ability to provide accurate patient education both pre- and post-operatively following operating room experience was stated by undergraduate participants. Comments included:

41  “I have an understanding of what happens and helps to answer questions from the patient and family”

63  “I felt more confident in explaining procedures to patients in the ward both pre--op and post-op. More aware of what they had been through”

109  “Sure particularly with post-op care & client education”

172  “Yes, being able to explain procedure & protocol to patients on the surgical ward prior to surgery”
Accurate patient education is an essential process in pre- and post-operative nursing care and recent studies report that information has not kept pace with modern surgery (Boughton & Halliday 2009). Participants reported that following observation of surgery they had a deeper understanding and greater confidence in their knowledge and ability to answer questions and provide education. For many years fears have been raised by health professionals regarding the ability of surgical ward nurses to provide accurate and up to date pre- and post-operative patient education without having formally been exposed to the surgical process (Brenner 2000; Davidhizar, Dowd & Bowen 1998; Fox 1998; Long, George & Gulledge 1995; Mitchell 2000, 2011b; O'Reilly 2001; Sherwood et al. 2003; Walker 1998). Participant comments reveal that theatre experience does enhance the ability to provide more accurate patient education.

- **Aseptic technique**

Asepsis is a term used to describe a sterile area or environment and literally means ‘without infection’, implying that there is an absence of micro-organisms. ‘Aseptic technique’ is the practical methods applied to ensure asepsis in an operating suite. Comments included:

- 12 “Yes, sterile technique, nursing knowledge & understanding what actually happens in the operating suite. Assists with understanding what the patients have been through, if working in other hospital wards i.e. surgical”

- 116 “Aseptic technique, putting sterile gloves on would be the two skills that stand out that will help with nursing outside theatre”

- 299 “Yes, aseptic technique was enhanced and really showed me why infection control is so important”

- 313 “Yes, definitely in relation to asepsis/ infection control plus it is great to know what particular procedures involve and wounds - made me mindful of infections”

Without effective aseptic technique post-operative wound infections occur. The prevention of patient infections (infection control) is paramount in post-operative care. Post-operative wound infections account for almost 40 per cent of surgical
patient adverse outcomes (Zegers et al. 2011) revealing the importance of good aseptic technique and regular hand washing on the surgical wards. Participants reported that the skill of providing aseptic technique and a greater understanding of preventing infection was learned via operating suite experience.

- **Technical skills and patient assessment**

Skills in managing complex technical equipment and subsequent assessment of the patient in relation to the data provided from monitoring are vital to safe patient care. Participants stated that operating suite experience assisted them in understanding these concepts. Comments included:

- "Yes, assessment & monitoring skills"
- "The skills learned in PACU e.g. Patient assessment, I will definitely take with me"
- "Yes, definitely – particularly in relation to anatomy and physiology, monitoring & assessment skills"
- "Yes, assessment, fluids, airway management and pain management"
- "I found physical assessment much easier & positioning patients"

Complex patient monitoring equipment has previously only been available in critical care areas such as Accident and Emergency, Intensive Care and Post Anaesthetic Care Units; however, in recent times monitoring systems are being introduced into acute surgical wards (Jeskey et al. 2011). Participants stated that not only did they gain an understanding of monitoring but, perhaps even more importantly, a subsequent understanding of assessment skills to interpret the data provided by the monitoring. This knowledge will be new to the surgical ward areas and can be transferred from the operating suite.

- **Skills not so easily classified**

Knowledge and skills reported to be learned via operating suite experience that did not fall into the eight main skills groups made up the ninth theme and were referred to as ‘skills not so easily classified’. Comments included:

- "Yes, in regards to team work and time management"
- "Yes, broadens my horizons"
- "Yes airway management is a vital skill for any nurse to master"
“Yes, I enjoyed being part of the team observing the various procedures & the interaction with surgeons & nurse” (response to question 1)

“Yes, really enjoyed the tight teamwork”

In this group participants reported that their nursing horizons had been broadened, they had learned much about teamwork and were better able to link theory to practice. Airway management (assessment of breathing and where necessary the instigation of assistance by use of medical devices and or oxygen therapy) was also mentioned.

- **General comments**

Many participants did not list any specific skills but made the following general comments:

“Absolutely. Being aware of what happens in theatre is very useful in caring for patients in all areas of nursing”

“Definitely, the skills learnt could be transferred to ward nursing & caring for patients in any nursing environment”

“Yes, it focused on the technical skills of nursing and therefore benefits nursing practice”

“Yes, I am a visual learner, so being able to see what happens assisted all my learning greatly”

Participants describe how operating room experience provided skills and knowledge that would support all areas of nursing, not simply the surgical wards. These comments are understandable as operating theatre experience offers areas of learning that are required in all nursing care.

- **Non-specific learning**

Of the participants’ who answered ‘no’ to learning any transferable skills, many went on to provide examples of learning that had actually occurred. Comments included:

“Hope, well – vital signs and assessments and certain drugs given by the anaesthetist were applicable to nursing outside the suite but that’s all”

“Not really – maybe more understanding of recovery for certain patients”
133 “Not particularly, more than anything, you understand why patients are in a lot of pain when they return to the ward”

182 “I did not really use skills I gained outside operating suite but the knowledge helped in understanding what happens during operations’

305 “Not really (i.e. scrubbing in) but things like anaesthetic nursing helps with basic nursing”

Of the 23 participants who answered ‘no’ to learning in the operating suite, ten gave examples of skills and knowledge they had learned. One possible hypothesis may be that the students who had not experienced, or only experienced minimal surgical ward nursing at the time of their theatre placement may not have had the ability to fully appreciate their learning at the time of data collection.

7.3 Phase 2 - Undergraduate nursing students’ qualitative data analysis and transformation merged analysis answering Research Question Three

In answering Research Question Three which asked how the different models of education might impact on recruitment and retention of nurses to this specialist area, recruitment of new nurses was first addressed by asking participants if they had enjoyed their time in the operating suite and why. The second part of Research Question Three asked participants if they would consider working in this specialty area after graduation. Retention of nurses within the operating suite involves the ability to retain staff already working in the field. This issue was specifically addressed via a focus group of experienced operating room nurses educators.

7.3.1 Qualitative and transformed merged analysis of students’ response to enjoyment in the operating suite

Figure 7.6 is a graph revealing that 68 per cent (n=225), of all participants’ (n=332) stated they enjoyed their time in the operating suite, seven per cent (n=22) did not enjoy the experience, four per cent (n=14) had mixed feelings, one per cent (n=2) were unsure whilst 21 per cent (n=69) of participants did not answer. It is again worth noting that of the 69 who did not respond 61 participants
did not spend any time in the operating room and did not answer this question. Of the participants who did experience an operating room practicum (n=271), 83 per cent (n=226) enjoyed the experience. A full list of student comments on enjoyment appears as Appendix 15.

![Bar chart showing enjoyment in the operating suite](image)

**Figure 7.6 – Enjoyment in the operating suite**

A further comparison was made between enjoyment (or lack thereof) and participants from the two different major types of practical experience, namely guided operating room experience (n=160) and non-guided operating room experience (n=172). Previous comparisons have revealed that participants with guided learning achieved a higher score when tested on areas of pre- and post-operative nursing care. This comparison was made to assess if the clinical guidance offered to the guided group had any impact on participant satisfaction of the clinical placement.

Figure 7.7 is a graph showing the comparison between enjoyment and guided practice versus non-guided practice experience and illustrates that more students from guided learning enjoyed their practical experience.
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Figure 7.7 - Enjoyment and guided versus non-guided practice

Within the two groups percentages of enjoyment have been calculated. 90 per cent (n=144 of 160) of guided group participants’ and 47 per cent (n=81 of 172) of the non-guided group enjoyed their experience. Of those who did not enjoy operating room experience there were five per cent (n=8) from the guided group and nine per cent (n=15) of the non-guided group. Four per cent (n=7) of both groups were unsure about their feelings whilst one per cent (n=1) of the guided and 40 per cent (n=68) of the non-guided group chose not to answer the question.

- **Guided learners who enjoyed their practical experience in the operating suite**

Qualitative comments from participants from guided learning confirm their enjoyment and comments included:

55  “I very much enjoyed it because I knew what I was looking at/doing”

67  “Yes, enjoyed a lot. Great people, great experiences”

149 “Very much! I’ve worked in the environment before so such felt comfortable I liked the professionalism, the teamwork, and the in-ward direct care”

180 “Yes, loved it”

187 “Yes, I had already done surgical ward placements & it was interesting to find out why patients’ presented the way they did”
Undergraduate nursing students from the guided learning group had participated in pre-learning. For some participants knowing what to expect when they arrived in theatre and a prior understating of operating room nursing facilitated their enjoyment by putting theory into practice.

- **Guided learners who did not enjoy their practical experience in the operating suite**

Qualitative comments from participants from non-guided learning who did not enjoy theatre included:

```
68   "No because I missed the patient contact, being able to speak with them"
160  "No because my mentor wasn’t very supportive”
163  "No not enough proactive teaching from the staff & also a different mentor each shift”
292  "Sort of the clinical facilitator was not interested in giving us learning opportunities in theatre and would put us in the library to research about theatre suite instead”
170  "No the environment does not allow the patient nurse contact as the patient is usually under anaesthetic / recovering from. I would prefer an area that allows me to talk to my patients”
202  "No- was no patient contact, not my sort of thing”
211  "No, not enough or no patient one to one communication”
290  "No, there was a lot of bitching & very little teaching. We were just expected to watch!”
```

Of the guided group who did not enjoy the experience, two themes emerged. Participants who were not provided with a supportive clinical learning environment stated this was a reason why they did not enjoy the experience. Although their university had arranged for them to be provided with a ‘guided’
practical experience, participants’ comments reveal that this did not occur for all students.

The second theme surrounded the inability to talk to patients whilst they were under heavy sedation or fully anaesthetised. Operating room nursing is not for everyone and it was pleasing to see that many participants missed the close patient dialogue that occurs between a nurse and their patient in the ward setting.

- **Non-guided learners who enjoyed their practical experience in the operating suite**

In the non-guided group, 47 per cent of participants enjoyed their experience in the operating room. Comments included:

10  “Yes interesting to see a different specialty of nursing”

25  “I found theatre to be extremely informative – the medical teams were passionate and were always willing to explain the procedures as well as encouraging additional questions. As a student I was only allowed to observe particularly at a private hospital. Although this was interesting participation would have allowed for another dimension in the learning process”

47  “Enjoyed it very much because I was able to scrub in and have hands on experience. Doctors and nurses were very keen to educate me”

256 “Yes it was a specialty day I choose. I loved being in all the action and I am usually on the surgical ward so I found it interesting to see the whole process by following it. Interesting to see the whole process followed the patient from start to finish”

272 “Yes it was very different from normal medical / surgical. I liked the fast paced quick change over of patients and watching procedures”

291 “Yes, because I got to interact with both the patient and staff during the procedure, ie scrubbed & gowned instead of just watching”

Many of the non-guided participants who enjoyed the experience stated that their learning was guided, discussing how the medical teams answered questions or that they got to participant.
Non-guided learners who did enjoy their practical experience in the operating suite

There were nine per cent of non-guided learners who did not enjoy their practical experience. Comment included:

“No, I hated & cried after the first day. I think it was more the staff in there & I got yelled at and spoken to horribly and I had absolutely no knowledge of what to do because no one taught me”

“No, I found them to be very clicky & felt that they were not prepared to give me any responsibility”

“No, it was interesting but just stood there for 5 hours”

“No, it became boring quickly because we could be of no assistance and we had to ‘stand’ in a corner. Would see more on T.V”

“No, was not able to be involved much so experience gained was very limited”

“No, Boring – didn’t do anything but watch!”

“No; too hot, had no idea of what was going on. Staff didn’t know I was there”

The absence of a supportive clinical learning environment, either because participants were spoken to in an inappropriate or impolite fashion or poor clinical support formed the two reasons why participants from non-guided learning did not enjoy the operating suite. As these participants had no pre-learning they were not able to participate thus had a mainly observational experience.

Limited time in the operating suite

Participant comments answering the questions on enjoyment or transferable skills in the operating suite included remarks regarding no time or limited time in operating suite.

Comments included:

“Yes, thought very brief, it gave me a good understanding of anatomy which could not have been obtained through a book”.

“Some. I only spent 8 hours in the operating suite. However, I found that I would like to have some more time in theatre” (response to question 2)

“Yes but too short”

“Yes only had 3 days in theatre” (response to question 2)

“Yes I did but so much to take in such a short time”
7.3.2 Qualitative analysis and transformed analysis of students’ response to future employment in the operating suite

The final research question asked undergraduate participants if they would consider working in the operating theatre after their graduation.

![Future desire to work in the operating suite](image)

**Figure 7.8 – Future desire to work in the operating suite**

Findings revealed that 47 per cent (n=156 of 332) of all participants and 58 per cent (156 of 271) of those who experienced a practical placement in the operating theatre would consider returning to theatre after graduation.

Comments from participants’ seeking immediate employment in theatre included:

56  “Yes I have applied for it as part of my GNP and hope to do further study in the field in the future”

59  “Definitely I loved every moment of the placement and after I complete my graduate year I am looking to move into this area”

236 “Yes, it is one of the only areas I’d consider working in”

239 “Yes have applied for new grad rotation in OT”

288 “Yes yes yes yes yes”

294 “Yes for sure”

Many participants wished to return to theatre soon after graduation, however many stated that they would prefer to consolidate their nursing and would consider theatre nursing later in their career. The data is informative as retention
figures are usually taken after the graduate nurse year, thus overlooking nurses who return to theatre later in their careers.

Comments from participants who may wish to return to theatre later included:

6  “Yes I would but not in the first 2 years after graduation”
108 “Yes, maybe following grad year”
212 “Yes in later years – not now though”
279 “Yes, most definitely (after I built up my skills base)”
283 “Yes but not for a few years – I want general ward experience first”
296 “Yes, after a few years of basic training experience”

To provide a more complete analysis of Research Question Three, it was necessary to make a further comparison between the two different major types of practical experience, namely guided operating room experience (n=160) and non-guided operating room experience (n=172). The purpose of this comparison was to assess if there was a correlation between these models of education and the number of participants who considered future employment in the operating suite (recruitment).

Figure 7.9 – Future employment and guided versus non-guided practice
Figure 7.9 shows that participants who were provided with guided practical experience in the operating suite were more likely to consider operating room nursing as a career, revealing that guided practice does play a part in recruitment of nurses to this specialist area. When we look at all participants (n=332) we see that of those who answered ‘yes’ to the question on future employment, 30 per cent (n=101) came from the guided group and 16.6 per cent (n=55) from the non-guided group. Findings showed that 63 per cent (n=101 of 160) of participants from the guided group and 32 per cent (n=55 of 172) of the non-guided group answered ‘yes’ to possible future employment in the operating suite. Within the whole cohort (n=332), of those who answered ‘no’, 11 per cent (n=38) came from the guided group, 15 per cent (n=50) came from the non-guided group, five per cent (n=17) of both groups were unsure, and one per cent (n=4) of the guided group and 15 per cent (n=50) of the non-guided group did not answer the question.

7.3.3 Qualitative analysis on retention of nurses to the operating suite provided by experienced operating room nurses

A focus group of 20 experienced operating room educators was held to provide external validation of qualitative findings of the research. During this focus group, participants reported connections between the different models of education that undergraduate nurses visiting their operating suites were exposed to, and the subsequent effects the different models played on the operating room workforce that impacted on retention of staff. As this was an unexpected finding from the October focus group, a second focus group was convened in February 2011 with 22 experienced operating room educators to explore this issue independently in greater depth.

Discussion surrounded the stressors of the staff when non-guided students visit the operating suite. The operating theatre environment is foreign to outsiders and so visitors are unable to enter without an escort. All participants stated a fear of unprepared visitors accidentally causing possible harm to patients by contaminating sterile instruments. Participants related stories of this occurrence. Operating theatre educators appreciated students who had prior learning before
coming to theatre as this made their job easier and allowed the students to participate in patient care. Students who had prior knowledge on how to scrub (5 minute hand wash prior to gowning) had the opportunity to participate by assisting the surgeon under the close guidance of an experienced operating room nurse. Other students generally only have an observation experience as there is not the time to individually teach each visitor the scrubbing process.

Focus group participants’ were sent a follow-up email asking for their comments in writing on subjects that were raised at the focus group.

Responses included:

Participant 1:

I currently work with students who do not undertake a Perioperative subject. They are unprepared so I need to put in time before they are ready. I brief them as a group (an hour presentation and discussion) prior to taking them into theatre and stay with each student as they ‘follow a patient through’. I can only take one student through at a time and it is time consuming, and seriously limits the numbers but from a safety perspective it is easier (as there is the potential for them to faint, contaminate the sterile field, etc). The majority of the students are studying a double degree which precludes electives”.

Participant 2:

I’ve been pondering our discussion & your query. Not sure how this would fit in with how we do things here. There are no long-term students that are not prepared and guided. We no longer have students that are not prepared; it was too difficult for staff. We have Undergraduates with a Clinical Specialist Nurse (CSN), Post Grads with their own Clinical Co-ordinator, Medical students supervised by medicos, and all other visitors are received and guided by our CSN’s. So I think this means we refuse anyone that is not prepared and booked in. We have a Visitors Policy that states the requirements and expectations, and the LEAST we accept is visitors on a week’s notice. They have to be booked in by the Nurse Unit Managers or the CSNs, to ensure that there are not too many people (for asepsis), and that there will be somebody to receive them ensuring they will not contaminate our sterile field.

Participant 3:

Unprepared students are a huge stressor to our staff and a reason why we have lost staff. This is certainly the comments we hear from our undergraduate educators who have students from one university (unprepared with no unit offered), compared to another where students are offered a formal subject. All students are offered the same level of support when they arrive at our operating suite – but those from universities that offer a specialty unit need less and flourish quickly. As you would also be aware, another common problem is that nursing
staff don’t feel it is in their job description to supervise students, and that all the responsibility should lie with the educator. Of course we know that this is not true, but have a read of the scanned letter to the editor from the Nursing Review – I think this expresses many nurses’ thoughts.

(Nursing review article was discussed in Chapter Three, page 19)

7.3.4 Summary of qualitative findings

In summary the qualitative analyses revealed:

- transformed merged analysis showed that of the participants who had experienced operating room experience (n = 271), 84 per cent (n = 228) stated they had learned skills that were transferable to areas of practice outside the operating suite,
- nine themes of knowledge and skills that were identified as transferable to areas outside the operating suite included pre- and post-operative care, pain management, anatomy and physiology, what the patient goes through, surgical procedures, patient education, asepsis, technical skills and patient assessment and other skills not so easily classified,
- qualitative data made explicit the conceptual, procedural, dispositional, (Billet 2001) and strategic knowledge (Gott 1988; Mezirow 1991) achieved by undergraduate nurses in the workplace,
- transformed merged analysis exploring enjoyment showed that of the participants who did experience an operating room practicum (n = 271), 83 per cent (n = 226) enjoyed the experience,
- transformed merged analysis also revealed a significant difference in enjoyment between guided and non-guided learners, 90 per cent (n = 144 of 160) of guided group participants’ and 47 per cent (n = 81 of 172) of the non-guided group enjoyed their experience,
- for guided learners, the most common reason for not enjoying their practical experience in the operating suite was because their learning was not guided, conversely, the most common reason non-guided learners enjoyed the operating suite was because their experience was guided,
CHAPTER 7: RESEARCH FINDINGS

- recruitment of new staff to operating room nursing was also linked to the provision of guided learning as transformed merged analysis showed that 63 per cent (n=101 of 160) of participants from the guided group and 32 per cent (n=55 of 172) from the non-guided group answered ‘yes’ to possible future employment in the operating suite,
- qualitative data from staff who provide the guided learning for undergraduate nurses in the workplace stated a fear of unprepared visitors accidentally causing possible harm to patients by contaminating sterile instruments and appreciated students who had prior learning before coming to theatre as this made their job easier and allowed the students to participate in patient care.

7.4 Phase 3 – Curriculum co-ordinators qualitative data findings

Curriculum co-ordinators from four of the six universities who participated in the research consented to be interviewed to allow deeper understanding of the setting up and running of their model of education. Their responses follow:

7.4.1 University no. 2

Question 1 What were the driving forces that led to the development of this perioperative model of education offered at your university?

Initially the hospital curriculum really was transported into higher education sector in a similar form. When perioperative nursing was removed from the undergraduate curriculum, we were fortunate at this university to have a champion; someone who was very passionate about perioperative nursing and who argued hard for the introduction of this elective subject. The argument was based on the grounds that if undergraduate nurses were not exposed to perioperative nursing they would be unlikely to choose to work there.

Question 2 Was any resistance encountered whilst setting up this model and if so, what strategies were you able to employ to facilitate the success of the project?

This model has been in place for many years, and I did not originally set it up, however I would like to discuss some current strategies I am employing to try and ensure the perioperative elective’s continued success. I attend as many special interest group meetings as possible, and present at as many conferences and seminars as I possibly can. At each one I remind attendees that undergraduate
nurses are our future and they must be nurtured. If students are treated well, they may consider a future Perioperative nursing career. (In support of this argument, more than twenty per cent of students studying at my university in postgraduate perioperative nursing courses have successfully completed the undergraduate perioperative nursing elective).

Question 3 How many years has the model been running and what feedback have you received from your students and the participating hospital staff?

The model has been running for 13 years. We are affiliated with many hospitals in metro, rural and regional areas of our state and some interstate hospitals now take our students for clinical placements. The feedback from the students is fantastic. Also, staff at hospitals report that the students are very well prepared for their clinical placement, which makes their work easier.

Question 4 Do you envisage any changes to your style of perioperative education and if so why?

I regularly review the student’s Workbook and Readings to ensure the information is current. I also carefully assess the student’s exam responses and notify the Workshop facilitators if I feel that additional emphasis should be placed on a particular practice, etc. I also review student feedback closely and implement improvements where possible. For example, the students requested an online version of their Perioperative Workbook as ‘Word’ document instead of a hardcopy. As an elective subject, this unit is not offered to all students. It is very popular and there is often a waiting list for enrolment and many miss out. From 2009, we conducted the Perioperative Nursing elective over Trimester 3, (Summer School), which will enable more students to study this unit. Electives are not available for students who are studying a double degree. It would be great if all students could gain an insight into Perioperative nursing and care of the patient undergoing surgery. Perioperative Educators coordinate preceptored clinical Perioperative placements, to ensure each student is welcomed and has the opportunity to experience a broad and interesting overview of Perioperative nursing and patient care. ‘Generation Y’ seem so assertive; they just say what they think; they are always asking questions and trying to clarify and learn. They need nurturing... many older nurses often say “we were thrown in the deep end, why do these students require so much fuss?” I advise them that the older style approach was stressful, but we knew no other way. The Gen Y students pay for their education, and they expect some nurturing and assistance. I strongly believe that a welcoming, professional and caring environment is the best way to recruit young nurses to the operating suite.

7.4.2 University no. 4

Question 1 What were the driving forces that led to the development of this perioperative model of education offered at your university?

I think it was really because of there was a body of the perioperative nurses here at this university and it was felt that the scope within the perioperative on-line
elective subject that could perhaps be used in other areas within nursing. And in some ways it was thought to be like a generic unit. Things like; preparing a sterile field; patient advocacy, all that sort of thing and patient positioning in the operating theatre. Just to make them aware if they choose not to go into perioperative nursing when they are working in the wards they would have a better understanding of what their patient encounters.

Question 2 Was any resistance encountered whilst setting up this model and if so, what strategies were you able to employ to facilitate the success of the project?

Prior to the on-line subject, there were some elective such as Palliative Care and Breast care, and there was a fairly strong push to say that this was more suited to all students. We were fortunate to have two champions to push for perioperative nursing. Unfortunately we are losing the battle now because next year is the last year that this unit will be offered.

Question 3 How many years has the model been running and what feedback have you received from your students and the participating hospital staff?

It has been running for four years now, this is its fourth year, and the operating room staff tell us that the students who secure a placement in the operating room who have done the electives have a much nicer experience because they go in having had some underpinning knowledge. This helps them understand what is actually going on and the specific roles of the perioperative nurses. They understand about the sterility and what to touch and what not to touch. They get a lot more out of it instead of simply standing up against a wall as the have some understanding and can participate.

Question 4 Do you envisage any changes to your style of perioperative education and if so why?

Unfortunately it appears that this subject will be discontinued after 2010. There is a possibility that it may be incorporated into the acute subject in 2011.

7.4.3 University no. 5

Question 1 What were the driving forces that led to the development of this perioperative model of education offered at your university?

Our university commenced the undergraduate program in 2004 and when I came on board in 2006 the third years that we were getting for registration were the first students to be offered this unit. Our head of school at that time sat me down and said this is the unit and these are the objectives for the unit and could you please write it. The unit had not been run before so I worked under my head of school’s direction. I was given overall aims for the unit and then probably about eight specifics for the unit. I just designed it from there. So the operating room
component of the unit was never difficult because I was a theatre nurse. The other parts of the unit were more difficult because it was looking at ICU and a big learning curve but the theatre very easy for me. So the driving forces lead to the perioperative model development was my head of school.

Question 2 *Was any resistance encountered whilst setting up this model and if so, what strategies were you able to employ to facilitate the success of the project?*

The only resistance, the risk of resistance wasn’t in the teaching of it, for every three hour lecture there was a need for a three hour labs, and the lab technicians were absolutely gorgeous to set up opportunity for us to use the lab. Because we didn’t have a clinical laboratory at the time we went to the operating theatres, the local operating theatres to scrub and then we thought them how to glove and gown back in our classrooms but we utilised materials, we utilised our own policies as a guide for the actual techniques that we were learning in theatre. The only resistance was that there was that there were only 30 clinical placements. As the unit was only commenced in 2006 we had problems setting up clinical placements as the local hospitals were already committed to other local universities, so, they would give use one place, to sort of try us out I think. It was quite difficult and what we found we had to look at country places for a lot of students to try and get them experience. We did this because it was in 2 two week blocks we would often ask the country places for a combined theatre, ED practicum for the four weeks because in a lot of country hospitals might not run there operating theatres every day and with visiting consultants coming up they might two days of theatre or three days of theatre. So the students for the four weeks, instead of doing ten days of theatre and ten days in emergency in blocks they would do three days in theatre then two days in ED and then the next week they would alter until the had ten days in each area. So that was the most difficult time of getting the students placement. Now we have the most wonderful reputation and the larger teaching hospitals give us blocks for eight or ten students so a lot easier to get that practical.

Question 3 *How many years has the model been running and what feedback have you received from your students and the participating hospital staff?*

The model commenced in 2006 this is the fourth year group of students coming through. We are now quite organised now that we are having students going through regularly. The feedback has all been good. The students love the unit. As to the hospital feedback, I had on my desk yesterday one of the clinical nurse supervisor’s, supervising the students out on practicum sent me the program from that hospital, and it was fabulous. So the students are being cared for by the staff development nurses in the theatre as well as supported by our clinical nurses at that hospital. So it is working out well for the students and for the hospitals as far as I know.

Question 4 *Do you envisage any changes to your style of perioperative education and if so why?*
Our curriculum has had quite a change this year to align it with the university policies and also with the professional accreditation standards and we are moving this unit into the first semester of third year so this will now be a semester five subject. To accommodate the practicum in that semester break so instead of the two full week practicums it is going to change to one three week practicum. And that is in response to industry not so much in theatre but in intensive care, they say it is a lot of work to orientate students in intensive care for only a two week practicum. But it will be relevant to theatre as well I would imagine. Instead of going towards two week practicums’s now it will be one elective practicum and it will be for three weeks, so there will be less students getting the theatre experience that I am not impressed about at all, but that those that are there are going to get three weeks now which will be great, but I am disappointed. From a unit coordinator perspective an over worked heavy academic load and everything else I am just thinking instead of having to find our cohort of around 70 students, two places which is 140 places, I have to find 70 students, 70 places.

7.4.4 University no. 9

Question 1 What were the driving forces that led to the development of this perioperative model of education offered at your university?

The unit was developed when I started at the university initially it was a lecture format and I think they did a little bit of a tour. The unit has developed from this time. There is pre-learning workshops and the students go to hospitals to do this. We allocate them and they do this on a weekend because it is much easier, getting hold of a theatre, is brilliant stuff. That is compulsory, we open trays, playing around in groups of 20 as one theatre is very small so every one get to touch and feel the instruments etc.. and the students are prepared for their practicum.

Question 2 Was any resistance encountered whilst setting up this model and if so, what strategies were you able to employ to facilitate the success of the project?

There is trouble getting clinical placement. But I don’t know how to get around that really but we face it every year. I think that we just have to think of other ways of how we get them in.

Question 3 How many years has the model been running and what feedback have you received from your students and the participating hospital staff?

This particular model that I use has been running since 2006 but it was running as a compulsory unit for 6 years. There has been very positive feedback from the students and hospital staff as the students are prepared for the OR.

Question 4 Do you envisage any changes to your style of perioperative education and if so why?
In 2008 when the students participated in the study they did not all get a practical placement in the theatre but now in 2009 more students are getting a clinical placement. OK, that is a bit of a change, so I suppose what they would really want to do would be everyone would like to get a placement in the operating room and for 3 weeks ideally. That is wonderful.

7.4.5 **Summary of curriculum co-ordinators’ comments**

In all four universities specific undergraduate operating room nursing courses were commenced because there was a staff member to champion operating room nursing and who led the team to either continue the subject (at the time when the initial curriculum was changing) or recommence the subject where it had been lost. In most cases the subjects had been running for some time when the co-ordinators commenced however they again mentioned that having a ‘champion’ of perioperative nursing assisted in setting up the unit. The main barrier encountered by co-ordinators was difficulty or ability to secure enough practical clinical places for their students.

Specific operating room nursing models had been running from between four to 14 years. Curriculum co-ordinators reported very positive feedback from the students. They also stated that they have had very positive feedback from operating room nursing staff who provided guidance to students by supervising them during their practical experience in the operating suite. Staff appreciated that the students had had preparation stating that this makes their work easier and provides a richer experience for the students. These sentiments echoed those made during the focus group of experienced operating room educators discussing the impact of different university models and retention of operating room staff. Operating room educators stated that their staff appreciated students who had prior learning and were prepared for the operating suite environment, and went on to report the stressors of supervising students with no preparation.

When discussing possible changes to their units, curriculum co-ordinators would have all liked to have more clinical places for their students. Many units are reviewed regularly to ensure they are up to date. Unfortunately one unit has been
discontinued since the collection of data for this thesis despite its reported popularity with student and staff. This particular unit was the only one of its kind in Australia and statistical analysis revealed that students who participated in this model achieved the second highest scores from participating universities.

7.5 Phase 4 - Follow-up study - Nurses completing their Graduate nurse year - quantitative data analysis.

The final phase of the research employed the same statistical analysis seen in Question One, however, rather than comparing guided and non-guided practice in final semester undergraduates, this comparison looks at guided and non-guided practice in nurses after their first year of practice and following a Graduate Nurse Program.

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Table 7.10 – Group statistics on graduate nurses

This table reveals a total of 89 graduate nurses participated in the follow-up study, with 39 in the guided practice experience group and 50 in the non-guided practical experience group. A Levene’s test for the homogeneity of variance was performed revealing that the groups were not significantly different to each other (p value >0.05).

The t-test analysis revealed a p value of p <0.001. From these findings the conclusion is drawn that there is a statistically significant difference in the knowledge levels between the two groups (t = 5.958; p < 0.001), namely guided and non-guided practical experience. On this basis it is concluded that graduate nurses following their graduate nurse year program who have been exposed to guided operating suite experience as an undergraduate or graduate nurse have
achieved a higher score on the questionnaire (testing knowledge regarding surgical ward nursing).

### 7.5.1 Pass/Fail

In line with comparisons made on the undergraduate cohort, further pass/fail comparisons were made using a t-test analysis. Results revealed a statistical significance ($t = 6.461, p < 0.0001$). The pass mark was ten out of twenty.

![Pie chart of percentages from pass fail t-test analysis on graduate nurses from guided and non-guided learning](image)

Several hypotheses will be presented in the Discussion chapter of this thesis as to the possible reasons for the increase in score in the guided group and the decrease in score in the non-guided group.

### 7.6 Summary

This chapter has presented findings from qualitative, quantitative and transformed merged analysis analyses from undergraduate nurses’ knowledge and experiences in the operating suite. Full summaries of both quantitative and qualitative findings have been provided at the end of their section. It has also presented qualitative findings from curriculum co-ordinators whose students were tested in Phase 2 and quantitative findings from knowledge testing of nurses following their graduate nurse year.
Perhaps the biggest disservice to the educational preparation of nurses occurred when educators removed the perioperative rotation from the curricula of undergraduate nurses (Stobinski cited in Martin 2011, p. 377)

Introduction

The findings presented in this research have shown that valuable learning does stem from guided operating suite experience and that knowledge gained during this practical experience is well suited to support surgical ward nursing. Findings have also revealed that valuable transferable skills are learned whilst in the operating suite, indicating that this area is one of rich learning for all undergraduate nurses. It has also been shown that guided practical operating suite experience supports recruitment of new staff and retention of existing operating room nurses.

Discussion will be presented under the three research questions posed, within the following headings and sub-headings.

8.1 Research Question One - Guided versus non-guided practice
  8.1.1 Phase 2 - Undergraduate nurses
  8.1.2 Phase 4 – Follow up study - Graduate nurses

8.2 Research Question Two – Undergraduate nursing operating suite experience
  8.2.1 Different models of operating room nursing experience offered to undergraduate nurses in Australia
  8.2.2 Time spent in the operating suite
  8.2.3 Transferable skills

8.3 Research Question Three – Recruitment and retention of operating room nurses
8.3.1 Impact of the different education models on recruitment of nurses to the operating suite

8.3.2 Impact of the different education models on retention of nurses working in the operating suite

8.4 Phase 3 - Discussion from curriculum co-ordinators on their specific models of education

8.5 Summary

8.1 Research Question 1 - Guided versus non-guided practice

The first research question asked if undergraduate nurses needed guided practical operating suite experience in order to achieve skills and knowledge that supported a high standard of nursing care outside the theatre domain, namely in the pre- and post-operative surgical wards. Findings from this research conducted nationally in Australia support previous research findings from Touzeau (2005) conducted in one Australian state, and Sigsby and Yarandi (2004) conducted in one university in America, suggesting that there is great value in operating room experience in the educational development of surgical ward nursing skills. This research differs from its predecessors by its national status, its participants being from different universities, and the direct comparison of students who were exposed to guided practical operating room experience as opposed to those who were exposed to non-guided practical operating room experience or no experience at all.

8.1.1 Phase 2 - Undergraduate nurses

Sigsby and Yarandi (2004) showed that students who had been exposed to a program of guided learning in the operating suite achieved higher test scores on surgical patient care than those who had a guided learning experience in the medical and surgical wards. Findings from this thesis research corroborate Sigsby and Yarandi’s findings supporting the merits of guided operating room experience, revealing via t-test analysis that students with guided experience showed a higher and statistically significant difference in knowledge about surgical nursing than students with non-guided or no practical operating room experience. Finding from this research have also shown that undergraduate nurses
learn more about surgical ward nursing via guided operating room nursing experience than from practical experience on the surgical wards alone.

Billett (2001) and Smith and Sadler-Smith (2006) suggest that the most significant basis for workplace learning is the provision of access to guidance from more experienced others. The lack of this may well also inhibit the opportunity to learn (Billett 2001). The findings from this research support these beliefs as participants from the guided practical experience group, who were provided with experienced operating room nurses guiding their learning whilst on clinical placement, achieved statistically significant higher test scores than those who had a non-guided learning experience in the operating suite.

When operating room nursing was removed from the core curricula, it was replaced with the follow-through style of learning. The follow-through style is where student nurses working in the surgical wards follow their patient to the operating suite, watch their surgery and recovery and return to the ward to care for their patient. The ability of students to leave the ward area and follow their patient through the surgical process often depends on the encouragement of the supervising staff on the surgical ward. As these visits tend to be ad hoc and operating suite staff have no ability to pre-plan or allocate specific nursing staff to provide guided supervision for these learners, their learning is non-guided. The non-guided participants achieved statistically significant lower test scores than those from the guided group, supporting comment by Clark, Kirschner and Sweller (2012, p. 7) who stated that ‘there is overwhelming evidence that, for everyone but experts, partial guidance during instruction is less effective than full guidance’. Further evidence in support of guided learning is seen when looking at the pass/fail comparison in percentage terms, which shows a pass rate of 76 per cent for the participants who were exposed to guided practical experience and 56 per cent for participants from the non-guided practical experience group.

The differences between guided and non-guided groups can be further understood when considering non-guided practical experience for undergraduate nurses in relation to the cognitive load theory. Kirschner et al. (2006) argue strongly in
favour of guided instruction, arguing that an important problem with unguided or minimally guided experience lies in its incompatibility with the manner in which our cognitive structures are organised, referred to as ‘human cognitive architecture’. They suggest that the understanding of long term memory function has altered significantly in the past twenty years and rather than being seen as a passive repository of discrete fragments of knowledge being stored for later use, it is now viewed as a central, dominant structure of human cognition critically influencing all we see and do (Kirschner, Sweller & Clark 2006). The follow-through style of practical experience for undergraduate nurses may only have interest value, remembering novice learners like these are of particular concern, as the heavy demands that free exploration of complex new environments place on working memory may in fact be detrimental to learning (Clark, Kirschner & Sweller 2012; Kirschner, Sweller & Clark 2006). Without educational schema, the working memory is working hard to absorb its new surroundings and information is not transferred from the short to the long term memory (Kirschner, Sweller & Clark 2006).

Educational theorists who have studied learning at work reject the notion that learning that has taken place in an educational institution is inherently superior to that which occurs in the workplace (Billett 2001; Buckley & Caple 2004; Fuller & Unwin 2005) and suggest that each should be valued in its own right and appreciated for its own specific contribution to knowledge acquisition (Buckley & Caple 2004). Findings from this research support this notion by showing that workplace learning, in the form of guided practical operating room experience, can provide an excellent vehicle for acquisition of surgical knowledge. In discussing learning at work, Billett (2001, p. 68) revealed that ‘just doing it’ (everyday work), observing more experienced workers performing their tasks and the guidance provided by other workers were all salient to gaining knowledge. McGarvey (2004) also supported this argument stating that the majority of learning in operating room nursing takes place in the clinical environment whilst working in the operating suite. The lower results achieved by non-guided learners are not surprising when reviewing literature supporting guided practical experience in the workplace (Billett 2006; Smith & Sadler-Smith 2006) and in
particular the need for direct guidance to assist novice learners (Clark, Kirschner & Sweller 2012).

For students learning in the workplace, the need for goals/objectives and competency standards to ensure learners understand what they need to achieve is considered essential (Billett 2001; Buckley & Caple 2004; Smith & Sadler-Smith 2006). Students involved in non-guided learning do not have objectives for learning, thus may not know what information needs to be gleaned from the clinical area. Compounding these issues is the lack of specific competency standards for surgical ward nursing. When reviewing the list of nursing competency standards compiled by Barralough (2002), it becomes clear that ‘specific’ practice standards are developed in conjunction with the formation of specific special interest groups within nursing, for example critical care nurses, day surgery nurses, diabetes nurses, perioperative nurses and so on. The generalist areas of nursing such as surgical and medical nursing rely on the broad-based Australian Nursing and Midwifery Councils ‘National Competency Standards for the Registered Nurse’. If specific standards for surgical ward nursing were available and were accessible to all nursing students, they could be accessed by undergraduate nurses in the absence of educational material provided in a formal placement arranged by their university.

Adding to the unsettling results of this research revealing surgical nursing knowledge deficits is the fact that surgical ward nursing has been found to be the most popular career choice of new nursing graduates (Happell 1999, 2000, 2002; Mott 2012; Stevens & Dulhunty 1992; Stevens & Dulhunty 1994). New graduate nurses have been shown to migrate into areas where they have had the most experience as students, namely the medical and surgical wards (Mott 2012). This ties in with findings from Happell (2002) who suggested that, upon graduation, student nurses gravitate to areas that are familiar. Findings from this research also support this theory, informing us that 63 per cent of undergraduate nurses who had a formal clinical placement in the operating suite stated that they would consider future employment in this specialty; whereas only 32 per cent of
participants who did not have a formal clinical placement considered the operating suite as a viable employment option.

The popularity of medical and surgical ward nursing has made universities even more reticent to include operating room nursing in their undergraduate curricula (Mott 2012). Given the obvious deficits in surgical nursing knowledge revealed through this research, it seems more important than ever to reassess this thinking and re-address methods for acquisition of surgical knowledge in the undergraduate nursing curricula.

8.1.2 Phase 4 – Follow up study - graduate nurses

Stobinski (2008) stated that relevant competency is not present on completion of undergraduate nursing courses. Whilst students in healthcare can gain knowledge about various competencies during their pre-service education, skills related to competencies are further advanced during practical on-the-job work (Kak & Cooper cited in Stobinski 2008). This idea is not confined to Stobinski as there is also a belief amongst nursing academics that there may be some gaps in student knowledge following graduation (Professor Marie Botti, personal communication at colloquium process, 22 February 2008). It was also suggested that if knowledge deficits were noted after nurses had completed their post-graduate year it would reveal a more significant problem and be of greater concern (Professor Marie Botti, personal communication at colloquium process, 22 February 2008). To specifically explore this assumption, Phase 4 of this research was developed to re-test nurses’ knowledge on surgical ward nursing at the completion of their Graduate Nurse Year Program.

Phase 4 of this research has shown that deficits in surgical ward nursing still exist after a Graduate Nurse Program when guided operating room experience was not provided as an undergraduate or graduate nurse. Data collected from participants following their Graduate Nurse Program revealed via a t-test analysis that statistically significant higher test scores were achieved by graduate nurses who had been exposed to guided operating suite experience (as an undergraduate or graduate), as opposed to nurses who had not been exposed to any guided
operating suite experience. In parallel to analyses performed on the undergraduate cohort, a further t-test analysis was performed on comparison of pass/fail between the two groups and was statistically significant. When we look at the pass/fail comparison in percentage terms we find a pass rate of 100 per cent for the guided practical experience group and 53 per cent for the non-guided practical experience group. This revealed that 47 per cent of participants from the non-guided group who had completed their Graduate Nurse Program and first year of nursing practice were still significantly deficient in surgical nursing knowledge. Casey et al. (2004) suggested that the Graduate Nurse Program closes the gap between a novice nurse and a safe and competent practitioner. This may be the case in medical nursing knowledge, however findings from this research would seriously question this assumption in regards to surgical nursing knowledge. Not only is this a three per cent decrease in pass rate from the previous year, but once new nurses have completed their Graduate Nurse Program there are few opportunities for further education in surgical ward nursing, lessening the chance of these deficits being rectified.

The increase in pass rate in the guided practice group from 76 per cent at the completion of undergraduate education to 100 per cent at the completion of the Graduate Nurse Program can be possibly explained in two ways. Firstly, students who have gained knowledge as undergraduates have had the opportunity to consolidate this knowledge as graduate nurses, thus increasing their score. These results are encouraging as they show that guided practice as an undergraduate plus consolidation in a Graduate Nurse Program led to a 100 per cent pass rate at the graduate level. This can be further understood when observing Benner’s (1982) model for the development of expertise. Graduate nurses having moved from the novice level to the advanced beginner level, are more experienced and able learners than when they were undergraduates. Rittle-Johnson (2006) stated that the novice group of learners does not have well organised knowledge structures or schema to assist learning, so knowledge acquisition is limited. On the other hand, the graduate group would have had the opportunity to develop a more complex schema surrounding surgical nursing as discussed by Paas & Sweller (2012), thus aiding their learning process. These combined factors appear to have rectified the
44 per cent deficit seen at the undergraduate level. The second reason for an increase in pass rates is that nurses who have had guided operating room experience as graduate nurses, would have been involved in a longer, more structured three or four month clinical rotation which would have provided more knowledge than an undergraduate placement.

The decrease in scores in the non-guided group from undergraduate to graduate nurses may be because the second cohort differed slightly from the first. Participants in the original Phase 2 cohort all came from universities that offered a specific operating room nursing subject, whereas the second cohort was made up of some participants from the original group plus new participants from universities with no formal program. As discussed in the method chapter of this thesis, it was suspected at the design stage of Phase 4 that it may be difficult to find and re-engage with the same group of participants who were tested as undergraduates. To rectify this potential problem, and gain sufficient numbers of graduate nurses for Phase 4, a wider net was cast and nurses at exactly the same level of education as the initial cohort were also invited to join the Phase 4 cohort. In the original cohort, even if some students did not enrol in the operating room subject, there was the ability to learn from other students who had been exposed to guided operating suite experience during group study sessions and classroom discussions. Student to student learning can be understood when reviewing comments from Billett (2001) who stated that learning is informal, ongoing and unavoidable and that we could no more shun learning as we could shun breathing. This thinking is supported by Smith and Sadler-Smith (2006, p. 134) who suggested that learning is ‘as much an informal and unplanned process as it is a planned process’.

Although the discussions by Billett and Smith and Sadler-Smith surrounded learning in the workplace, informal learning would also occur between adult university students who had studied together informally or during classroom sessions. This was not the case for graduates who only joined the Phase 4 cohort, as they were from universities that had no formal operating room subject and so had no access to students who had guided operating room experience, preventing
informal learning from their peers. Also these graduates only had access to the follow-through style of observation, which has been shown in this research to yield poor knowledge results. It is hypothesised that these combined factors may have contributed to the lower scores in the unguided graduate cohort.

8.2 Research Question 2 – Undergraduate nursing operating suite experience

Research Question 2 inquired about the different models of operating suite education offered to Australian undergraduate nursing students and also inquired about which of these models yielded the best educational outcomes. It also asked if there were any transferable skills acquired from operating suite experience that may assist nurses in their pre- and post-operative surgical nursing care.

8.2.1 Different models of operating room nursing experience offered to undergraduate nurses in Australia

The term ‘model of education’ refers to the overriding design and delivery of the subject whereas the ‘pattern mix’ of operating room education refers to the actual different teaching/learning opportunities that were incorporated within the model. Included in the pattern mixes were combinations of operating room nursing theory, guided practical workplace experience, non-guided practical workplace experience, and extra practical experience.

Whilst statistical analyses were performed on the different models of education, the overwhelming variable in knowledge acquisition appeared in the comparisons of pattern mix as opposed to comparisons of the models. This was the availability of guided operating suite practical experience, namely, observing surgical procedures in the operating suite with guidance from an experienced operating room nurse. These findings also support previously discussed literature by Billett (2001) and Smith and Sadler-Smith (2006) supporting the value of guidance by experienced staff in the workplace. They also support discussion by Smith (2003) that knowledge acquisition and concept development are in part dependent on access to a more expert other.
In comparison of pattern mixes, statistical analyses using the non-parametric Kruskal-Wallis test and post hoc Mann-Whitney U test showed a statistically significant difference between ‘theory & guided practice’ and ‘nothing’. Interestingly, whilst not statistically significant, a trend was noted where the highest mean scores were achieved by students who were involved in guided practical operating suite experience, namely ‘theory, guided practice and extra experience’, ‘theory and guided practice’ and ‘guided practice’. The four lower scores were achieved by participants from non-guided practice groups ‘theory and non-guided practice’, ‘non-guided practice’, ‘theory’ and ‘nothing’. This advantage of guidance in the workplace supports discussion by Smith (2003) who reported that in order for a worker to move reliably beyond the procedural level there is likely to be a requirement for more resources than simple training manuals which do not allow knowledge exploration through human questioning and discussion.

When observing the different learning opportunities in the pattern mix of education offered to undergraduate nurses in operating room experience, it is clear that participants who were provided with some pre-learning prior to clinical placements and guided practical operating room experience scored higher than other participants. Pre-learning in the novice group also facilitates the formation of well-organised knowledge structures, or schema, in a domain that assists the coordination of information in the working memory (Rittle-Johnson 2006), thus aiding learning in the workplace environment.

In three of the six participating universities it was possible for students to have had theoretical classes on operating room nursing and surgical procedures without any practical operating theatre exposure. This provided the ‘theory’ pattern mix group. It was of note that the mean score of the ‘theory’ group offered little benefit over ‘nothing’. These findings support the belief that learning of surgical nursing skills and knowledge are achieved via guided practical workplace experience. These ideas reiterate those of Billet (2001) who suggested that much of the learning that occurs over our working lives will have been gained in the workplace.
8.2.2 Time spent in the operating suite

The overall findings from the correlation between time in the operating suite and participant score showed a statistically significant relationship revealing that time in the operating suite is advantageous to score. This supports findings from Touzeau (2005) who found that there was a positive correlation between increased time spent in the operating suite and increased score. Subsequent analysis from this research indicated that time was advantageous in all participants up to about 40 - 60 hours and then seemed to plateau further indicating that there may be diminishing return on effort after about 60 hours for undergraduate nurses.

The progression of knowledge as a consequence of time can also be understood when we look at the adaptation of the Dreyfus model ‘From Novice to Expert Knowledge’, as presented in Chapter Four. Learners pass through stages of learning congruent with their level of experience. Guided operating room nursing placements organised by individual universities are undertaken in the second or third year of education. At this point the nursing students are at the ‘novice’ level and have had minimal acute clinical nursing experience, and have not had the opportunity to consolidate their learning with a Graduate Nurse Year. This novice level of learner would only have minimal schema development (Clark, Kirschner & Sweller 2012).

Whilst the findings on pass rates in the non-guided group did deteriorate from the undergraduate to graduate cohorts, the mean overall score in both guided and non-guided graduate nurses was higher. In the undergraduate guided cohort the mean score was 11.0 and non-guided was 9.9. The graduate nurses’ mean score for the guided cohort was 13.5 and non-guided was 10.5. Graduate nurses would be classified at the ‘advanced’ or ‘competent learner’ level, able to absorb more knowledge thus increasing means scores across all cohorts. In developing the multiple-choice quantitative assessment tool it was important to guarantee that questions posed tested information and knowledge that could be learned via operating theatre experience. A trial was conducted with volunteer operating room nurses whose experience ranged from one to ten years in the operating suite. The mean score for this cohort was 18.5 confirming the assumption that knowledge on
surgical ward nursing care can be learned in the operating suite. This group would be defined as ‘proficient’ or ‘expert learners’, reflected in their ability to achieve the highest scores.

Collectively, these findings tell us that time and score plateau in the undergraduate group at around 40 to 60 hours. However with further practical experience in a more experienced nurse, where consolidation of undergraduate knowledge and greater schema development has occurred, surgical knowledge increases with time.

8.2.3 Transferable skills

Since the beginning of the removal of operating room nursing from the core curricula, concerns had been voiced about deterioration of surgical nursing skills if undergraduate nurses did not have any experience in the operating suite (Callaghan 2011; Jongeneel 2002; Mitchell 2011a, 2011b; Mott 2012; Peters & Frazer 1999). These concerns included patient education, pre- and post-operative surgical nursing care, aseptic technique, and pain management. To test these concerns, the quantitative assessment tool multiple choice questions for this research were constructed around these four areas of concern. Participants of this research were also asked if they had learned any transferable skills via operating suite experience that would assist them in areas of nursing outside the operating suite. Eight main themes of learning were identified in the findings of this research. Knowledge and skills that did not fall into the eight main themes were referred to as ‘skills not so easily classified’, which made up the ninth theme. In this category participants stated that teamwork, observing a different type of nursing, management of a patient’s airway and breathing, and a broadening of their horizons were achieved.

This qualitative data has also made explicit the conceptual, procedural, dispositional, (Billet 2001) and strategic knowledge (Gott 1988; Mezirow 1991) achieved by undergraduate nurses in the workplace. A deeper level of understanding and insight was articulated by participants who gained transferable skills and knowledge via practical experience in the operating room and this will
support a higher standard of nursing care in the pre- and post-operative surgical wards.

Girard (2004) suggested that university faculty members should be made aware that knowledge and skills required for general nursing can be learned through operating suite experience. Data from the undergraduate cohort who had operating suite experience support this fact, with 84 per cent of undergraduate nurses stating that they had learned skills that were transferable to areas of practice outside the operating suite. These findings also support previous researchers who have also informed us that many skills learned in the operating room are transferable and are of great benefit to nursing disciplines outside the operating suite (Sigsby & Yarandi 2004; Touzeau 2005).

The eight themes of transferable learning included pre- and post-operative care, pain, anatomy and physiology, what the patient goes through, surgical procedures, patient education, asepsis and technical skills and assessment. These will be presented under the four areas of concern noted in surgical nursing knowledge.

- **Patient Education**

  Research over thirty years has shown that anxiety is a major issue for patients about to undergo surgery, with a lack of information being cited as a contributing factor (Mitchell 2000). Accurate patient education is an essential process in pre- and post-operative nursing care and recent studies report that appropriate patient information has not kept pace with modern surgery (Boughton & Halliday 2009). This result is not unexpected when we again review findings from this research, informing us that 28 per cent of participants had five hours or less of exposure to surgery and only half were exposed to a guided learning experience. It would be very difficult for nurses to provide accurate information to their patients about their impending surgery or expected post-operative care when they have had little or no exposure to the operative process. Participants reported that following observation of surgery in the operating suite they had a better understanding of what happened to their patient and would then be better able to answer questions about the procedure from the patient or their family. They also gained confidence in the ability to provide more accurate information as there was an increased
knowledge and understanding of the different procedures. Participants also reported a greater understanding and knowledge of anatomy and physiology, and seeing actual surgical procedures acted as an adjunct to other learned skills such as pain management, post-operative complications and accurate patient education.

Following surgery, patients return to the surgical ward with their surgical incision site covered by a sealed wound dressing. When a nurse accepts a patient in the post anaesthetic care unit (referred to by operating room nurses as the PACU) which is housed in the operating suite, a report or ‘handover’ is given by the anaesthetist regarding the anaesthetic the patient has received, and a second report is generally given by an operating room nurse who was involved in the surgical procedure about the operation, incision type, associated drain tubes and the type of dressing used. When participants worked in the PACU they were able to hear and absorb this information. In the ward area, it is preferred that this dressing is left intact until just before the patient is discharged from hospital. This is to prevent the introduction of bacteria, which are unable to penetrate the dressing. Witnessing the surgery and participating in PACU care allows the nurse to know where each incision is for each particular procedure and also allows accurate answering of patient questions about the surgical site, facilitating appropriate pre-and post-operative patient education.

- **Pre- and post-operative surgical nursing care**

Consensus surrounding adverse surgical events is that they constitute a serious problem, annually killing more people than breast cancer or AIDS (de Vries et al. 2008). Zegers et al (2011) found that 3.6 per cent of surgical admissions (representing 65 per cent of all adverse events) had suffered complications, and of those 41 per cent were considered preventable through appropriate training and quality assurance measures (Zegers et al. 2011). When caring for a patient post-operatively the patient is recovering from both a surgical intervention and an anaesthetic intervention. With these interventions come a myriad of possible complications, which nurses need to understand. With understanding comes the ability for early recognition and treatment, which may prevent poor outcomes in patient care. It is not uncommon for patients to deteriorate during the recovery phase in the PACU, and in fact, detection of deterioration and taking corrective
measures (as often occurs in respirations and blood pressure) are the purpose of this specialised room (Drain & Odom-Forren 2008). For this reason the ratio of nurses to patients is high (one-to-one nursing until the patient is stable). The vulnerability of patients post-operatively was first noted in the 1940s when it was realised that patients first recovered from anaesthesia, not the surgery, and that it was essential to provide a room close to the theatre where the patient could be cared for by nurses, to reduce the deaths from respiratory failure immediately after surgery (American Society of Peri-Anesthesia Nurses 2012). The ability to observe and assist experienced nurses who are making patient assessments and dealing with deteriorating patients in a controlled environment and learning when to summon urgent assistance is vital in providing skills for undergraduate nurses to recognise similar situations in patient deterioration later in the surgical wards.

This was confirmed by participants of this research who stated that they learned about the importance of taking and how to interpret patient observations in the PACU. Most serious patient consequences occur when patients deteriorate without senior medical staff being notified and so early warning systems have now been implemented; however, the effectiveness of these systems depends on the ability of surgical ward nurses of ‘monitoring and recognising the patients’ condition, including taking interpretive vital signs and making the clinical decision to activate the medical emergency team’ (Liaw et al. 2011, p. 297).

Another important skill participants stated they learned was the ability to more accurately make an overall assessment of the general condition of their patient. This is vital in knowing when an alteration in patient observations, such as is often seen in blood pressure, heartbeat or breathing can become a life threatening event. Participant comments also confirmed that learning when patients are deteriorating and when to call for help were achieved via PACU experience, stating they had learned much about post-operative patient care in regards to patient assessment skills, the importance of taking patient observations, and being aware of possible post-operative complications.

Complex patient monitoring equipment has previously only been available in critical care areas such as Accident and Emergency, Intensive Care and PACU,
however in recent times monitoring systems have been introduced into acute surgical wards (Jeskey et al. 2011). However, simply relying on automated technology to monitor vital signs without a deep understanding of information provided can lead to nurses failing to spot signs of deterioration in the patient (Lomas & West 2009b). Participants stated that they gained an understanding of monitoring and an integrated understanding of patient assessment skills during operating suite experience, allowing them to accurately interpret the data provided by the monitoring. This knowledge will be new to surgical ward areas and can be transferred from guided operating suite experience.

- **Asepsis**

Aseptic technique is easy to understand in the operating suite as it is very black and white. When nurses are able to grasp the concept of asepsis in black and white terms, it is then easier, on return to the ward setting, to establish the levels of grey which occur in a less ‘clean’ environment (Touzeau 2005). Post-operative wound infections accounted for almost 40 per cent of adverse surgical patient outcomes (Zegers et al. 2011), revealing the importance of good aseptic technique and regular hand washing on the surgical wards. This research has provided further insight into this, revealing that participants who had operating room experience learned about aseptic technique, the importance of infection control and methods to achieve this. If nurses have never experienced operating room nursing and have never been exposed to an aseptic technique being performed by experts, there is a fear that these nurses may not develop an appropriate aseptic technique.

- **Pain management**

The most frequent individual topic and set of skills that participants stated learning via operating room experience surrounded acute post-operative pain management. Experiencing post-operative pain has been found to be the most common fear for surgical patients prior to their operation (Samaraee et al. 2010). This fear is not surprising and sadly not unrealistic. When reviewing current research into this serious problem we find that, despite an increasing focus on pain management leading to the development of national and international standards and firm recommendations for provision of analgesic medications (Hartog et al. 2010), post-operative pain still continues to be undermanaged (Hartog et al. 2010;
Many hospitals in Australia have introduced Acute Pain Services (APS) made up of specialised doctors and nurses to manage post-operative pain (Hartog et al. 2010) yet pain relief in post-operative patients still remains suboptimal (Samaraee et al. 2010).

The introduction of acute pain services, and their specialised staff, have assisted in providing advice and education to medical and nursing staff but these services are generally offered during business hours. When these specialised staff are not present, acute post-operative pain management becomes the responsibility of the surgical ward nurses. Whilst these nurses do not order analgesic medications, they play a major role in patients’ post-operative pain management because it is the nursing staff who are responsible for administering the medications. Doctors order several different types of analgesic medication for the nurses to give to their patients during the post-operative period. This allows the nurses to assess the level of pain and provide the appropriate medication, however despite this it has been shown that in many cases the ‘nurses do not administer the pain relief’ (Bell 2000, p. 66). Generally the decision on what pain relief to administer would be driven by more senior nursing staff on the ward. It has been found that whilst the nurses had the theoretical knowledge surrounding pain management, they seemed to lack the ability to transfer this knowledge into their nursing care (Samaraee et al. 2010). Suggested reasons for this were that their knowledge was superficial or was not well integrated into their practice (Samaraee et al. 2010). Participants from this research have articulated that actually seeing surgery helps link the theory learned at university to the actual patient they are caring for.

Another problem in acute pain management is that nurses follow the habitual culture of the ward rather than reflecting on their own new knowledge and understanding (Samaraee et al. 2010). Traditionally, as undergraduate nurses rotated through the operating suite, they provided a great educational resource by discussing new procedures and techniques with more experienced staff on return to the ward area (Lunday, Winter & Batchelor 1999). These discussions would have included pain caused by different surgical techniques. This research has informed us that 18.3 per cent of participants had no operating room experience, a
further 9.7 per cent had 5 hours of less, and only half the participants’ were involved in guided operating room experience. With these low participation rates of practical operating suite experience, this ‘passing on of knowledge’ now seldom occurs. Also remembering that it has been 25 years since all nurses were involved in operating room experience as undergraduates, the reality is that many senior nurses working on surgical wards may not have witnessed modern surgery and so would not have deeper knowledge of pain caused by specific surgical procedures. Participants stated that actually seeing and participating in the surgical process enabled them to develop a deeper understanding of the pain patients’ suffered post-operatively.

As discussed in Appendix 12, laparoscopic surgery was initially marketed as being less painful post-operatively than conventional surgeries (Rothrock 2007). This may be true in the long term, but immediately after the operation it has been shown to often be very painful (Hartog et al. 2010). Patients return to the surgical ward with several small stab wounds as opposed to one large incision so it is not surprising that the nurses and doctors who have not witnessed the surgery underestimate pain following these procedures (Hartog et al. 2010). Many major surgical procedures are now performed using a laparoscope, such as ‘laparoscopic cholecystectomy’ (removal of the gall bladder), ‘laparoscopic assisted bowel resection’, and laparoscopic splenectomy (removal of the spleen), all of which are the same procedures as before, just via smaller incisions. One of the 20 multiple choice questions used to assess participants’ surgical knowledge concerned pain after laparoscopic surgery. This question asked about possible pain after a ‘diagnostic laparoscopic’ procedure. In a diagnostic procedure, surgeons are looking to diagnose a problem, usually pre-existing acute abdominal pain, so organs are moved around and probed looking for the causative factor. As a result, this procedure is often very painful post-operatively. Only 36 per cent of nurses who participated in this research considered this procedure may have been associated with moderate to severe pain, whereas 47 per cent of participants believed that because the patient only had two small incisions their pain would be minimal.
The findings from the research of Riva and Cherubini (2011, p. 265) revealed that when estimating patients’ pain, nurses were driven by ‘anchoring’ of their previous beliefs. This is where initial impressions override any relevant evidence that may be given by the patient, even if the patients’ ideas contradict their initial ideas (Riva et al. 2011). A Verbal Analogue Score (VAS) is an assessment of severity of pain, allowing nurses to gauge the patient’s pain level and choose the most appropriate analgesia for that patient at that time. Ene et al. (2008) showed similar findings to Riva and Cherubini, stating that 40 per cent of nurses did not use the VAS to assess pain requirements, and confirming that the nurses relied heavily on their own judgment of patients’ pain rather than actually asking the patients. Participants from this research stated that observing an actual patient having surgery gave them the ability to prevent this behaviour, suggesting it made it easier to believe the patient.

Following research into the conditions that influence nurses’ decisions to adopt evidence based pain management practices, Carlson (2010) suggested that further exploration was required into the large unexplained variance in nurses’ post-operative pain assessment. Could it be that until nurses see and experience surgery first hand, they do not have the ability to link theory to practice? Research findings from this thesis would support this idea, revealing that nurses learned two salient points in regard to the decision to provide pain relief. One was ‘why patients had pain’, and the second was ‘what the patient went through’. The answer to ‘why patients had pain’ seems intuitively obvious; however, the comment itself suggests that operating suite experience gave the participants a greater awareness of the connection between the patient and the patient’s pain. The latter phrase, ‘what the patient went through’, relates to greater empathy and an actual realisation of the patient’s position. The phrase ‘what the patient went through’ was most interesting as it is not a common expression and yet it was used by participants from different universities across Australia. Operating suite experience gave the undergraduate nurses the ability to understand more fully what had happened to their patient and inspired them to take corrective action for their patient. Participants stated that this understanding also affected the nursing care they gave their patient when they returned to the surgical ward.
What is also very interesting is that this realisation of ‘why patients had pain’ and ‘what the patient went through’ had only occurred following the opportunity to observe ‘real life’ surgery. It would be very unusual for these students not to have seen surgery on education videos, training documentaries or reality television, but this ‘light bulb moment’ only occurred when they were participants in a real life surgical situation.

Another major role of the PACU staff is to manage acute post-operative pain (Drain & Odom-Forren 2008). In this area specialised nurses use more intravenous narcotic medications than would be used on the ward areas as it is desirable to combat the pain quickly, and the intravenous route works faster than other medication routes such as intramuscular or oral. Ward nurses are reluctant in using intravenous narcotics (Bell 2000). In the PACU undergraduate nurses are exposed to this type of pain relief being administered by nurses who are confident in its delivery. Participants reported they learned much about acute pain management skills by working in the area. Undergraduate nurses stated that they learned how to assess pain and how to provide individualised appropriate treatment all by observing experienced post anaesthetic nurses perform their craft.

This research has shown that if undergraduate nurses do not witness surgical procedures in the operating suite, their skills in the area of acute pain management may be deficient and it is hypothesised that this may be a major contributing factor to the poor medication administration and management of acute post-operative pain on the surgical wards.

8.3 Research Question 3 - Recruitment and retention of operating room nurses

Research Question Three asked how the different models of operating room education that the participants were exposed to may impact on recruitment and retention of nurses within this specialist area. ‘Recruitment’ refers to the acquisition of new nurses to the operating suite, whereas ‘retention’ refers to the ability to retain experienced nurses who are already working in this field. There is an enormous amount of literature written on the topic of recruitment and
CHAPTER 8: DISCUSSION

retention, but most focuses on recruitment of new staff. A lesser amount of literature has been published on retention of staff, with discussion focusing on workload pressures relating to the staffing shortages in the profession. Pressures discussed include burnout from working in a short-staffed environment, and increased overtime and stressors from orientation of new hires (Allanson & Fulbrook 2010).

There was a clear gap in the literature in the comparison of the different learning models undergraduate nursing students had been involved in, and if these played a role in new nurses considering operating room nursing as a career. A second gap noted in the literature was the possible impact the different models of education students were exposed to may have had on the staff supervising these visiting students in the operating suite (as opposed to orientation of new staff). For this reason in this research these two issues have been divided and addressed independently from each other.

8.3.1 Impact of the different education models on recruitment of nurses to the operating suite

Since the move from hospital to university education, operating theatre clinical experience has been gradually phased out of most nursing schools’ curricula (Mott 2012) and a structured clinical rotation is rarely offered to undergraduates (Castelluccio 2012). Findings from phase 1 of this research have confirmed comments from both Mott and Castelluccio informing us that, of the 31 universities in Australia that offered undergraduate nursing degrees, 12 offered specific operating room nursing education as a specialty choice and only four universities provided this subject as a core subject where all students were enrolled.

Historically all undergraduate nurses visited the operating suite from between four to six weeks, however over time this subject has been removed from most undergraduate nursing curricula (Mott 2012). As exposure by undergraduate nurses to the operating suite decreased, so did the recruitment of new graduate nurses to this specialty area (Happell 1999, 2000, 2002; Stevens & Dulhunty...
1992; Stevens & Dulhunty 1994). The shortage of operating room nurses is now well chronicled (Head 2010; Messina, Ianniciello & Escallier 2011; Thompson 2007) with operating room nursing in Australia and overseas experiencing a staffing crisis (Bull & Fitzgerald 2004a; Trice, Brandvold & Bruno 2007). An area that had not previously been researched was in the exploration of the quality of the theatre experience student nurses had been exposed to and the impact that this variable may have on graduate nurses considering operating room nursing as a career. For this reason this was addressed in this research.

Qualitative data was collected from undergraduate nursing students nationally in Phase 2 of this research, where participants were asked if they had enjoyed their time in the operating suite and why, and if they would consider working in this specialty area after graduation. Findings regarding recruitment of nurses to the operating suite showed that 63 per cent of participants from the guided group and 32 per cent from the non-guided group answered yes to considering future employment in the operating suite. This data shows that participants who were provided with guided practical experience were more likely to consider operating room nursing as a career revealing that guided practice is a positive variable in recruitment of nurses to this specialist area. Rather than being contradictory to the findings of Happell and Stevens and Dulhunty regarding exposure to the operating room experience, findings from this research add valuable knowledge that not only exposure, but the quality of that exposure aids in recruitment of new staff. The number of participants who would consider future employment in the operating room are very encouraging, showing that if all undergraduate nurses were exposed to guided practical experience and 63 per cent of those nurses wished to return, the recruitment problems within this specialty would be solved.

Answers to the question related to enjoyment revealed that the operating suite was generally a popular clinical placement for undergraduate nurses. The variable that had the greatest impact on enjoyment was also not the model of education but the pattern mix. It surrounded the quality of the practical placement, specifically whether the participants experience was guided by a more experienced operating room nurse and whether the operating room staff were kind to the participants.
The comparison between enjoyment and guided practical versus non-guided practice illustrates that more students from the guided learning group enjoyed their practical experience. Of the guided group, 90 per cent of participants and 47 per cent of the non-guided group enjoyed their experience. Of those who did not enjoy operating room experience, five per cent came from the guided group and nine per cent from the non-guided group.

When mining more deeply into the reasons why students did or did not enjoy their practice placement in the operating suite, it was most interesting to note that the most common reason for participants from the guided learning group not enjoying their experience were those occasions when their experience was non-guided. In this situation there was an arrangement and an expectation from their university that the students would receive a guided learning experience, but – for reasons not uncovered in this research - this was not provided. One hypothesis may be that the operating suite was suffering staffing shortages and did not provide mentors, or that the mentors provided were not adequately chosen or trained for this role.

Participants from the guided group who did not enjoy the operating suite stated that their mentor was either not interested or supportive, that there was not enough proactive teaching, or that tension between staff members prevented any teaching and the students just stood and watched. In the complete reverse of this finding, non-guided students who enjoyed the experience often did because their experience was guided. Participants commented that they were able to participate by ‘scrubbing in’ with staff and enjoyed the staff interactions, stating that they were extremely informative and encouraged questions.

Another less common response as to why the guided participants did not enjoy the operating suite was that some participants missed the long-term contact that nurses have with their patients on the ward areas. This is an understandable rationale for not enjoying the experience. In operating room nursing the contact between patients and nurses is short-term, and if nurses prefer the longer contact, then those nurses would be best to choose nursing careers in the areas where longer contact can be fostered. Martin (2011) would suggest that this finding is a positive one, as it alerts nurses to the fact that this specialty is not for them. This
knowledge as an undergraduate prevents these nurses, as graduates, from choosing to accept a position in the operating suite and undergoing lengthy expensive orientation programs, only to realise later that this is not their niche in nursing.

One common denominator from both the guided and non-guided groups as to why they did not have a positive experience in the operating suite was when they were not able to be involved in the surgical procedure or patient care and simply had to observe. Of the six participating universities that offered specific operating room nursing subjects for their students, five offered pre-learning. For example, students who have had pre-learning would have been instructed on how to do a ‘surgical scrub’. This method of hand washing is specific, difficult to master and takes five minutes to complete effectively. If undergraduate nurses have mastered this procedure prior to coming to the operating suite, they are able to work with an experienced operating room nurse and assist the surgeon. When this has not occurred, time constraints and difficulty in mastering the task would prevent this.

In this scenario, the students’ experience is only observational. Participants’ comments confirmed this, stating that they would have liked to have participated more, that they just observed, that they had to stand in a corner for five hours and that they could have seen more on television.

The operating suite is a very foreign environment, even to other hospital staff (Castelluccio 2012), and sending undergraduate nurses with no pre-learning or preparation is in many cases setting them up for failure. This practice also portrays operating room nurses in a very poor light and possibly unfairly so. Unprepared undergraduate nurses do not understand the very strict rules of asepsis, and can easily, inadvertently contaminate surgical instruments, thereby risking patient safety. There is a specific distance that must be kept around a sterile set-up of instruments. If students get too close to the sterile set-up, all the experienced nurses would yell ‘stop’ or ‘don’t move’. In this scenario, the operating room nurses appear most unkind and students do not really understand what they have done wrong; simply explaining they were getting too close to a
sterile set-up may seem picky to someone who has no theoretic understanding of aseptic technique.

Post-operative surgical wound infections have been shown to increase patient mortality (Walsh, Greene & Kirshner 2011). Operating room nurses are very aware of this and take aseptic technique and possible breaches of sterility very seriously. Generally post-operative wound infections occur around the surgical incision site, however infections caused during the surgical procedure may involve an infection of the deeper tissues and may be very difficult to treat. Protecting the patient from such infections is one of the ways nurses in the operating suite act as patient advocates, always maintaining asepsis and sterility of the surgical field. When participants had not been afforded pre-learning, the experience was often detrimental to the student, to the operating room staff and to the reputation of this specialty area. Data from experienced operating room nurse educators in the focus group to discuss the different models of education also covered the previous scenario. Findings from this group revealed that some operating suites no longer accepted unprepared students as they have had incidents of breaches in aseptic technique where students accidently unsterilized surgical instruments, which put patients at serious risk of infection.

8.3.2 Impact of the different education models on retention of nurses working in the operating suite

The focus group of experienced operating room educators were asked if they had noted any possible issues or stressors between the different models or pattern mixes students were exposed to, and if these had any impact on their staff who were supervising the students. Many members of this cohort were from large metropolitan hospitals that accepted students from several different universities and so were in a good position to make this comparison. The focus group participants immediately divided the students into two groups, prepared and unprepared. Prepared students were defined by the group as students from universities who offered pre-learning and preparation before allowing the students to come to the operating suite. Unprepared students were defined as students who arrived with no preparation.
All participants of this focus group stated a fear of unprepared visitors accidentally causing possible harm to patients by contaminating sterile instruments, some relating stories of this occurrence. For this reason, some hospitals no longer accept unprepared students. The operating theatre educators appreciated students who had prior learning before coming to theatre as this made their job easier and allowed the students to participate in patient care. Participants stated that students who had prior knowledge on how to ‘scrub’ had the opportunity to participate by assisting the surgeon under the close guidance of an experienced operating room nurse, while other students generally only had an observation experience as there was not the time to individually teach each student the scrubbing process. These comments mirror findings from the undergraduate cohort. From an education perspective, participants stated that the students who had been prepared for their practical experience in the operating suite ‘need less and flourish quickly’. Experienced operating room educators from this focus group also stated that unprepared students were a great stressor to their staff and that this was a reason why experienced staff had chosen to leave operating room nursing. These findings support those of Young (2009) who suggested that the added pressure on staff when preceptoring students would need to be addressed or further staffing casualties would be seen.

This foreign environment can also act as a stressor for undergraduate nursing students (Castelluccio 2012). Several factors have been noted to cause anxiety for students visiting the operating suite which include fear of fainting or vomiting, fear of contaminating sterile instruments or inability to answer a question (Castelluccio 2012). As anxiety has been shown to be a potential barrier to learning, an effective way to lessen the anxiety of a clinical placement would be to prepare the students for the operating room environment before they arrive (Binding & Randell cited in Castelluccio 2012). Many of these students’ fears could be alleviated with pre-learning. Interestingly, students rarely faint because of seeing blood or surgery; fainting occurs because many visitors are nervous and do not eat breakfast prior to attending (Castelluccio 2012). Eating is a basic requirement of operating room nursing as a combination of altered oxygen levels (from wearing a face mask) and low blood sugars (from not eating regularly)
cause fainting. Vomiting is often in association with fainting. With understanding and appropriate preparation, students would not contaminate the surgical field and would not be so concerned about being asked difficult questions.

Clearly, participation in guided education provides the best educational results. Given the findings on time and score that tell us that there is an increase in knowledge as a result of increased time spent in the operating suite, it would be advisable that all undergraduate nursing students be encouraged to have as much operating room experience as possible. Certainly, whilst brief unguided visits to the operating suite do not support deeper knowledge, it is evident that the students do gain an overall picture of their surgical patients’ journey and this is supported by comments such as ‘what the patient went through’ and ‘why patients have pain’. This understanding may assist in providing more empathetic nursing care.

This is however in conflict with findings from the focus group of experienced operating room educators, who revealed that an emerging trend is not to accept unprepared students to the operating suite as they are a safety risk to the patient and a great stressor to staff. Non-guided participants would fall into the group of students who were unprepared, and their comments of dissatisfaction also support the educators’ findings. The findings from this research would also suggest that unprepared and unguided students do not learn adequately and often have a negative experience, so the value of the follow-through visits in its current form should be seriously questioned. In the next 20 years, the demand for operating room nurses will far outstrip our current rate of supply (Head 2010; Messina, Lanniciello & Escallier 2011). There is now compelling research evidence that tells us that there is a shortage of operating room nurses, both in Australia and worldwide. One strategy to assist this situation is to positively promote operating room nursing. Having students with negative experiences of the operating suite is extremely detrimental to recruitment of new nurses and would undermine this process.
8.4 Phase 3 - Discussion from curriculum co-ordinators on their specific models of education

In Phase 3 of this research, six curriculum co-ordinators who had responsibility for the operating room education models compared in Phase 2 were invited to participate in a personal interview to further investigate their model of education. Four curriculum co-ordinators consented to participate. Questions focused on:

- the driving forces that led to the development of the model of operating room education offered at their university,
- the strategies employed in setting up the model with collaborating hospital operating suites (if applicable),
- feedback from hospital staff and students about the model of education,
- any future changes envisaged for their education model.

Given that findings from this research revealed that guided practical operating room experience yields better knowledge and understanding about surgical ward nursing than experience in the surgical ward alone, it would be advisable that all undergraduate nursing students have the opportunity to participate in this practicum. With this information in mind the value of the data provided by curriculum co-ordinators on setting up and maintaining an operating theatre specialty subject can be fully appreciated.

The driving force behind setting up specific operating room nursing programs was generally a staff member who was an advocate or ‘champion’ of operating room nursing. Participants stated they had someone who was very passionate about perioperative nursing and who argued for its inception. The champion also argued that knowledge gained from this unit may assist in areas outside the operating suite, so the unit was conceived as generic in nature. Transferable knowledge findings from this research would now support this belief.
In discussion on resistance encountered whilst setting up this model it was noted that two of the four co-ordinators had commenced their position when the unit was running. For those starting from the beginning, it was initially very difficult to obtain clinical places, however over time, when operating room staff saw how well prepared the students were, this became easier. One co-ordinator spoke about initial problems with setting up clinical laboratory practicums as their university required this. As there was not a laboratory set up at the university for operating theatre nursing, students went to a local hospital’s operating suite during a weekend to gain their experience. The practice of using a real operating suite out-of-hours was utilised by all of the co-ordinators and is clearly the best method of pre-learning for undergraduate nurses.

All co-ordinators discussed the problem of securing enough clinical places for their students. Co-ordinators looked for clinical placements in both metropolitan and rural settings. One co-ordinator presented some strategies to alleviate this problem. They discussed that they presented at several special interest group meetings and conferences selling the value of their subject. They stated that at each conference they reminded attendees that undergraduate nurses are our future and they must be nurtured, and if students are treated well, they may consider a future in operating room nursing. They provided data revealing that more than 20 per cent of students studying a postgraduate perioperative nursing course at their university had previously completed the undergraduate perioperative nursing subject confirming findings from Happell (1999, 2000, 2002) and this research that have shown that a positive clinical placement will recruit nurses to this specialty.

All four curriculum co-ordinators who participated in this research presided over subjects that offered pre-learning. Feedback from hospitals suggested that their subjects had been running from between three and 13 years. The main feedback from the hospitals to the universities was in praise of the programs because the students were so well prepared and the hospital staff suggested that this made their work much easier. Feedback from students also suggested that they enjoyed
the experience because they had some knowledge when they arrived and so they felt more confident. One co-ordinator stated that the preparation allowed students to get a lot more out of their experience as the knowledge they gained beforehand allowed them to participate more fully. In reviewing data related to preparation of students prior to clinical placements in the operating suite, data from the curriculum co-ordinators clearly supports previously presented data from both the experienced operating room educators and undergraduate participants, enlightening all to the fact that pre-learning should be mandatory prior to operating suite experience.

In discussing future changes, one co-ordinator reported that unfortunately their course was to be discontinued. Other co-ordinators stated that they regularly review their course content for updates in practice and discussed the desire to try and increase numbers to accommodate all students in both theory and guided practice.

8.5 Summary

Employers’ expectations about the skills and competency levels of novice nursing graduates ‘can still be considered incongruent with the skill level of university-prepared graduate nurses’ (Vittrup & Davey 2010, p. 89). This research would support this belief as it has revealed surgical ward nursing knowledge deficits in both undergraduate nursing and Graduate Nurse Program graduates. A possible limitation of this research may have been in the underrepresentation of universities without formal operating room subjects. Initially, when universities were approached to participate in the research, it was because of their innovative programs. Inviting universities with no formal program would have been for comparison reasons only and this was considered unethical. It is hypothesised that if these universities were included in this research the percentage of non-guided to guided participants would have been greater and the deficits seen in the undergraduate group may have been higher. Data from this research support the findings of Sigsby and Yarandi (2004) who suggested that the operating suite is a favourable learning environment to support the understanding of nursing care for
patients who have had surgery. Operating room nursing may not be for everyone. Some nurses will love it and some will not, however if provided with a support environment in which to learn, all nurses will gain knowledge and skills that support surgical ward nursing.
In 1985 it was legislated by the Australian Federal and State Governments to begin the transfer of pre-registration nursing from hospital-based training to advanced colleges or university-based education (Heath 2001). Over time the operating suite practical placement has been altered from approximately six weeks for every student in the hospital-based training era to new models of education with varying clinical experience that differ between university providers. This experience ranges from a mix of pre-learning, theory and guided or non-guided practical experience or none at all. In some universities a reintroduction of operating room nursing to the core curriculum has been seen; others offer this subject as an elective or high dependency choice, but the majority of universities in Australia have no formal program and only offer ad hoc follow-through visits to the operating suite to observe a patient’s surgery. In many cases students receive no operating theatre experience in their undergraduate education.

This research has shown that follow-through visits, in their current format, do not support learning, do not support recruitment of new staff and are a negative variable in the retention of experienced staff already working in the operating suite. Preparation of novice visitors to the operating suite is paramount to learning and enjoyment of the experience and to patient safety.

Findings of this research have also shown that 18.3 per cent of undergraduate nurses did not set foot in an operating suite in their entire undergraduate education and a further 9.7 per cent had five hours of less. This tells us that 28 per cent of undergraduate nurses who participated in this national Australian research spent less than half a day in the operating suite during their undergraduate degree preparation. Further findings from this research have informed us that this is not
sufficient to support safe knowledgeable pre- and post-operative surgical nursing care.

Participants in this research have revealed that surgical ward nursing knowledge was deficient in 44 per cent of nurses at the time of their graduation and in 47 per cent of nurses at completion of their Graduate Nurse Program year. This research has also shown great benefit in guided practical operating suite experience in providing knowledge and skills that support surgical ward nursing. It has also revealed opposing principles when we note that operating room clinical experience has been gradually phased out of most nursing schools’ curricula, even when this experience has been shown to provide greater surgical ward knowledge than is gained from surgical ward nursing experience alone.

At the commencement of this research, several gaps were noted in the literature. These were:

- the exploration of the operating suite as an area of rich learning,
- the educational effects of limited or no operating room experience for undergraduate nurses in their ability to care for pre- and post-operative patients in the surgical ward area,
- the comparison of students’ experiences in the operating suite and the impact of this on their subsequent recruitment to nursing in this specialty area,
- the effects that different student educational models had on retention of staff already working in the operating suite.

Given the changes to the undergraduate nursing curriculum over the last 25 years, there was great value in investigating several questions that related to undergraduate operating room nursing experience in Australia. The research questions for this thesis were:

- Do undergraduate nurses need to be involved in guided operating suite practical experience in order to achieve skills and knowledge that will support a high standard of nursing care in the pre- and post-operative surgical wards?
• What are the different models of operating suite education offered to Australian undergraduate nursing students, which of these models yields the best educational outcomes and what are the transferable skills acquired from operating suite experience that assist in pre- and post-operative surgical nursing care?

• How might these differing models of operating suite education impact on recruitment and retention of nurses to this specialist area?

This research has successfully addressed these three questions and helped to close the gaps initially noted in Australian and relevant overseas literature. It has shown that undergraduate nurses do need to be exposed to guided operating room experience in order to achieve a high standard of nursing care in the pre- and post-operative surgical wards.

At the time of data collection 31 universities in Australia offered undergraduate nursing and of these 12 universities offered specific operating room nursing subjects. Four different models of operating room nursing education were offered to undergraduate nurses which were an elective model, on-line model, mixed model (core high dependency subject, where students choose one subject of which one was operating room nursing) or core curricula model. The model of operating room education referred to the overriding design and delivery of the subject whereas the pattern mix of operating room education referred to the actual different teaching and learning opportunities that were incorporated in the model.

Findings revealed that the different education models were not the driving variable in participants’ surgical knowledge; however the pattern mix the students participated in was salient. The pattern mix was a combination of operating room nursing theory, guided practical workplace experience, non-guided practical workplace experience, and extra practical experience. Students who were provided with theory in the form of pre-learning followed by guided operating room practical experience were able to yield the best educational outcomes. The
time the students spent in the operating suite was significant up to 40 to 60 hours and then a plateau effect was noted.

A wealth of knowledge was gained by participants in the operating suite; knowledge that could be taken with them to utilize in other disciplines of nursing. Transferable knowledge and skills reported by participants in this research were an enhanced understanding of pre- and post-operative nursing care, pain management, anatomy and physiology, the concept of what the patient went through, knowledge of surgical procedures, ability to provide accurate patient education, asepsis, technical skills, and advanced patient assessment. One of the most significant post-operative problems and the most common individually learned transferable skill acquired through operating room experience concerns acute pain management. The connection between seeing surgery first-hand and having the ability and insight to care for patients appropriately after their surgery was clearly evident from findings of this research.

The most significant variable contributing to students enjoying their time in the operating suite as well as considering future employment in this area also concerned the pattern mix of education, namely whether they had guided operating room practical experience or not. Ninety per cent of participants from the guided group and 47 per cent of participants from the non-guided group enjoyed their experience. The most common reason students did not enjoy the operating suite was because participants’ learning was not supported by experienced operating room staff. Findings also showed that 63 per cent of participants from the guided group, and (only nearly half that number) 32 per cent of the participants from the non-guided group considered future employment in the operating suite. The provision of an experienced operating room nurse to guide clinical learning was the vital to knowledge acquisition, enjoyment of their placement and future recruitment to this specialty area of nursing.

A major variable affecting the retention of experienced operating room nurses who supervised the participants was whether undergraduate nurses were adequately prepared prior to visiting the operating suite. This research has shown
that unprepared students visiting the operating suite are a possible risk to patient safety and are a huge stressor to supervising staff. Experienced operating room nurses who participated in this research reported that this stress was a causative factor for experienced operating room nurses choosing to leave employment in this area.

When we summarize all the stakeholder issues that have been highlighted from current Australian and relevant overseas literature, and observe the findings from this research, a way forward may be clearer. A summary of findings from the literature and this research revealed that:

- a shortage of operating room nurses has been noted in virtually every state and territory of Australia (Allanson & Fulbrook 2010),
- in the next 20 years, the demand for operating room nurses will far outstrip our current rate of supply (Head 2010; Messina, Ianniciello & Escallier 2011),
- the lack of a significant operating room nursing practical experience in undergraduate education has diminished the supply of new nurses entering the operating room nursing field (Happell 1999, 2000, 2002),
- statistics related to adverse surgical events show that patient morbidity and mortality in surgical complications is estimated at between 50 per cent and 75 per cent of all adverse medical events (Pinney, Pearce & Feldman 2010),
- surgical nursing knowledge has been shown to be deficient in this research at both undergraduate and graduate levels (44 per cent of undergraduates and 47 per cent of graduates failed surgical knowledge testing),
- surgical ward nursing is the most popular choice of new graduates,
- Australian universities are struggling to secure enough acute medical and surgical hospital clinical places for their undergraduate nursing students (Halcomb, Peters & McInnes 2012),
- future prediction of healthcare demands have suggested more nurses be trained which will further increase a need for placements (Barnett et al. 2008).
Girard (2004) suggested that it was essential to share ideas on how to provide operating room experience in an already crowded curriculum. Touzeau (2005), Sigsby and Yarandi (2004) and findings from this research, have all shown that knowledge and skills for surgical ward nursing are best learned in the operating suite. Rather than trying to find additional time from already crowded curricula, a portion of time and resources already allocated to surgical nursing should be reallocated to encompass guided operating room experience. This would be prudent as the operating suite has been shown to provide the desired knowledge required for surgical ward nursing.

In my opinion, this appears to be a ‘win-win’ situation. Universities are having difficulty in securing enough acute medical and surgical clinical placements, so the reintroduction of operating suite placements may ease this problem. The reintroduction of undergraduate operating room nursing into the core undergraduate nursing curricula would improve recruitment. There is no doubt that decreased exposure to the operating suite has been the major contributing factor in new nurses not entering the field (Happell 1999, 2000, 2002). The subsequent increase of new staff to the operating suite should decrease the pressure on existing staff and assist in retention of experienced operating room nurses. Undergraduate nursing knowledge would increase to provide a higher quality of surgical nursing care.

The vital caveat in this proposal would be that resources are provided to initiate guided (as opposed to non-guided) practical experience.

In the short term a simple solution to the problem of receiving unguided, unprepared students to the operating suite would be to provide all undergraduate nursing students with a two-hour orientation presentation on visiting this specialist area. Whilst the follow-through visits do not provide enough knowledge to support safe surgical care, they do allow undergraduate nurses to understand ‘what the patient went through’ and why patients had pain, which appears to be pivotal in providing empathetic pain relief and nursing care. Certainly this would not replace the benefits of a week-long guided experience but would give the
students an understanding of the environment, encourage more students to observe surgery, decrease the stressors and allow a more successful learning experience. This practice may well be extended to all visitors, such as medical students, and students from allied health.

This research has informed us that undergraduate nurses achieve greater learning about surgical ward nursing knowledge via guided operating suite experience as opposed to surgical ward nursing experience alone. Participants who were exposed to guided operating room experience have proved that they can provide a safer, higher standard of nursing care, and so for this reason it is a recommendation of this research that all undergraduate nurses should have guided operating room nursing experience as part of their undergraduate nursing degree.

In order to provide a well rounded, complete understanding of surgical nursing care it is recommended that perioperative or operating room nursing be included in the core curricula to ensure all undergraduate nursing students are provided with this learning experience as part of their preparation for surgical ward nursing. As the undergraduate curricula are already crowded, it is recommended that universities reallocate surgical nursing time and resources to encompass guided operating room experience. This is a reasonable approach as operating suite experience has been proved to enhance surgical ward nursing knowledge.

With the exponential increase in new surgical procedures and minimally invasive laparoscopic surgery, coupled with the fact that many experienced surgical ward nurses may not have witnessed modern surgery, it is also recommended that all experienced surgical ward nurses be invited to ‘follow through’ one of their own patients who is having a surgical procedure they have not witnessed. These visits could be pre-booked with the operating room staff to ensure preparation and supervision. Although this may be time consuming in the short term, the gains in assisting surgical ward nurses depth and understanding of newer surgical procedures would be an enormous asset to patient care. The impact on pre- and post-operative nursing care, including an enhanced knowledge of acute post-
operative pain management and an understanding of ‘what the patient went through’ in modern surgery would also be immeasurable.

The operating suite needs to be viewed as an area of rich learning. It is also recommended that operating room nurses educate their nursing colleagues and the wider community about the work they do and the skills they can pass on to more junior staff.

As many of the problems faced by the operating room nursing profession were born from a misunderstanding of role, education regarding the important service provided to patients may enable more informed debate by educationalists and the general community. It is hoped that this will lead to a greater level of support for operating room nursing.

The findings of this research have also highlighted the importance of guided workplace learning and in particular the process of nurse preceptorship. This important area is worthy of further investigation. It is recommended that further research be undertaken investigating the skill set required for successful preceptors and the necessary qualifications to achieve this goal.

The genesis of this project followed the preventable death of a 37-year-old mother of three following routine thyroid surgery. In the coronial report it was stated that had a specific treatment been undertaken (the removal of sutures from the patient’s neck) the patient may have survived. This was knowledge that I had gained as a student nurse via guided operating room experience. Findings from this research revealed that, despite this being a rare, but well documented complication with a known emergency treatment, only 29 per cent of undergraduate nurses at the end of their university education and 45 per cent of graduate nurses at the end of their Graduate Nurse Program year were aware of the correct response in this situation. Timely, appropriate surgery and high quality pre- and post-operative care may be the key in preventing deaths in the first 48 hours after surgical procedures (Mullen et al. 2012). Surgical adverse events occur in 3.6 per cent of all hospital admissions representing 65 per cent of all reported
adverse events (Zegers et al. 2011). One important factor in ensuring patient safety and increasing the standard of patient care lies in the educational preparation of our junior nurses.

One of the most poignant remarks that has stayed with me throughout my whole research journey was born from a conversation I had whilst presenting at a surgical conference canvassing for volunteers for my Master of Professional Education and Training study. As a young nurse provided me with postal details he remarked:

After graduation I struggled in the surgical wards, until I had a stint in the theatre. It was like the missing piece of the puzzle was added, and suddenly it all made sense (Touzeau 2005, p. 58)

With the birth of modern surgery in the early eighteen hundreds came the term ‘operating theatre’. It was so named as it was built resembling a twentieth century lecture theatre, allowing visitors to observe surgical procedures. It is ironic that in modern times the operating theatre has lost much of its audience.
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Appendix 1: Article – Death after surgery

Woman told, don’t panic

Death after surgery

Elissa Hunt

A MOTHER who died after lack of oxygen was told by hospital staff she was just panicking when she struggled for air after a routine operation, an inquest heard yesterday.

Mother-of-three Silvana Manitta, 37, suffered severe brain damage when internal bleeding blocked her airways after a thyroid operation in March 2002.

She died after her family agreed to withdraw treatment because her brain damage was irreversible.

Her husband Mario wrote to the coroner with concerns that staff were patronising in telling his wife she was panicking when it was clear she could not breathe.

He said her surgeon should have been called as soon as she showed breathing difficulty and that nurses did not recognise the emergency fast enough.

The inquest heard her surgeon and another doctor agreed Mrs Manitta’s death was preventable.

Mrs Manitta had a thyroid operation at the Werribee Mercy Hospital on March 7 and she began to have breathing problems while recovering.

The inquest heard one expert believes that had the stitches from her operation been removed sooner her life could have been saved.

Mr Manitta said when his wife first struggled to breathe a doctor was called and told her she was “only panicking”.

When she again had breathing problems later Mr Manitta said nurses rejected his suggestion that they call the surgeon who did the operation.

Instead they called the earlier doctor and debated about calling a “code blue” emergency as they waited for him to arrive.

Several hours later Mrs Manitta was operated on again and taken to St Vincent’s Hospital, where she later died.

Her surgeon Dr Patrick Hayes told the inquest Mrs Manitta’s complications were rare and he hadn’t seen a similar situation in the 150-200 other operations he had done.

The inquest continues.

Herald Sun, Wednesday, May 12, 2004 p16
Appendix 2: Phone survey

Survey regarding operating suite experience in Australia

Conducted by Paula Touzeau as part of a PhD research project
**Name of University**

Do you have a formalized or structured ‘perioperative’ program for your undergraduate students?

YES  NO

Approximately how many students do you have participating in this program? .................

If ‘no’ please go to question 2.

1. Core curricula subject - all students participate

2. Elective subject where some students participate

   If selected, approximately what percentage of students participate? .................

Does your program include clinical placements at a hospital?

YES  NO

If yes, approximately how many contact hours do your students’ have at the university (e.g. preparatory tutorials) and how many contact hours are offered in a hospital Operating Suite?

Hours at University......... Hours at Hospital............

If no, please describe your courses structure?

-----------------------------------------------------------------------------------
-----------------------------------------------------------------------------------
-----------------------------------------------------------------------------------
-----------------------------------------------------------------------------------
-----------------------------------------------------------------------------------
**Elective Subject**
How are students selected for the subject?

Do you have any further information regarding your course?

Is there any other form of perioperative experience that your students may undertake?

2. If ‘no’ was initially selected could you please provide some detail about your undergraduate’s surgical experience.

What type of experience do your students have?

- Follow through visits - where students follow a patient during their surgical experience.

- Operating Suite experience as part of a surgical clinical rotation. If so what is the approximate length?

- On line learning

Is there any other form of perioperative experience that your students may undertake?

Do you have any further information regarding your course?

Thank you so much for your time and participation
Appendix 3: Plain Language Statement & Questionnaire – Undergraduate Nursing Students

Research Questionnaire & Plain Language Statement for Undergraduate Nursing Students

“This is an anonymous questionnaire. Please ensure that you do not write your name, or any other comments that will make you identifiable, on the attached questionnaire. By completing the questionnaire you are consenting to take part in this research. As such you should first read the enclosed Plain Language Statement carefully as it explains fully the intention of this project”.

Conducted by Paula Touzeau as part of a PhD research project
DATE:

Project Title: ‘The value of guided operating suite experience for undergraduate nurses’.

My name is Paula Touzeau and I am a Registered Nurse studying towards a doctoral degree in Education through Deakin University in Victoria. This research project is under the supervision of Associate Professor Peter Smith and Dr Damian Blake both in the Faculty of Arts and Education.

My research is aimed at evaluating ‘Perioperative’ (Operating Theatre) experience offered to undergraduate nurses across Australia. During your hospital placements you may have visited the operating suite in one form or another. I am particularly interested in the knowledge that you learned whilst in theatre and how this may assist you in your future work in the surgical wards when caring for pre- and post-operative patients.

One of the important parts of education is to constantly evaluate the process in an attempt to provide the best quality learning for all students. This is your opportunity to assist in the future education of nursing students who will study in the coming years. For this reason, I would like to invite you to participate in my study by answering the questions on the attached questionnaire.

Participation in the study is voluntary. All material collected is anonymous. Please do not put your name on the form. There is absolutely no connection between this study and your results, and the anonymity of the questionnaire ensures this, so please do not look up your answers.

The questionnaire will take approximately 15 minutes to complete. When you are finished could you please place the completed questionnaire in the return paid envelope provided & post back to me. All data and material associated with the research will be securely stored and destroyed via secure methods after a period of six years.

Depending on the findings from the initial research, it may be interesting to test your knowledge at the end of your graduate year to assess how much more you have learned. If you are interested in being involved in the follow-up study I invite you to send me an email at ptouzeau@swh.net.au & provide me with
your email details. There is no need for any dialog, just write ‘follow up study’ in the subject box. It may be wise not to use your University email address as you will no longer be students. I will contact you if needed in twelve months time & send you out a second anonymous questionnaire. As the questionnaire is anonymous I will have no idea who has completed it, so please be assured there is no connection between the email list and the completed survey.

I would be more than happy to forward you information on the completed project should you wish. If you have any questions regarding the project you may contact the researcher on 0355631668.

I realize your time is precious so thank-you very much for your participation,

Paula Touzeau

Should you have any concerns about the conduct of this research project, please contact

Supervisor          or          Associate Supervisor
Peter Smith
Faculty of Arts & Education
Geelong Campus
Deakin University
Email: pjbs@deakin.edu.au

or

Damian Blake
Faculty of Arts and Education
Geelong Campus
Deakin University
Email: dmblake@deakin.edu.au
Questionnaire 1 – University Number

Please do not place your name on the questionnaire. Please do not continue until you have read and agree with the following:

I have read the Plain Language Statement that describes the research. By anonymously completing the questionnaire, I acknowledge my willingness to participate in this project. I further understand that the information from this questionnaire will not be made available to any person other than the research team.

Could you please provide some information about yourself?

Gender:  
Female  Male

Were you involved in the Perioperative Elective Subject offered at your university?

YES  NO

Approximately how many hours / days did you spend in the Operating Suite during your entire undergraduate training?

Did you enjoy your time in the operating suite? If so? Why? If not why?

Did you find the information that you may have learned in the operating theatre assisting you in your nursing skills outside the operating suite?

Would you consider working in the operating theatre after you graduate?
Please circle only ONE correct answer

1. Patients who have undergone a general anaesthetic:
   a) All have an endotracheal tube inserted into their trachea to assist ventilation
   b) Have an endotracheal tube inserted only if they have a non-depolarizing muscle relaxant
   c) Have an endotracheal tube inserted only if they have a depolarizing muscle relaxant
   d) Will only require intubation for specific surgical and anaesthetic requirements

2. Epidural and Spinal anaesthesia:
   a) Differ because spinal anaesthesia is denser & longer lasting
   b) Differ in the anatomical positioning in which the local anaesthetic solution is deposited
   c) Do not differ
   d) Differ only in the amount of local anaesthesia used

3. If a patient has had a depolarizing muscle relaxant:
   e) Fasciculation (generalized twitching) will occur and cause no side effects or muscle soreness
   f) Fasciculation (generalized twitching) will occur and may cause muscle soreness in the ward later
   g) No fasciculation will be seen
   h) Fasciculation is not seen as this is only seen in non-depolarizing muscle relaxants

4. Epidural or spinal anaesthetic used with intravenous sedation:
   i) Will seem exactly the same to a patient as a general anaesthetic
   j) Allows pain free surgery whilst the patient is fully awake and aware of all the surroundings
   k) Allows pain free surgery on a patient who is relaxed and may hear noises and can talk to staff
   l) Is very relaxed but may experience very mild pain

5. In the post anaesthetic Care Unit oxygen therapy is:
   m) Only used when patients are hypoxic
   n) Used in patients who’s saturation of oxygen falls below 94%
   o) Used for all post general anaesthesia patients
   p) Not used at all

6. A patient has consented to a ‘Total Abdominal Hysterectomy’. In this procedure the ovaries are:
   q) Always removed
   r) Conserved and left in situ
   s) Sometimes conserved & some times removed depending on the case
   t) Only removed if carcinoma is present
7. If a patient had a laparoscopic cholecystectomy it would be expected that they would have:
   u) Two small incisions
   v) One large upper abdominal incision
   w) Four to six small incisions
   x) Lower abdominal incision

8. Following laparoscopic surgery it is common for patients to suffer:
   y) Back pain from lying on the operating table
   z) No pain post operatively
   aa) Calf pain from the calf stimulators
   bb) Shoulder tip pain from gas under the diaphragm

9. In a diagnostic laparoscopy the patients:
   a) Very rarely have any pain post operatively
   b) Have only minimal pain as they have only two small incisions
   c) Have many incisions thus have moderate pain
   d) Have two incisions but may experience moderate to severe pain

10. In hypovolemic shock the patient will exhibit:
    cc) A decrease in blood pressure and an increase in heart rate
    dd) A decrease in heart rate and blood pressure
    ee) An increase in blood pressure and a decrease in heart rate
    ff) An increase in heart rate and an increase in blood pressure

11. In a shocked patient (\( \downarrow > 20\% \) of baseline B/P) the position of choice would be:
    gg) Head down and feet up
    hh) Head flat and feet up
    ii) Head up and feet up
    jj) Head down and feet flat

12. You are caring for a patient who has had a thyroidectomy. Your patient suddenly develops a stridor. Do you:
    kk) Sit the patient up, give oxygen 6 litres via a Hudson mask & reassure the patient
    ll) Do what is suggested in a) & notify the surgeon and if respiratory distress is severe remove clips/sutures from both skin and muscle layers of the neck
    mm) Do what is suggested in a) & notify the surgeon and prepare to administer iodine for serum calcium levels
    nn) Post thyroid patients are often very anxious prone to hysterical breathing patterns. Stay with the patient and provide reassurance

13. If a sterile item is dropped on the floor in the ward you should:
    e) Consider the item unsterile and discard it
    f) Carefully examine the integrity of the item and if O.K. use it
    g) Use it as planned
    h) Use it only if there are no more of this item
14. The single most effective method of preventing cross infection is:
   i) Use of antibiotics in post surgical patients
   j) Use of preoperative antibiotic cover for all patients
   k) Use of strong disinfectants in the ward
   l) Effective & timely hand washing

15. Patients who are coming for surgery need to:
   oo) Leave full upper & lower teeth in situ for airway assistance
   pp) Take all teeth out and leave on the ward
   qq) Clean false teeth and soak in disinfectant before coming to theatre
   rr) Leave their teeth at home for safe keeping

16. Pre-operative shaves are:
   m) Performed with shaving cream and razor on the ward
   n) Performed by clippers in the operating suite or as close to the surgical procedure as possible
   o) Performed by patients at home who are instructed on where to shave prior to admission to hospital
   p) Performed by clippers on the ward the night prior to surgery

17. Following general anaesthetic children who are not ‘nil by mouth’ or suffering from nausea will be gradually introduced to oral intake:
   q) After they have been back on the ward for two hours
   r) After they have been back on the ward for one hour
   s) As soon as they return to the ward
   t) After they have been on the ward for 4 hours

18. When assessing the effectiveness of a closed suction drain tube such as a redivac, the nurse knows that the system has lost its suction when:
   u) Fluid can no longer be seen draining into the bottle
   v) There has been no further drainage since the last marking on the bottle
   w) The patient has not complained of pain, which is a classic sign of loss of suction
   x) When the concertina valve on the bottle has lost tension and has risen.

19. Hypothermia is a common postoperative occurrence. In rewarming patients on the ward it is essential to:
   y) Take the blood pressure regularly as it is likely to decrease during rewarming
   z) Take the blood pressure regularly as it is likely to increase during rewarming
   aa) Take the blood pressure as a routine post-op observation but this has no connection with the temperature
   bb) Concentrate on increasing the temperature and do not worry about the blood pressure
20. You are looking after a patient who has a post-operative narcotic infusion. Your observations will include blood pressure, heart rate, respirations & consciousness. In observing your patient for the effects of narcosis, it would be true to say that:

- ss) The blood pressure is the most important
- tt) Respirations and conscious state are the most important
- uu) All observations are equally important
- vv) Heart rate is the most important

Your time & participation have been very much appreciated
thank-you again.
Appendix 4: Plain language statement for undergraduate nurses

DEAKIN UNIVERSITY
VICTORIA - AUSTRALIA
HUMAN RESEARCH ETHICS APPROVAL NUMBER HEAG08-27
PLAIN LANGUAGE STATEMENT FOR UNDERGRADUATE NURSES
UNIVERSITY NUMBER 8

DATE:

Project Title: ‘The value of guided operating suite experience for undergraduate nurses’.

My name is Paula Touzeau and I am a Registered Nurse studying towards a doctoral degree in Education through Deakin University in Victoria. This research project is under the supervision of Associate Professor Peter Smith and Dr Damian Blake both in the Faculty of Arts and Education.

My research is aimed at evaluating ‘Perioperative’ (Operating Theatre) experience offered to undergraduate nurses across Australia. During your hospital placements you may have visited the operating suite in one form or another. I am particularly interested in the knowledge that you learned whilst in theatre and how this may assist you in your future work in the surgical wards when caring for pre- and post operative patients.

One of the important parts of education is to constantly evaluate the process in an attempt to provide the best quality learning for all students. This is your opportunity to assist in the future education of nursing students who will study in the coming years. For this reason, I would like to invite you to participate in my study by answering the questions on the attached questionnaire.

Participation in the study is voluntary. All material collected is anonymous. Please do not put your name on the form. There is absolutely no connection between this study and your results, and the anonymity of the questionnaire ensures this, so please do not look up your answers.

The questionnaire will take approximately 15 minutes to complete. When you are finished could you please place the completed questionnaire in the return paid envelope provided & post back to me. All data and material associated with the research will be
securely stored and destroyed via secure methods after a period of six years.

Depending on the findings from the initial research, it may be interesting to test your knowledge at the end of your graduate year to assess how much more you have learned. If you are interested in being involved in the follow-up study I invite you to send me an email at ptouzeau@swh.net.au & provide me with your email details. There is no need for any dialog, just write ‘follow up study’ in the subject box. It may be wise not to use your University email address as you will no longer be students. I will contact you if needed in twelve months time & send you out a second anonymous questionnaire. As the questionnaire is anonymous I will have no idea who has completed it, so please be assured there is no connection between the email list and the completed survey.

I would be more than happy to forward you information on the completed project should you wish. If you have any questions regarding the project you may contact the researcher on 0355631668.

I realize your time is precious so thank-you very much for your participation,

Paula Touzeau

Should you have any concerns about the conduct of this research project, please contact

Supervisor or Associate Supervisor
Peter Smith Damian Blake
Faculty of Arts & Education Faculty of Arts and Education
Geelong Campus Geelong Campus
Deakin University Deakin University
Email: pjbs@deakin.edu.au Email: dmblake@deakin.edu.au
Appendix 5: Invitation to participate – Head of Schools

Paula Touzeau
3 Barbro Terrace,
Warrnambool, 3280
Victoria.

Professor ……………
Head of Nursing School
……………..University
…………………..

27/8/2008

Dear Professor ……….,

My name is Paula Touzeau and I am a doctoral candidate studying in the Faculty of Education and Arts at Deakin University in Victoria under the supervision of Dr Peter Smith and Dr Damien Blake.

Ethics approval was sought and granted via Deakin University ethics committee in August 2008.

My research surrounds operating theatre experience for undergraduate nurses and the ability of this experience to prepare our young nurses for pre- and postoperative nursing care in the surgical wards.

Phase 1 of the project involved a telephone survey and website search gaining consumer information on all various types of operating theatre experience offered nationally to undergraduate nursing students. This was in an attempt to reveal the differing models of education offered at Australian Universities. Five different models of education delivery from ten universities have been chosen for comparison in phase 2 of the project. Your university has been chosen as it offers an innovative ………………..program of undergraduate operating theatre experience.

I now write formally to invite your university to participate in this research.

A consent form and Plain Language Statement accompany this letter and the latter will explain the research more fully.

Thank you for your consideration and interest in my research.

Yours Sincerely,

Paula Touzeau
Appendix 6: Follow-up study email invitation

From: Paula Foran (Touzeau) [pforan swh.net.au]
To:
Bcc:
Subject: Follow up study from Paula's PhD
Sent: Thursday, 25 February 2010 10:41 AM
Subject: Follow up study from Paula's PhD
Attachments: Follow-up questionnaire for email.doc

Hi there,

My name is Paula & I am in the final stages of my PhD at Deakin University in Melbourne.

You may recall doing a questionnaire way back in your final year of University regarding pre- and post operative care and your theatre experience. You very kindly provided me with your email address.

It would be great if you had the time to do the questionnaire again now that you have completed your graduate year. It is of course voluntary & anonymous.

If you could provide me with your postal address I will send you a questionnaire. A stamped addressed envelope will be enclosed for its return.

Thank-you so much for your time and assistance in my research. I really appreciate it.

Kind Regards,

Paula Foran (nee Touzeau)
“This is an anonymous questionnaire. Please ensure that you do not write your name, or any other comments that will make you identifiable, on the attached questionnaire. By completing the questionnaire you are consenting to take part in this research. As such you should first read the enclosed Plain Language Statement carefully as it explains fully the intention of this project”.

Conducted by Paula Foran (Touzeau) as part of a PhD research project
DATE: November 2010

Project Title: ‘The value of guided operating suite experience for surgical ward nurses’.

My name is Paula Foran (Touzeau) and I am a Registered Nurse studying towards a doctoral degree in Education through Deakin University in Victoria. This research project is under the supervision of Associate Professor Peter Smith and Dr Damian Blake both in the Faculty of Arts and Education.

My research is aimed at evaluating ‘Perioperative’ (Operating Theatre) experience offered to undergraduate and newly graduated nurses across Australia. During your undergraduate or graduate years you may have visited the operating suite in one form or another. I am particularly interested in the knowledge that you learned whilst in theatre and how this may assist you in your future work in the surgical wards when caring for pre- and post-operative patients.

One of the important parts of education is to constantly evaluate the process in an attempt to provide the best quality learning for all students. This is your opportunity to assist in the future education of nursing students who will study in the coming years. For this reason, I would like to invite you to participate in my study by answering the questions on the attached questionnaire.

Participation in the study is voluntary. All material collected is anonymous. Please do not put your name on the form. There is absolutely no connection between this study, you or your hospital and the anonymity of the questionnaire ensures this, so please do not look up the answers.

The questionnaire will take approximately 15 minutes to complete. When you are finished could you please return the questionnaire to the educator who gave it to you and he/she will return it to me.

All data and material associated with the research will be securely stored and destroyed via secure methods after a period of six years.
I would be more than happy to forward you information on the completed project should you wish. If you have any questions regarding the project you may contact the researcher on 0355631668.

I realize your time is precious so thank-you very much for your participation,

Paula Foran (Touzeau)

Should you have any concerns about the conduct of this research project, please contact

Supervisor or Associate Supervisor
Peter Smith Damian Blake
Faculty of Arts & Education Faculty of Arts and Education
Geelong Campus Geelong Campus
Deakin University Deakin University
Email: pjbs@deakin.edu.au Email: dmblake@deakin.edu.au
Questionnaire 2

Please do not place your name on the questionnaire. Please do not continue until you have read and agree with the following:

I have read the Plain Language Statement that describes the research. By **anonymously** completing the questionnaire, I acknowledge my willingness to participate in this project. I further understand that the information from this questionnaire will not be made available to any person other than the research team.

Could you please provide some information about yourself?

**Gender:**  
- Female  
- Male

Approximately how many hours / days did you spend in the Operating Suite during your entire undergraduate training?

____________________________________________________________________

Did you spend time in the operating suite during your graduate year?

**YES**  
**NO**

If yes, approximately how long?

____________________________________________________________________

Comments

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Please circle only ONE correct answer

1. Patients who have undergone a general anaesthetic:
   a) All have an endotracheal tube inserted into their trachea to assist ventilation
   b) Have an endotracheal tube inserted only if they have a non-depolarizing muscle relaxant
   c) Have an endotracheal tube inserted only if they have a depolarizing muscle relaxant
   d) Will only require intubation for specific surgical and anaesthetic requirements

2. Epidural and Spinal anaesthesia:
   ww) Differ because spinal anaesthesia is denser & longer lasting
   xx) Differ in the anatomical positioning in which the local anaesthetic solution is deposited
   yy) Do not differ
   zz) Differ only in the amount of local anaesthesia used

3. If a patient has had a depolarizing muscle relaxant:
   cc) Fasciculation (generalized twitching) will occur and cause no side effects or muscle soreness
   dd) Fasciculation (generalized twitching) will occur and may cause muscle soreness in the ward later
   ee) No fasciculation will be seen
   ff) Fasciculation is not seen as this is only seen in non-depolarizing muscle relaxants

4. Epidural or spinal anaesthetic used with intravenous sedation:
   aaa) Will seem exactly the same to a patient as a general anaesthetic
   bbb) Allows pain free surgery whilst the patient is fully awake and aware of all the surroundings
   ccc) Allows pain free surgery on a patient who is relaxed and may hear noises and can talk to staff
   ddd) Is very relaxed but may experience very mild pain

5. In the post anaesthetic Care Unit oxygen therapy is:
   eee) Only used when patients are hypoxic
   fff) Used in patients who’s saturation of oxygen falls below 94%
   ggg) Used for all post general anaesthesia patients
   hhh) Not used at all

6. A patient has consented to a ‘Total Abdominal Hysterectomy’. In this procedure the ovaries are:
   gg) Always removed
   hh) Conserved and left in situ
   ii) Sometimes conserved & some times removed depending on the case
   jj) Only removed if carcinoma is present
7. If a patient had a laparoscopic cholecystectomy it would be expected that they would have:
   iii) Two small incisions
   jjj) One large upper abdominal incision
   kkk) Four to six small incisions
   lll) Lower abdominal incision

8. Following laparoscopic surgery it is common for patients to suffer:
   mmm) Back pain from lying on the operating table
   nnn) No pain post operatively
   ooo) Calf pain from the calf stimulators
   ppp) Shoulder tip pain from gas under the diaphragm

9. In a diagnostic laparoscopy the patients:
   kk) Very rarely have any pain post operatively
   ll) Have only minimal pain as they have only two small incisions
   mm) Have many incisions thus have moderate pain
   nn) Have two incisions but may experience moderate to severe pain

10. In hypovolemic shock the patient will exhibit:
    qqq) A decrease in blood pressure and an increase in heart rate
     rrr) A decrease in heart rate and blood pressure
    sss) An increase in blood pressure and a decrease in heart rate
     ttt) An increase in heart rate and an increase in blood pressure

11. In a shocked patient (\(\downarrow > 20\%\) of baseline B/P) the position of choice would be:
    uuu) Head down and feet up
    vvv) Head flat and feet up
    www) Head up and feet up
    xxx) Head down and feet flat

12. You are caring for a patient who has had a thyroidectomy. Your patient suddenly develops a stridor. Do you:
    yyy) Sit the patient up, give oxygen 6 litres via a Hudson mask & reassure the patient
    zzz) Do what is suggested in a) & notify the surgeon and if respiratory distress is severe remove clips/sutures from both skin and muscle layers of the neck
     aaaa) Do what is suggested in a) & notify the surgeon and prepare to administer iodine for \(\uparrow\) serum calcium levels
      bbbb) Post thyroid patients are often very anxious prone to hysterical breathing patterns. Stay with the patient and provide reassurance

13. If a sterile item is dropped on the floor in the ward you should:
    oo) Consider the item unsterile and discard it
    pp) Carefully examine the integrity of the item and if O.K. use it
    qq) Use it as planned
    rr) Use it only if there are no more of this item
14. The single most effective method of preventing cross infection is:
   ss) Use of antibiotics in post surgical patients
   tt) Use of preoperative antibiotic cover for all patients
   uu) Use of strong disinfectants in the ward
   vv) Effective & timely hand washing

15. Patients who are coming for surgery need to:
   cccc) Leave full upper & lower teeth in situ for airway assistance
   dddd) Take all teeth out and leave on the ward
   eeee) Clean false teeth and soak in disinfectant before coming to theatre
   ffff) Leave their teeth at home for safe keeping

16. Pre-operative shaves are:
   ww) Performed with shaving cream and razor on the ward
   xx) Performed by clippers in the operating suite or as close to the surgical procedure as possible
   yy) Performed by patients at home who are instructed on where to shave prior to admission to hospital
   zz) Performed by clippers on the ward the night prior to surgery

17. Following general anaesthetic children who are not ‘nil by mouth’ or suffering from nausea will be gradually introduced to oral intake:
   aaa) After they have been back on the ward for two hours
   bbb) After they have been back on the ward for one hour
   ccc) As soon as they return to the ward
   ddd) After they have been on the ward for 4 hours

18. When assessing the effectiveness of a closed suction drain tube such as a redivac, the nurse knows that the system has lost its suction when:
   eee) Fluid can no longer be seen draining into the bottle
   fff) There has been no further drainage since the last marking on the bottle
   ggg) The patient has not complained of pain, which is a classic sign of loss of suction
   hhh) When the concertina valve on the bottle has lost tension and has risen.

19. Hypothermia is a common postoperative occurrence. In rewarming patients on the ward it is essential to:
   gggg) Take the blood pressure regularly as it is likely to decrease during rewarming
   hhhh) Take the blood pressure regularly as it is likely to increase during rewarming
   iii) Take the blood pressure as a routine post-op observation but this has no connection with the temperature
   jjjj) Concentrate on increasing the temperature and do not worry about the blood pressure
20. You are looking after a patient who has a post-operative narcotic infusion. Your observations will include blood pressure, heart rate, respirations & consciousness. In observing your patient for the effects of narcosis, it would be true to say that:

kkkk) The blood pressure is the most important
llll) Respirations and conscious state are the most important
mmmm) All observations are equally important
nnnn) Heart rate is the most important

Your time & participation have been very much appreciated thank-you again.
Appendix 8: Ethics Approval

Faculty of Arts and Education
Human Ethics Advisory Group (HEAG)
Melbourne campus at Burwood, 221 Burwood Highway, Burwood 3125, Victoria, Australia.
Telephone (03) 9244 0412, Facsimile (03) 9244 6306; Email: josephine.wro@deakin.edu.au

Chair: Dr Damien Blake
Secretary: Ms Josephine Wee

27 August 2008

Ms Paula Touzeau

Project Ref No: HEAG 08/27
Project Title: The value of guided operating theatre experience for surgical ward nurses

Dear Paula,

Your research ethics application has now been considered by independent reviewers of the Arts and Education Human Ethics Advisory Group and has been approved for you to commence the research.

Please be reminded that any modifications that you wish to make in the future must first be approved by the Arts and Education HEAG. You are also required to report any adverse events immediately.

The project number should now be included on the Plain Language Statements and must always be quoted in any communication with the Committee to avoid delays.

Best wishes,

Dr Damian Blake
Chair, HEAG
Plain Language Statement and Consent Form for
Head of Nursing School

(University of ........)

Conducted by Paula Touzeau as part of a PhD research project
Project Title: ‘The value of guided operating suite experience for undergraduate nurses’.

Dear Professor .......

I would like to introduce myself. My name is Paula Touzeau and I am a Registered Nurse studying towards a doctoral degree in Education through Deakin University in Victoria. This research project is under the supervision of Associate Professor Peter Smith and Dr Damian Blake both in the Faculty of Arts and Education.

Ethics approval has been granted from the Deakin University Human Research Ethics Committee, reference number HEAG08-27.

My research is aimed at evaluating ‘Perioperative’ (Operating Theatre) experience offered to undergraduate nurses nationally. The aims would be to explore comparative models of ‘perioperative’ education in Australia by:

a) establishing their ability to facilitate surgical knowledge that may assist nurses when caring for patients in pre- and post-operative surgical wards

b) determining if these differing models have any impact on recruitment and retention of nurses to the operating suite.

As your university offers a model of perioperative education (not all Australian Universities offer formal perioperative education to their undergraduate nurses) I would like to invite all your third year undergraduate nursing students and the curriculum coordinator of the undergraduate perioperative subject and to participate in my research.

Participation would be in two parts, firstly it would include inviting your third year undergraduate nursing students to participate in a voluntary anonymous questionnaire that would take approximately 15 minutes to complete. This would need to be undertaken just prior to the students’ final exams to ensure all learning had taken place.
Secondly I would like to invite the curriculum coordinator of the participating students to take part in a voluntary interview to discuss the particular perioperative model offered at your university, its inception and subsequent development. The interview process would take approximately 40 minutes. Following the interview, a transcript of the discussion will be sent back to the curriculum coordinator for final editing to ensure that their comments have been accurately recorded. This would be arranged at a mutually suitable time.

The anonymity of your university will be maintained at all times and will be referred to in my thesis & possible publications as ‘University Number 9’. All data and material associated with the research will be securely stored and destroyed via secure methods after a period of six years.

Ten universities with five differing models of perioperative education have been invited to participate. This may be a great opportunity for your university to benchmark your innovative perioperative model nationally.

If you have any questions regarding the project you may contact the researcher on 0355631668.

I would be more than happy to forward you information on the completed project should you wish.

Thank-you very much for the kind consideration you are giving to my doctoral research.

Yours Sincerely,

Paula Touzeau

Should you have any concerns about the conduct of this research project, please contact

Supervisor
Peter Smith
Faculty of Arts & Education
Geelong Campus
Deakin University
Email: pjbs@deakin.edu.au

or

Associate Supervisor
Damian Blake
Faculty of Arts and Education
Geelong Campus
Deakin University
Email: dmblake@deakin.edu.au
I, of

Hereby consent to allow my third year nursing students and curriculum coordinator to be invited to participate in a voluntary human research study to be undertaken by Paula Touzeau.

I have read the Plain Language Statement relevant to the research study and I understand that the purpose of the research is to investigate the ‘Perioperative’ subject offered at our university with a view to its value in preparing undergraduate nurses for pre- and post-operative surgical nursing.

I acknowledge that:

1. The aims, methods, and anticipated benefits, and possible hazards of the research study, have been explained to me.
2. I voluntarily and freely give my consent to allow my third year nursing students and relevant curriculum coordinator to be invited to participation in such research study.
3. I understand that findings will be used for research purposes and may be reported in journals.
4. Individual results will not be released to any person.
5. I am free to withdraw my consent at any time during the study, in which event my participation in the research study will immediately cease and any information obtained from me will not be used.

Signature:

Date: / /
Appendix 10: Plain Language Statement and Consent Form for Curriculum Coordinators

Conducted by Paula Touzeau as part of a PhD research project

DEAKIN UNIVERSITY
HUMAN RESEARCH ETHICS APPROVAL NUMBER HEAG08-27
PLAIN LANGUAGE STATEMENT FOR CURRICULUM CO-ORDINATORS

Date :

Project Title: ‘The value of guided operating suite experience for undergraduate nurses’.

I would like to introduce myself. My name is Paula Touzeau and I am a Registered Nurse studying towards a doctoral degree in Education through Deakin University in Victoria. This research project is under the supervision of Associate Professor Peter Smith and Dr Damian Blake both in the Faculty of Arts and Education.

The research I am conducting is aimed at evaluating ‘Perioperative’ (Operating Theatre) experience offered to undergraduate nurses across Australia. Specifically I am looking at the usefulness of operating theatre experience to prepare undergraduate nurses for surgical ward nursing and the possible impact of their experience on recruitment and retention of nurses to this specialty area. The research will be conducted in 2 phases.

The first phase of the research was completed when you students voluntarily completed a questionnaire surrounding surgical nursing knowledge.

In the second phase I would like to interview the curriculum coordinators who presided over the students who were involved in phase one of the project. It is for this reason I would like to invite you to participate.

…………., Head of Nursing School has consented to you be invited.

Your anonymity and that of your university will be maintained at all times and you will be referred to in my thesis & possible publications as ‘the curriculum coordinator of Australian University 1’. All data and material associated with the research will be securely stored and destroyed via secure methods after a period of six years.

Three universities with differing models of perioperative education will be involved in the research. This may be a great opportunity for your university to benchmark your innovative perioperative model nationally.
Participate in the project would require an interview taking approximately 40 minutes of your time. The interview would be semi-structured and questions would focus around the following:

- What were the driving forces that led to the development of this perioperative model of education offered at your university?
- Was any resistance encountered whilst setting up this model and if so, what strategies were you able to employ to facilitate the success of the project?
- How many years has the model been running and what feedback have you received from your students and the participating hospital staff?
- Do you envisage any changes to your style of perioperative education and if so why?

With your permission I would like to audiotape the interview for later transcription to text. I will then supply the text to you to ensure that I have captured your sentiments and comments accurately. You will be welcome to edit this transcript. Only comments from the edited transcript will be used. Your name will not be recorded on the tape or the transcript. Instead a number will be assigned and I will have a code that enables me to associate you with your number. Once the project is complete all identifying data will be destroyed. Access to the data and associating codes will be restricted to myself and they will be stored separately in locked cabinets at my workplace for a period of six years. After that time the data will be destroyed along with the associating codes.

It would be my pleasure to forward you a copy of the completed thesis if you wish.

If you have any questions regarding the project you may contact the researcher on 0355631668.

Thank-you for your time,

Paula Touzeau

Should you have any concerns about the conduct of this research project, please contact

Supervisor or	Associate Supervisor
Peter Smith	Damian Blake
Faculty of Arts & Education	Faculty of Arts and Education
Geelong Campus	Geelong Campus
Deakin University	Deakin University
Email: pjbs@deakin.edu.au	Email: dmblake@deakin.edu.au

DEAKIN UNIVERSITY
HUMAN RESEARCH ETHICS APPROVAL NUMBER HEAG08-27
CONSENT FORM: Curriculum co-ordinators

I, of

Hereby consent to be a subject of a human research study to be undertaken by Paula Touzeau.

I have read the Plain Language Statement relevant to the research study and I understand that the purpose of the research is to investigate the ‘Perioperative ’ subject offered at our university with a view to its value in preparing undergraduate nurses for post surgical nursing.

I understand that the interview will be audio taped and that a transcript will be forwarded to me to ensure accuracy of my comments and to allow me to edit the transcript if necessary. I further understand that my name will not be used in reporting of the findings.

I acknowledge that:

1. The aims, methods, and anticipated benefits, and possible hazards of the research study, have been explained to me.
2. I voluntarily and freely give my consent to my participation in such research study.
3. I understand that findings will be used for research purposes and may be reported in journals.
4. Individual results will not be released to any person.
5. I am free to withdraw my consent at any time during the study, in which event my participation in the research study will immediately cease and any information obtained from me will not be used.

Signature:

Date: / /
Appendix 11: Quantitative Assessment Tool

Please circle only ONE correct answer

1. Patients who have undergone a general anaesthetic:
   - All have an endotracheal tube inserted into their trachea to assist ventilation
   - Have an endotracheal tube inserted only if they have a non-depolarizing muscle relaxant
   - Have an endotracheal tube inserted only if they have a depolarizing muscle relaxant
   - Will only require intubation for specific surgical and anaesthetic requirements

2. Epidural and Spinal anaesthesia:
   - Differ because spinal anaesthesia is denser & longer-lasting
   - Differ in the anatomical positioning in which the local anaesthetic solution is deposited
   - Do not differ
   - Differ only in the amount of local anaesthesia used

3. If a patient has had a depolarizing muscle relaxant:
   - Fasciculation (generalized twitching) will occur and cause no side effects or muscle soreness
   - Fasciculation (generalized twitching) will occur and may cause muscle soreness in the ward later
   - No fasciculation will be seen
   - Fasciculation is not seen as this is only seen in non-depolarizing muscle relaxants

4. Epidural or spinal anaesthetic used with intravenous sedation:
   - Will seem exactly the same to a patient as a general anaesthetic
   - Allows pain free surgery whilst the patient is fully awake and aware of all the surroundings
   - Allows pain free surgery on a patient who is relaxed and may hear noises and can talk to staff
   - Is very relaxed but may experience very mild pain

5. In the post anaesthetic Care Unit oxygen therapy is:
   - Only used when patients are hypoxic
   - Used in patients who’s saturation of oxygen falls below 94%
   - Used for all post general anaesthesia patients
   - Not used at all

6. A patient has consented to a ‘Total Abdominal Hysterectomy’. In this procedure the ovaries are:
   - Always removed
   - Conserved and left insitu
   - Sometimes conserved & some times removed depending on the case
lllll) Only removed if carcinoma is present

7. If a patient had a laparoscopic cholecystectomy it would be expected that they would have:
   iii) Two small incisions
   jjj) One large upper abdominal incision
   kkk) Four to six small incisions
   lll) Lower abdominal incision

8. Following laparoscopic surgery it is common for patients to suffer:
   mmmmm) Back pain from lying on the operating table
   nnnnn) No pain post operatively
   ooooo) Calf pain from the calf stimulators
   ppppp) Shoulder tip pain from gas under the diaphragm

9. In a diagnostic laparoscopy the patient's:
   qqqqq) Very rarely have any pain post operatively
   rrrrr) Have only minimal pain as they have only two small incisions
   sssss) Have many incisions thus have moderate pain
   ttttt) Have two incisions but may experience moderate to severe pain

10. In hypovolemic shock the patient will exhibit:
    uuuuu) A decrease in blood pressure and an increase in heart rate
    vvvvv) A decrease in heart rate and blood pressure
    wwww) An increase in blood pressure and a decrease in heart rate
    xxxxx) An increase in heart rate and an increase in blood pressure

11. In a shocked patient (↓ > 20% of baseline B/P) the position of choice would be:
    yyyyy) Head down and feet up
    zzzzz) Head flat and feet up
    aaaaaa) Head up and feet up
    bbbbb) Head down and feet flat

12. You are caring for a patient who has had a thyroidectomy. Your patient suddenly develops a stridor. Do you:
    ccccc) Sit the patient up, give oxygen 6 litres via a Hudson mask & reassure the patient
    ddddd) Do what is suggested in a) & notify the surgeon and if respiratory distress is severe remove clips/sutures from both skin and muscle layers of the neck
    eeeeee) Do what is suggested in a) & notify the surgeon and prepare to administer iodine for ↓ serum calcium levels
    ffffff) Post thyroid patients are often very anxious prone to hysterical breathing patterns. Stay with the patient and provide reassurance

13. If a sterile item is dropped on the floor in the ward you should:
    gggggg) Consider the item unsterile and discard it
    hhhhhh) Carefully examine the integrity of the item and if O.K. use it
    iiiiiii) Use it as planned
14. The single most effective method of preventing cross infection is:
   kkkkk) Use of antibiotics in post surgical patients
   lllll) Use of preoperative antibiotic cover for all patients
   mmmmmm) Use of strong disinfectants in the ward
   nnnnn) Effective & timely hand washing

15. Patients who are coming for surgery need to:
   oooooo) Leave full upper & lower teeth in situ for airway assistance
   pppppp) Take all teeth out and leave on the ward
   qqqqqq) Clean false teeth and soak in disinfectant before coming to theatre
   rrrrrr) Leave their teeth at home for safekeeping

16. Pre-operative shaves are:
   ssssss) Performed with shaving cream and razor on the ward
   tttttt) Performed by clippers in the operating suite or as close to the surgical
         procedure as possible
   uuuuuu) Performed by patients at home who are instructed on where to
         shave prior to admission to hospital
   vvvvvv) Performed by clippers on the ward the night prior to surgery

17. Following general anaesthetic children who are not ‘nil by mouth’ or suffering
    from nausea will be gradually introduced to oral intake:
    mmm) After they have been back on the ward for two hours
    nnn) After they have been back on the ward for one hour
    ooo) As soon as they return to the ward
    ppp) After they have been on the ward for 4 hours

18. When assessing the effectiveness of a closed suction drain tube such as a
    redivac, the nurse knows that the system has lost its suction when:
    wwwwww) Fluid can no longer be seen draining into the bottle
    xxxxxx) There has been no further drainage since the last marking on the
            bottle
    yyyyyy) The patient has not complained of pain, which is a classic sign
            of loss of suction
    zzzzzz) When the concertina valve on the bottle has lost tension and has
            risen.

19. Hypothermia is a common postoperative occurrence. In rewarming patients on
    the ward it is essential to:
    qqq) Take the blood pressure regularly as it is likely to decrease during
        rewarming
    rrr) Take the blood pressure regularly as it is likely to increase during
        rewarming
    sss) Take the blood pressure as a routine post-op observation but this has
        no connection with the temperature
    ttt) Concentrate on increasing the temperature and do not worry about the
        blood pressure
20. You are looking after a patient who has a post-operative narcotic infusion. Your observations will include blood pressure, heart rate, respirations & consciousness. In observing your patient for the effects of narcosis, it would be true to say that:

aaaaaa) The blood pressure is the most important
bbbbbb) Respirations and conscious state are the most important
ccccccc) All observations are equally important
dddddd) Heart rate is the most important

Your time & participation have been very much appreciated thank-you again.
Appendix 12: Reliability of individual multiple-choice questions

In 2010 patients are well-informed consumers. The internet, documentaries on medical procedures and reality television with actual patients revealing their surgical procedures have provided patients with a level of understanding never seen before. This in turn has seen the depth and complexity of questions asked by patients regarding their surgical procedures increase dramatically.

Each individual question has a reason for its inclusion, and a ‘story’ to tell. The following information will provide explanation and insight into the development of each question’s subject matter. Correct answers will be bolded in red for reader interest.

**Question 1  Subject category – pre-operative patient education**

Patients who have undergone a general anaesthetic:

a) All have an endotracheal tube inserted into their trachea to assist ventilation  

b) Have an endotracheal tube inserted only if they have a non-depolarizing muscle relaxant  

c) Have an endotracheal tube inserted only if they have a depolarizing muscle relaxant  

**d) Will only require intubation for specific surgical and anaesthetic requirements**

An endotracheal tube (ETT) is a device that is inserted into the windpipe to assist breathing (Morgan, Mikhail & Murray 2006). Historically it would have been used in approximately 50% of all patients receiving general anaesthesia however in modern anaesthetic practice it is only used on patients who have had procedures that require them to be paralysed during their operation or on patients with pre-existing airway concerns (Morgan et al. 2006). A newer much less invasive device called a Laryngeal Mask Airway (LMA) is being used more frequently and often replaces the need for an endotracheal tube (Morgan et al.)
It is important for nurses to know the difference between these devices as patients requiring an endotracheal tube have been paralysed and may experience changes in their breathing or heart rate post-operatively. Reality television programs often explain this concept thus many patients have an awareness of the types of airway devices available. Patients often ask nurses what type of airway device they will be having or have had.

**Question 2  Subject Category – pre-operative patient education**

Epidural and Spinal anaesthesia:

a) Differ because spinal anaesthesia is denser & longer lasting  
b) **Differ in the anatomical positioning in which the local anaesthetic solution is deposited.**  
c) Do not differ  
d) Differ only in the amount of local anaesthesia used

Epidural and spinal anaesthesia are types of local anaesthetic blocks that differ in the anatomical positioning in which the local anaesthetic solution is deposited (Morgan et al. 2006). ‘Epi’ means ‘outside’ so epidural refers to the space that sits outside the dura which is one of the protective layers around the brain and spinal cord (Seeley, Stephens & Tate 2006). Spinal anaesthesia is placed in the space inside the dura (Morgan et al. 2006). Understanding the differences between the two are important as it changes the amount of local anaesthetic solution that can be administered, the denseness of motor blockade (ability to walk) and length of block duration (Morgan et al. 2006). This is important pre-operative education for the patient.

**Question 3  Subject Category – surgical ward nursing / post-operative care**

If a patient has had a depolarizing muscle relaxant:

a) Fasciculation (generalized twitching) will occur and cause no side effects or muscle soreness  
b) **Fasciculation (generalized twitching) will occur and may cause muscle soreness in the ward later**  
c) No fasciculation will be seen
d) Fasciculation is not seen as this is only seen in non-depolarizing muscle relaxants

There are two different types of muscle relaxant drugs used to paralyse patients who require endotracheal intubation whilst anaesthetised (Morgan et al. 2006). One particular type, ‘depolarising’ muscle relaxants cause generalized twitching (fasciculation) which may cause muscle soreness later in the ward area (Morgan et al. 2006). The pain is similar to muscle pain one would get if they had exercised very strenuously. Similarly to exercise pain, it presents a day or so after the exercise has been done. If nurses do not understand this possible side effect they cannot explain this to the patients and may even suspect more serious complications are occurring. Patients have been exposed to unnecessary testing only to then find this was due to the muscle relaxant (Morgan et al. 2006).

**Question 4  Subject Category – pre-operative patient education**

Epidural or spinal anaesthetic used with intravenous sedation:

a) Will seem exactly the same to a patient as a general anaesthetic

b) Allows pain free surgery whilst the patient is fully awake and aware of all the surroundings

c) **Allows pain free surgery on a patient who is relaxed and may hear noises and can talk to staff**

d) Is very relaxed but may experience very mild pain

Patients who are told they will be having a local anaesthetic technique with sedation are often anxious about being awake and so pre-operatively ask the nurses in the ward questions about this anaesthetic technique. The sedation is very strong and patients are very relaxed during the procedure. The drugs that are used to provide the sedation often cause amnesia (Morgan et al. 2006) post-operatively so the patients tell nurses on the ward post-operatively that they were asleep but in reality they were not. Patients are pain free, able to hear noises and talk to the staff at time of surgery but do not remember this later. It can be problematic if patients
are not given accurate pre-operative information and are told that this will be the same as a general anaesthetic.

It is essential that patients have accurate pre-operative education because it allays fears and instils confidence in the staff and hospital.

**Question 5  Subject Category – surgical ward nursing / post-operative care**

In the Recovery Room oxygen therapy is:

a) Only used when patients are hypoxic

b) Used in patients who’s saturation of oxygen falls below 94%

c) **Used for all post general anaesthesia patients**

d) Not used at all

Post general anaesthesia all patients will require oxygen therapy to help wash out anaesthetic drugs from the respiratory track and also to assist in cellular repair (Morgan et al. 2006).

**Question 6  Subject Category – pre-operative patient education**

A patient has consented to a ‘Total Abdominal Hysterectomy’. In this procedure the ovaries are:

a) Always removed

b) **Conserved and left insitu**

c) Sometimes conserved & some times removed depending on the case

d) Only removed if carcinoma is present

In explanation of this question, I must relate a clinical incident I was involved in. On routine checking in of a patient for surgery, a woman who had consented to a ‘Total Abdominal Hysterectomy’ asked what was going to happen to her ovaries. I explained that she had consented for a Total Abdominal Hysterectomy and that referred to her uterus only, however I would speak to her surgeon before the operation began to confirm this consent. She thanked me and explained that she had asked four different nurses on the ward pre-operatively and been given four different answers. She was very relieved because she had been told by her surgeon that she would retain her ovaries to save her having hormone replacement. I spoke
to the surgeon to confirm that her consent was correct and she would be having ovarian conservation.

Surgical consents are very specific and only the stated procedure can be performed (Berry & Kohn 2004). If the ovaries were to be included the consent would have been for ‘Total Abdominal Hysterectomy and bilateral (or left or right) oopherectomy’. If the surgeon was going to observe the ovaries at the time of operation and make a decision whether or not to conserve, then the consent would have reflected this and said ‘Total Abdominal Hysterectomy plus or minus oopherectomy’. Much angst could have been saved if the correct information was provided the first time.

**Question 7  Subject Category – surgical ward nursing /pre-operative care**

If a patient had a Laparoscopic Cholecystectomy it would be expected that they would have:

a) Two small incisions  
b) One large upper abdominal incision  
c) **Four to six small incisions**  
d) Lower abdominal incision

It is essential to know what type of incisions a patient would have to enable the nurse to accurately check and assess the post-operative dressings and provide accurate pre-operative education to the patient.

**Question 8  Subject Category – pain management**

Following laparoscopic surgery it is common for patients to suffer:

a) Back pain from lying on the operating table  
b) No pain post operatively  
c) Calf pain from the calf stimulators  
d) **Shoulder tip pain from gas under the diaphragm**

Shoulder tip pain is a common side effect of laparoscopic surgery (Rothrock 2007). During these procedures gas is placed in the abdominal cavity to allow
vision of the organs. Post-operatively this gas can rise up under the diaphragm and cause referred pain to the shoulders (Rothrock 2007). This is more likely to occur several hours after surgery when the patient is sitting upright and moving around more easily thus vital post-operative education.

**Question 9 Subject Category – pain management**

In a diagnostic laparoscopy the patients:

a) Very rarely have any pain post operatively

b) Have only minimal pain as they have only two small incisions

c) Have many incisions thus have moderate pain

d) **Have two incisions but may experience moderate to severe pain**

Laparoscopic surgery was initially marketed as being far less painful post-operatively than convention surgeries (Rothrock 2007). This is true, however in the initial post-operative phase patients’ can experience moderate to severe pain depending on the procedure as the same operation has been performed. In the subsequent days when the patients move around more their post-operative pain should be less. There are many cases of patients receiving minimal or no analgesia because nurses believed that the procedure is pain free.

**Question 10 Subject Category – surgical ward nursing / post-operative care**

In hypovolemic shock the patient will exhibit:

a) A **decrease in blood pressure and an increase in heart rate**

b) A decrease in heart rate and blood pressure

c) An increase in blood pressure and a decrease in heart rate

d) An increase in heart rate and an increase in blood pressure

Shock may be defined as a decrease in blood pressure of greater than 20% of the baseline blood pressure reading (Morgan et al. 2006) Hypovolemic shock is due to blood loss. This is a very serious complication if not identified and treated quickly may lead to death (Morgan et al. 2006). It is paramount that nurses know exactly what the correct signs and symptoms of this complication are so as to be able to assess and report changes in the patients’ medical state.
**Question 11  Subject Category – surgical ward nursing / post-operative care**

In a shocked patient (a decrease of greater than 20% of baseline B/P) the position of choice would be:

a) Head down and feet up  
b) **Head flat and feet up**  
c) Head up and feet up  
d) Head down and feet flat

If the signs and symptoms of shock are noted it is essential to take prompt and appropriate action. The aim of positioning is to provide the easiest blood flow to the brain so the patient is laid flat with their feet up to promote drainage of blood from the legs. In older teachings it was thought that placing a patient head down would assist blood flow to the brain further however newer research has proved the head down position (Trendelenburg) to be unphysiological (Morgan et al. 2006) and more cerebral blood is achieved by the flat position.

**Question 12  Subject Category – surgical ward nursing / post-operative care**

You are caring for a patient who has had a thyroidectomy. Your patient suddenly develops a stridor. Do you:

a) Sit the patient up, give oxygen 6 litres via a Hudson mask & reassure the patient  
b) Do what is suggested in a) & notify the surgeon and if respiratory distress is severe remove clips/sutures from both skin and muscle layers of the neck  
c) Do what is suggested in a) & notify the surgeon and prepare to administer iodine for ↑ serum calcium levels  
d) Post thyroid patients are often very anxious prone to hysterical breathing patterns. Stay with the patient and provide reassurance

The genesis of my research into pre-operative and post-operative care stemmed from the death of a mother of three in 2002. Staff caring for the patient on the surgical ward believed that her breathing pattern was due to ‘panicking’ when in fact she was bleeding internally and the blood caused compressing her windpipe.
The treatment is to remove the stitches from the skin and muscle layer of the neck to allow the blood to flow out and relieve the pressure on the windpipe (Morgan et al. 2006).

**Question 13  Subject Category – asepsis**

If a sterile item is dropped on the floor in the ward you should:

a) **Consider the item unsterile and discard it**

b) Carefully examine the integrity of the item and if O.K. use it

c) Use it as planned

d) Use it only if there are no more of this item

Any item that is dropped on the floor must be considered unsterile (Rothrock 2007). There were two very simple questions (13 & 14) to ensure that the students were actually reading the questions and not just randomly circling answers. This was one.

**Question 14  Subject Category – asepsis**

The single most effective method of preventing cross infection is:

a) Use of antibiotics in post surgical patients

b) Use of preoperative antibiotic cover for all patients

c) Use of strong disinfectants in the ward

d) **Effective & timely hand washing**

This concept is the basis of infection control and prevention of all infection (Rothrock 2007).

**Question 15  Subject Category – surgical ward nursing / pre-operative care**

Patients who are coming for surgery need to:

a) **Leave full upper & lower teeth in situ for airway assistance**

b) Take all teeth out and leave on the ward

c) Clean false teeth and soak in disinfectant before coming to theatre

d) Leave their teeth at home for safe keeping
Full upper and lower dentures provide great assistance to providing airway support in anaesthesia management (Morgan et al. 2006). The anaesthetic nurse will remove a patient’s teeth in theatre if required and place them back in the patient’s mouth at the completion of surgery. If surgical ward nurses are not aware of this information they may send patients to theatre without their teeth.

**Question 16  Subject Category – surgical ward nursing / pre-operative care**

Pre-operative shaves are:

a) Performed with shaving cream and razor on the ward

b) **Performed by clippers in the operating suite or as close to the surgical procedure as possible**

c) Performed by patients at home who are instructed on where to shave prior to admission to hospital

d) Performed by clippers on the ward the night prior to surgery

In approximately mid 1990 hair removal prior to surgery changed from shaving pre-operatively to clipper shaving in the operating suite. This change was due to infection control as it was shown that pre-shaving removed the top layer of cells thus revealed underlying skin micro-organisms and causing a greater number of post-operative skin infections (Rothrock 2007).

**Question 17  Subject Category – surgical ward nursing / post-operative care**

Following general anaesthetic children who are not ‘nil by mouth’ or suffering from nausea will be gradually introduced to oral intake:

a) After they have been back on the ward for two hours

b) After they have been back on the ward for one hour

c) **As soon as they return to the ward**

d) After they have been on the ward for 4 hours

As children are smaller, they are more prone to dehydration than adults and so cannot be fasted for extensive periods of time (Morgan et al. 2006). On return to the surgical ward children who are not ‘nil by mouth’ or suffering from nausea will be gradually introduced to oral intake as soon as they return.
Question 18  Subject Category – surgical ward nursing / post-operative care

When assessing the effectiveness of a closed suction drain tube such as a redivac, the nurse knows that the system has lost its suction when:

a) Fluid can no longer be seen draining into the bottle
b) There has been no further drainage since the last marking on the bottle
c) The patient has not complained of pain, which is a classic sign of loss of suction
d) **When the concertina valve on the bottle has lost tension and has risen**

It is essential for nurses to know when the drainage bottle has lost its suction so corrective measures to reinstate the suction can be achieved. Suction will promote drainage and stop a blood clot forming internally.

Question 19  Subject Category – surgical ward nursing / post-operative care

Hypothermia is a common postoperative occurrence. In rewarming patients on the ward it is essential to:

a) **Take the blood pressure regularly as it is likely to decrease during rewarming**
b) Take the blood pressure regularly as it is likely to increase during rewarming
c) Take the blood pressure as a routine post-op observation but this has no connection with the temperature
d) Concentrate on increasing the temperature and do not worry about the blood pressure

The correlation between a patient temperature and their blood pressure is essential for post-operative nursing care because many post-operative patients have a lower body temperature (Stanhope, 2006). If nurses are not aware of a possible drop in blood pressure when rewarming, they may not take observations to assess for this and life-threatening condition it may go unnoticed.
**Question 20  Subject Category – pain management**

You are looking after a patient who has a post-operative narcotic infusion. Your observations will include blood pressure, heart rate, respirations & consciousness. In observing your patient for the effects of narcosis, it would be true to say that:

a) The blood pressure is the most important  

b) **Respirations and conscious state are the most important**  

c) All observations are equally important  

d) Heart rate is the most important  

‘Narcosis’ is the term used for signs that present when a patient has had or is having too much narcotic (Morgan et al., 2006). These changes manifest in the respiration which will start to slow and the conscious state will deteriorate (the patient will become more drowsy).
Appendix 13: Results of individual multiple-choice questions

**Question 1**  Subject category – pre-operative patient education

Patients who have undergone a general anaesthetic:

a) All have an endotracheal tube inserted into their trachea to assist ventilation
b) Have an endotracheal tube inserted only if they have a non-depolarizing muscle relaxant
c) Have an endotracheal tube inserted only if they have a depolarizing muscle relaxant
d) Will only require intubation for specific surgical and anaesthetic requirements

**Question 2**  Subject Category – pre-operative patient education

Epidural and Spinal anaesthesia:

a) Differ because spinal anaesthesia is denser & longer lasting
b) Differ in the anatomical positioning in which the local anaesthetic solution is deposited
c) Do not differ
d) Differ only in the amount of local anaesthesia used

**Question 3**  Subject Category – surgical ward nursing / post-operative care

If a patient has had a depolarizing muscle relaxant:

a) Fasciculation (generalized twitching) will occur and cause no side effects or muscle soreness
b) Fasciculation (generalized twitching) will occur and may cause muscle soreness in the ward later
c) No fasciculation will be seen
d) Fasciculation is not seen as this is only seen in non-depolarizing muscle relaxants
**Question 4  **Subject Category – pre-operative patient education

Epidural or spinal anaesthetic used with intravenous sedation:

a) Will seem exactly the same to a patient as a general anaesthetic

b) Allows pain free surgery whilst the patient is fully awake and aware of all the surroundings

c) Allows pain free surgery on a patient who is relaxed and may hear noises and can talk to staff

d) Is very relaxed but may experience very mild pain

![Question 4 - Central Blockage & Intravenous Sedation](image)

**Question 5  **Subject Category – surgical ward nursing / post-operative care

In the Recovery Room oxygen therapy is:

a) Only used when patients are hypoxic

b) Used in patients who’s saturation of oxygen falls below 94%

c) Used for all post general anaesthesia patients

d) Not used at all

![Question 5 - Oxygen Therapy](image)

**Question 6  **Subject Category – pre-operative patient education

A patient has consented to a ‘Total Abdominal Hysterectomy’. In this procedure the ovaries are:

a) Always removed

b) **Conserved and left insitu**

c) Sometimes conserved & some times removed depending on the case

d) Only removed if carcinoma is present

![Question 5 - Total Abdominal Hysterectomy](image)
**Question 7  Subject Category – surgical ward nursing / pre-operative care**

If a patient had a Laparoscopic Cholecystectomy it would be expected that they would have:

a) Two small incisions  
b) One large upper abdominal incision  
c) Four to six small incisions  
d) Lower abdominal incision

**Question 8  Subject Category – pain management**

Following laparoscopic surgery it is common for patients to suffer:

a) Back pain from lying on the operating table  
b) No pain post operatively  
c) Calf pain from the calf stimulators  
d) Shoulder tip pain from gas under the diaphragm

**Question 9  Subject Category – pain management**

In a diagnostic laparoscopy the patients:

a) Very rarely have any pain post operatively  
b) Have only minimal pain as they have only two small incisions  
c) Have many incisions thus have moderate pain  
d) Have two incisions but may experience moderate to severe pain
**Question 10**  *Subject Category – surgical ward nursing / post-operative care*

In hypovolemic shock the patient will exhibit:

a) **A decrease in blood pressure and an increase in heart rate**

b) A decrease in heart rate and blood pressure

c) An increase in blood pressure and a decrease in heart rate

d) An increase in heart rate and an increase in blood pressure

**Question 11**  *Subject Category – surgical ward nursing / post-operative care*

In a shocked patient (a decrease of greater than 20% of baseline B/P) the position of choice would be:

a) Head down and feet up

b) **Head flat and feet up**

c) Head up and feet up

d) Head down and feet flat

**Question 12**  *Subject Category – surgical ward nursing / post-operative care*

You are caring for a patient who has had a thyroidectomy. Your patient suddenly develops a stridor. Do you:

a) Sit the patient up, give oxygen 6 litres via a Hudson mask & reassure the patient

b) **Do what is suggested in a) & notify the surgeon and if respiratory distress is severe remove clips/sutures from both skin and muscle layers of the neck**

c) Do what is suggested in a) & notify the surgeon and prepare to administer iodine for ↑ serum calcium levels

d) Post thyroid patients are often very anxious prone to hysterical breathing patterns. Stay with the patient and provide reassurance
Question 13  Subject Category – asepsis

If a sterile item is dropped on the floor in the ward you should:

a)  Consider the item unsterile and discard it
b)  Carefully examine the integrity of the item and if O.K. use it
c)  Use it as planned
d)  Use it only if there are no more of this item

Question 14  Subject Category – asepsis

The single most effective method of preventing cross infection is:

a)  Use of antibiotics in post surgical patients
b)  Use of preoperative antibiotic cover for all patients
c)  Use of strong disinfectants in the ward
d)  Effective & timely hand washing

Question 15  Subject Category – surgical ward nursing / pre-operative care

Patients who are coming for surgery need to:

a)  Leave full upper & lower teeth in situ for airway assistance
b)  Take all teeth out and leave on the ward
c)  Clean false teeth and soak in disinfectant before coming to theatre
d)  Leave their teeth at home for safe keeping
Question 16  Subject Category – surgical ward nursing / pre-operative care

Pre-operative shaves are:

a) Performed with shaving cream and razor on the ward
b) **Performed by clippers in the operating suite or as close to the surgical procedure as possible**
c) Performed by patients at home who are instructed on where to shave prior to admission to hospital
d) Performed by clippers on the ward the night prior to surgery

Question 17  Subject Category – surgical ward nursing / post-operative care

Following general anaesthetic children who are not ‘nil by mouth’ or suffering from nausea will be gradually introduced to oral intake:

a) After they have been back on the ward for two hours
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c) Take the blood pressure as a routine post-op observation but this has no connection with the temperature

d) Concentrate on increasing the temperature and do not worry about the blood pressure

**Question 20  Subject Category – pain management**

You are looking after a patient who has a post-operative narcotic infusion. Your observations will include blood pressure, heart rate, respirations & consciousness. In observing your patient for the effects of narcosis, it would be true to say that:

a) The blood pressure is the most important

b) **Respirations and conscious state are the most important**

c) All observations are equally important

d) Heart rate is the most important
Appendix 14: Un-themed qualitative data on transferable skills

Question 2 - Student comments on transferable skills

Did you find the information that you may have learned in the operating theatre assisting you in your nursing skills outside the operating suite?

University no. 2 - No formal perioperative experience (follow-through)
1. “Yes, why we perform the practices we do pre & post-op”
2. “I learned that the pre-preparation of patients before the operation was very important”
3. “Yes, assessment & monitoring skills”
4. “To a small extent. I think I understand the pain post-op patients will be experiencing after seeing how rough surgery can be”
5. “Yes, a better understanding of procedure, pain and recovery patients may experience post-operatively”
6. “Yes, understand anatomy and understand why patients have so much pain and require specific nursing care”
7. “Especially aseptic skill”
8. “It was invaluable in gaining a better insight to post-operative care of patients & their needs”
9. “Yes, an increased understanding in what patients’ undergo when they have surgery”
10. “Yes, aided in understanding the process and therefore side effects the patient may have and why, and then how to nurse them”
11. “Yes, sterile technique, nursing knowledge & understanding what actually happens in the operating suite. Assists with understanding what the patients have been through, if working in other hospital wards i.e. surgical”.
12. “Yes, assists in understanding what has been done and patient care”
13. “It provided insight into what a patient goes through during a procedure and how it takes its toll on the body – this enhances my understanding and increased my knowledge in post-op care in the wards”
14. “Yes, information given to me in theatre and I went away and looked up reference materials”
15. “Yes it helped with surgical care”
16. “Other than the understanding of procedures and anatomy involved, no”
“Definitely - gain a better understanding of patient & what they are going through – affects the care you give on the ward”

“I did find the information useful as the surgeon in my theatre was very helpful explaining things to me being a student”

“Yes, more insight into procedures and care needed”

“It made me more understanding of the pain that patients complain of. It also made me more knowledgeable so I could explain procedures of processes to patients”

“Affirmative, very much so – my rationale for attending was I wanted to observe surgery to gain a thorough understanding of the process by actually participating in it not just reading about it”

“Yes”

“Yes”

“I imagine it would – again though I have no idea (no exposure) but I found skills that I learned in one area I was always able to apply in another area”

“Yes, I found that by witnessing procedures it gives you a better understanding of the patient recovering on the ward”

“No”

“Yes, in regards to team work and time management”

“I have an understanding of what happens and helps to answer questions from the patient and family”

“Yes”

“Yes. I often think back to that one day I was in theatre”

“No”

“It has been interesting and gives a greater idea of the procedures and what sort of pain or areas of pain for the person”

“Some. I only spent 8 hours in the operating suite. However, I found that I would like to have some more time in theatre”

“Yes in the anatomical sense it was educational to see in the flesh what is normally only see in text books. And the anaesthetic component at the surgery is more important than we think. Normally vitals etc... are taken without a second thought, now I think more about it)”

“It helped me understand a little more about the anatomy”

“Yes – this experience helped me link theory to practice”

“No”

“Yes I am able to understand what the patient goes through before they return to the ward and am better able to make decisions based on their OT experience and treatment”

“Yes”
University no. 2 – Guided Practice

“Hope, well – vital signs and assessments and certain drugs given by the anaesthetist were applicable to nursing outside the suite but that all”

University no. 2 – Perioperative subject (guided learning & practice)

“The skills learned in PACU eg. Patient assessment, I will definitely take with me”

“Yes, broadens my horizons”

“Yes – particularly re: anatomy and physiology”

“Yes, I loved it. It is my chosen career path and it is the reason why I studied nursing”

“Definitely”

“Yes. I learned why patients may be so sore because I watched their procedures so I have more of an understanding of what they were going through. It also gave me the skills to prepare them for theatre procedures”

“Knowledge of patient positioning whilst being operated on”

“Yes textbook provided was very useful”

“Yes insight gained into the patients’ experiences”

“Yes with the TURP’s and bladder washout, what the mother goes through in a c-section and some anatomy. Definitely with sterility, a bit of anaesthetics, so I have a different perspective now”

“I felt more confident in explaining procedures to patients in the ward both pre-op and post-op. More aware of what they had been through.

“Absolutely”

“Yes, as I understand more about the physical procedure and therefore the care they need”

“Most definitely. Sterility is so important and working in the operating suite just highlighted its importance. Understanding preventative measures such as warming up to prevent hypothermia were extremely beneficial for insight”.

“Yes, particularly in post-op care”

“Yes as you can have an appreciation of what goes on but also being able to understand how they perform a few operations and being able to tell the patient what will happen”

“Yes”

“In most respects nursing care differs greatly however there was still the notion of patient respect and advocation”

“Yes, better understanding of process patient has been through”
“Yes as I was able to understand fully what the patient has gone through and this allowed my support as a nurse to improve my trust in believing the patient and their pain improved”.

“Yes, I was able to understand why patients come out of surgery feeling the way they do”

“Yes, broadens horizons”

**University no. 4 - No formal perioperative experience (follow through)**

“Yes airway management is a vital skill for any nurse to master”

“Yes because I could relate to the patients discomfort”

“Yes only had 3 days in theatre”

“No/Yes. Taught me to allow students to take ?????? and we become supernumery”

“No, didn’t really learn anything”

“Yes, has increased educational knowledge of what happens so that I can explain more fully to the patients”

“Yes ++. Insight into the procedures, pre & post-op. All information acquired specific to nursing care. Intra-op not retained on reflection. Spent time in day procedure unit as a RN Div2 but limited again. Conflict as where info was learned & skills”

“Yes, sterility”

“A little, helped me understand the recovery of orthopaedic patients”

“It made what you do on the ward and why make so much more sense. Certainly it gave me a rationale for certain drugs and policies of the ward. Complemented the theory excellently”

“Made me aware of possible complications”

“Gained some understanding of what the patient goes through”

“Definitely yes”

“Yes, assisted my compassion and understanding of procedures”

“Yes”

“Should be”

“Yes”

“Yes, it helped me to understand what the patient had gone through when in surgery”

“Better understanding of procedures & reason for pre-op requirements”

“Yes”

“Sure particularly with post-op care & client education”

“Not really”
“Yes sometimes, more on a ward when a patient comes back post-op”

“Not really – maybe more understanding of recovery for certain patients”

**University no. 4 – Guided practice no theory**

“Yes, particularly the admission & discharge process”

“Aseptic technique, putting sterile gloves on would be the two skills that stand out that will help with nursing outside theatre”

“Yes, greater understanding of anatomy, anaesthetics, how certain operations are performed”

“Yes, as relevant when caring for patients after surgery as gave me more understanding of procedure”

“Yes an enhanced understanding of anatomy & physiology”

“Absolutely. Being aware of what happens in theatre is very useful in caring for patients in all areas of nursing”

“Yes, clinical skill improvement”

“Yes. I am now able to understand the levels of pain reasons for drains etc.”

“No”

“Yes, when attending to pre & post op care plans – why we do what we do”

“Yes, pain management skills & knowing why patients feel like they do on the wards after surgery”

“Definitely, the skills learnt could be transferred to ward nursing & caring for patients in any nursing environment”

**University no. 4 – Theory but no guided practice**

“Not really”

“Sometimes”

“Yes, I can explain to patients what will/may happen. I understand my role & responsibilities in the O.R. and have better understanding of what O.R. staff from me, i.e documentation”

“Yes, it helped when we assist patient with pain because we know where the operation site was & what intervention we need to provide”

“Yes particularly, more than anything, you understand why patients are in a lot of pain when they return to the ward”

**University no. 5 – Perioperative subject (guided learning & practice)**
“Yes I feel my clinical judgement has been helped & I feel more confident at looking the patient to guide my nursing interventions, not just using machines”

“Yes tremendously. Now I know why so many patients have pain”

“Yes”

“Yes, I now understand why the patients are in pain or why they are on the pathways for care”

“Yes the theory learnt during course very informative to theatre prac”

“Yes”

“Yes, especially with post-op care, reasons for pain etc…”

“Yes”

“Yes, especially when considering that care of post-op patient, understanding the procedure they have had and that kind of thing to aid in care”

“Yes, enabled me to better understand the procedure in the OR and related care essential on the ward”

“Yes, types of equipment used. Seeing patients in theatre gives a better understanding of how they would feel after surgery and be able to better assess them”

“Yes it helped you understand and appreciate what goes on in the OR and why patients have pain, nausea, difficulty moving etc…”

“Yes because you can better understand anatomy and physiology and appreciate pain and complications patients may have”

“Yes because it gave me insight in a patients journey through surgery”

“Yes, you know what the patient is going through and you have a better understanding of their care”

“Yes by understanding how procedures / operations are performed, I can understands what the needs and requirements will be from post-op recovery back to the ward”

“Yes”

“Yes”

**University no. 9 – Theory no guided practice**

“The information learned in theory during the course re medications, terminology & procedures is very useful in surgery nursing”

“Yes provides great anatomical information & the reasons behind post-op care”

“Yes by being able to see procedures done helped to provide better care to patients on the surgical ward”
“Yes, I questioned myself about getting patients up too early. I understand more clearly the state & reason for their illness”

“Yes”

“Yes, helps with anatomy - seeing where organs are in the body”

“Yes regarding checking & rechecking forms in order to make sure we have the right patient”

“Yes, you understand what the patient goes through”

“Yes”

University no. 9 - Perioperative subject (guided learning & practice)

“Yes, to explain to my ortho patients what will happen during their procedure”

“Yes. Asepsis & wound care & manner of surgery relating to mobility & pain post-op pain”

“Yes, helped on surgical wards knowing what actually happens in operations, why they are in so much pain”

“Yes”

“Yes, as I understand better the procedures in which patients have been through”

“Yes”

“Yes”

“Learned good aseptic technique”

“Yes”

“Yes, it was very interesting”

“Yes, being able to explain procedure & protocol to patients on the surgical ward prior to surgery”

“Yes to a certain degree, but have not had a standard surgical placement”

“Yes”

“Yes”

“No”

“Yes, for surgical wards”

“Definitely, e.g drains – I am now able to explain to my patients on the ward the purpose & position of the drain & reassure them about it”

“Yes, more knowledge always helps”

“Yes, looking after surgical patients”

“Yes, it helped me realize how important sterile technique is”
“I did not really use skills I gained outside operating suite but the knowledge helped in understanding what happens during operations’

“Yes”

“Yes”

“Yes”

“Yes”

“As above (I had already done surgical ward placements & it was interesting to find out patients’ presented the way they did) I knew what to expect’’

“Yes”

“Yes, especially in the area of post-op care’’

“Yes”

“Yes”

“Yes”

“Yes”

“Yes as said above it gave a broader perspective of what the patient had to endure’’

“Not in particular”

“Yes”

“Yes, scrubbing, gown & gloving be sterile’’

“Yes”

“Yes, particularly working on surgical wards as I have a further understanding of what they have been through in their surgery and understanding their symptoms’’

“Increased ability to provide information to patients & have increased understanding of procedures’’

“Yes, I felt well prepared’’

“No”

“Yes, you get an understanding of why the patients maybe experiencing the pain that that they are’’

“Yes”

“No”

“No”

“Yes brief intro’’

“Yes”

“Yes”

“Yes, keeping a sterile field. I am much more conscious of this’’”
“Yes I now have background to how to care whilst on wards”

**University no. 7 – Perioperative subject (guided learning & practice)**

“Yes, definitely – particularly in relation to anatomy and physiology, monitoring & assessment skills”

“No”

“More insight into post-op pain & bleeding”

“Yes, understanding of procedure patient has endured & what that will mean to pts healing”

“Possibly”

“No at this point”

“Yes”

“Yes”

“Yes, it focused on the technical skills of nursing and therefore benefits nursing practice”

“Yes, assessment, fluids, airway management & pain management”

“Not really applicable: I felt operating suites were very specific”

“Yes”

“Yes, the online training was great”

“Yes, I learned more medications and I found infection control is very important”

“Yes”

“It has helped me understand why patients often suffer severe pain post-operatively”

“Yes, helped with post-op patient care on the wards understanding operations”

“No scientific and impersonal”

“Yes realized the importance of post-op observations”

“No”

“No, it was a good few years ago now, cannot remember a lot about it”

“Yes, I make sure other students are informed and know who people are and what’s happening”

“No”

“Yes”

“Yes because I understand the operation”

“No”

“I found physical assessment much easier & positioning patients”
“No”

“Yes”

“Yes, you learn a lot about the body, you get to see first hand and doctors and nurses teach a lot and explain a lot”

“Yes, showed me more about what the body undergoes during surgery”

“Yes”

“Yes”

“Yes many aspects of the information helped”

“Yes, it gave me a greater understanding the need to fill paperwork out etc... when on the wards and pre-admission”

“Yes”

“Yes, particularly PACU & sterile procedures in O.T”

“Yes”

“Yes, I am a visual learner, so being able to see what happens assisted my learning greatly”

“Yes”

“Yes, in regards to pain management, understanding why there is so much pain”

“Yes, assists in assignment writing & recalling knowledge learnt on other prac”

“Absolutely, it gave me a better understanding of pain & the reasons”

“Yes greater appreciation of vital signs”

“Yes, especially with the risk of haemorrhage infections & post complications”

“Some skills assist in nursing outside”

“No”

“No, I was pregnant & they were not very accommodating & I failed one as I was tired & pregnant with triplets”

“Yes”

“No, not really. I know in theory all the different ways to position a patient but saw very little of how in practice”

“Definitely – having a better understanding of the O.T assisted me in getting a patient ready for an op. and what must b done before going to O.T.”

“Yes”

“Yes”

“Yes, infection control - procedures”
“Yes because it made me more aware and gave me further knowledge into different diseases, injuries, abnormalities and cancers”

“Yes”

“Yes, aseptic technique was enhanced and really showed me why infection control is so important”

**University no 8 – No Perioperative subject**

“Only when I was observing”

“A small amount”

“Yes was good with all the sterile field stuff”

“Not really (i.e. scrubbing in) but things like anaesthetic nursing helps with basic nursing”

“Yes”

“Yes, it gave me a better understanding of what the roles of the staff in the op room & what to expect”

“Yes, definitely in relation to infection control plus it is great to know what particular procedures involve - made me mindful of infections”

“Yes, it’s beneficial to our nursing to see what happens and what the patient goes through in the theatre so we can understand and address issues such as pain post-operatively”

“Yes by watching the procedure it allowed me to understand why it is important to do observations and all post-op care”

“Yes”

“Some aspects”

“Yes, sterile aseptic procedures”

“Yes”

“Yes, it was so amazing”

“Yes sterile technique in wounds, made me mindful of things”

“Yes, medications mainly”

“Yes”

“?? Only observed”

“Yes”

“No”
Appendix 15: Un-themed qualitative data on enjoyment in the operating suite

**Question 1 - Student comment on enjoyment**

Did you enjoy your time in the operating Suite? If so why?

<table>
<thead>
<tr>
<th>Student No</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>University no. 2 - No formal perioperative experience (follow-through)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>“Yes, it gave me an understanding of the entire process for the patient and why we perform the practices that we do pre and post operatively”</td>
</tr>
<tr>
<td>2</td>
<td>no comment</td>
</tr>
<tr>
<td>3</td>
<td>“Yes I did It is totally different with wards. Most patients stay for one to several hours nurses provide more intensive care in the operating suite than wards”</td>
</tr>
<tr>
<td>4</td>
<td>“I absolutely loved it, so different to nursing on the wards”</td>
</tr>
<tr>
<td>5</td>
<td>“No, I hated &amp; cried after the first day. I think it was more the staff in there &amp; got yelled at and spoken to horribly and I had absolutely no knowledge of what to do because no one taught me”</td>
</tr>
<tr>
<td>6</td>
<td>“Division 2 nurse so not offered as part of my course”</td>
</tr>
<tr>
<td>7</td>
<td>“Yes, very exciting learnt a lot. Good educational tool to see what happens during theatre, to help understand nursing care required”</td>
</tr>
<tr>
<td>8</td>
<td>“Not really. Its fun and many things to learn however the opportunity to partake is limited as a nursing student. Most of the time just observing”</td>
</tr>
<tr>
<td>9</td>
<td>“I loved it”</td>
</tr>
<tr>
<td>10</td>
<td>“Yes interesting to see a different specialty of nursing”</td>
</tr>
<tr>
<td>11</td>
<td>“If ECT is included then yes. It was interesting to see what actually went on and therefore relate theory to practice”</td>
</tr>
<tr>
<td>12</td>
<td>“Yes I did, it was an amazing experience to be involved in big procedures”</td>
</tr>
<tr>
<td>13</td>
<td>“Limited places in this course &amp; I did not get one of them”</td>
</tr>
<tr>
<td>14</td>
<td>no exposure / no comment</td>
</tr>
<tr>
<td>15</td>
<td>“Yes, it was a specialized area that required a lot of skill/knowledge and it helped my functioning on the ward in post-op care of patients”</td>
</tr>
<tr>
<td>16</td>
<td>“Yes &amp; no. At one hospital the staff took time to explain procedures. At another placement, staff made me feel like I was a waste of their time”</td>
</tr>
<tr>
<td>17</td>
<td>“Yes, I can watch all kinds of operations – they are amazing”</td>
</tr>
<tr>
<td>18</td>
<td>no exposure / no comment</td>
</tr>
</tbody>
</table>
“Yes, thought very brief, it gave me a good understanding of anatomy which could not have been obtained through a book”.

“To a degree, it did not appeal to me as an area to work but the experience was good”

“I did enjoy my time in the operating suite as it gave me an opportunity to see different types of nursing. I did not enjoy wearing a mask”

“Yes it allowed me to see what is involved before you receive a patient from theatre”

“Yes, it was interesting, a good experience but not for me as I like patient interaction”

“I found theatre to be extremely informative – the medical teams were passionate and were always willing to explain the procedures as well as encouraging additional questions. As a student I was only allowed to observe particularly at a private hospital. Although this was interesting participation would have allowed for another dimension in the learning process”

“It was great but I never got to see much at all”

“It was great but I never got to see much at all”

“Yes it gave me insight as to why the patients will experience pain/feelings after surgery and also what goes on”

“No because I did not spend any time there”

“No because I did not spend any time there”

“Yes, I found it to be a very fascinating area to work in where the nurses take a very different role and set of responsibilities to the ward”

“Yes because I got to see a variety of operations performed”

“Yes, if I could have the chance very soon to improve the situation of patients which can feel high achievements during the work” (no exposure)

“Yes, if I could have the chance very soon to improve the situation of patients which can feel high achievements during the work” (no exposure)

“Yes, it was interesting, intense and all the anatomy & physiology we learnt we got to put into practice”

“I did. It was good to see what goes on in there and to see why the patients come out the way they do”
“Yes it was really interesting”

no exposure / no comment

no exposure / no comment

“Yes it was very good to see something different – compared to just being in the wards. Got to learn a lot from it too”

no exposure / no comment

“Enjoyed it very much because I was able to scrub in and have hands on experience. Doctors and nurses were very keen to educate me”

“It was alright – an interesting experience to see what happens to patients during different procedures before they are on the ward”

“Yes it was very interesting to see the different pathways that nurses can go throughout their theatre career”

“Yes, the experience was very interesting. Particularly because of the equipment and resources behind the scenes which are not often spoken about and the usage of materials”

“Yes, it was good to see a different kind of nursing”

no exposure / no comment

no exposure / no comment

“Yes but too short”

“Yes one of my goals is to work in OT. My time in the OT gave me information I required to make this decision”

“Yes because I knew my patient will be better than pre operation”

“Yes, loved it”

University no. 2 – Perioperative subject (guided learning & practice)

“Yes and No. I found the operating suite to be very interesting but I missed the patient contact. I loved working in recovery as it was 1on 1 patient contact, many of which had complex issues”

“Yes it was an interesting experience a bit outside of the normal program. It will help me to understand what the patients experience are pre and post-op”

“I very much enjoyed it because I knew what I was looking at/doing”

“At times”

“Yes”

“I loved it because it was such a different experience”

“Yes, informative, friendly, welcoming. Learnt a lot about behind the scenes”.
“I did not enjoy my first week clinical placement. The students did not have a preceptor nor a clinical teacher so we just watched procedures instead of being able to scrub in and assist”.

“Yes interesting/ different work, team environment”

“Yes, when I was initially learning everything. Afterwards I didn’t find it stimulating enough during procedures. I got bored during repeated procedures such as TURPS but found it fantastic and interesting when being able to learn and see body parts”

“Yes very much enjoyed!! Interesting, I learnt a lot”

“Staff really nice and interested in teaching”

“Yes, got to see a lot and learn how operations fit patient’s condition”

“Yes, I found it interesting (the procedures), concerning how the staff are so laid back and tiring being on your feet the whole time”

“Yes, enjoyed a lot. Great people, great experiences”

“No because I missed the patient contact, being able to speak with them”

“Yes it was very interesting & very different to general nursing”

“Was a good opportunity to observe what patients go through in the operating suite prior to caring for them on the wards”

“Yes but not for me. No real patient contact”

“Yes as it allowed a wider knowledge base of patients health both pre and post-op”

“I loved the experiencing the variety and I learned so much about the human body”

**University no. 2 – Guided Practice**

“Very interesting to witness all the various surgical procedures. Helped me understand anatomy, physiology incredibly. Not helpful for nursing education re my skills”

**University no. 4 - No formal perioperative experience (follow-through)**

previously recorded

previously recorded

“Yes, provided greater understanding of what the patient has been through and necessity for regular analgesia. Also experience in recovery was valuable.

“Yes because I was treated nicely and the operations were explained to me and it was interesting”

“Yes”

no comment
“I did not spend any time in the suite”

“No, I found them to be very clicky & felt that they were not prepared to give me any responsibility”

“No, it was interesting but just stood there for 5 hours”

“Yes”

“50/50 – Overall it was stimulating. No formal educational support from clinical educator as her time was rationed. Staff in OR PACU enthusiastic with students but little guidance in learning. Self directed with foreign drugs and procedures”

“No, It became boring quickly because we could be of no assistance and we had to ‘stand’ in a corner. Would see more on T.V”

“Yes I enjoyed all the time I spent in operating suite. I wish I had more time / experience in the operating suite”

“Yes I did but so much to take in such a short time”

“I did – I was only able to go and observe operating procedures due to the encouragement of the ward nurse I was buddied with”

“No, was not able to be involved much so experience gained was very limited”

“Enjoyed it. Got to see a different field of nursing”

“Yes – really the first and only opportunity to experience anatomy at all”

“Yes because I got to see how operations were performed and therefore understand the pain the patients were in”

no exposure / no comment

no exposure / no comment

“I enjoyed that everybody wanted to explain things but it was hard to stand still for hours without doing anything”

“Yes, interesting”

“Yes”

“Yes, because I didn’t really have an understanding of what goes on in surgery before this”

“I don’t know because I haven’t experienced it”

no exposure / no comment

“Was not there long enough to comment”

“Didn’t get the opportunity & also never wanted to”

“Yes, however being ignored by surgeons does not help in learning”

“Yes staff were supportive & friendly, opened eyes to what happens there. An insight into patient experience”
“Yes, I found the exposure to the anatomy most interesting, more so than the theoretical perspective. The surgeon & anaesthetist were very informative & eager to share the knowledge”

“Yes, fun to see what happened”

“unsure”

no exposure / no comment

“It was O.K. I felt a bit out of my depth with the mask. But I really enjoyed watching procedures. I would have liked to have been involved not just observe”

**University no. 4 – Guided practice no theory**

“Yes, if day surgery counts then yes very much so. Very structured and liked having a concrete routine”

“Yes, it was very interesting & learnt a lot, but it’s not for me”

“Yes, interesting, different area blood & guts”

“Yes as different to other areas of nursing/midwifery”

“Although I enjoyed it, I found the environment unsuitable as it was difficult to develop technical & clinical skills IE medical rounds, patient management, mod delivering i.e. IV lines”

“Yes, although it is not an area of interest for me (I prefer my patients conscious). I think it is an essential learning experience for any nurse”

“Yes”

“Yes, I learnt so much about the whole process of the surgical experience for the patient”

“Yes, knowledge of anatomy and physiology increaser as well as critical thinking skills, and psychomotor skills”

“Yes good experience but the nurses were not friendly & very political”

“Thoroughly enjoyed learning about the process the patient goes through a team effort involved”

**University no. 4 – Theory but no guided practice**

no exposure / no comment

no exposure / no comment

“Yes, it was an interesting area unlike any other aspect of nursing that I had experienced”

“I would have liked the opportunity to spend time in the OR”

“Yes very interesting to watch”
“Yes sometimes. Usually Lower Uterine Segment Caesarean Section as part of midwifery degree placement”

“Yes, was interesting in anaesthesia techniques. The operating itself, appreciated & now understand roles of nurses in O.R, such as protecting sterile fields, counts etc....”

no exposure / no comment

“Yes, it was good to understand the actual procedure that was done”

“Yes, I found it very interesting. The staff were friendly & helpful. It was really amazing to witness surgery”

no exposure / no comment

**University no. 5 – Perioperative subject (guided learning & practice)**

“No exposure / no comment

“Very much - interesting”

“Yes was a wonderful clinical placement, great staff and the preceptor was fantastic”

“Yes, I enjoyed being part of the team observing the various procedures & the interaction with surgeons & nurse”

“Yes, staff allowed me to get involved in the procedure”

“Yes, an enjoyable experience that gave a good opportunity to learn skills and increase knowledge on a wide variety of specialities in the O.R”

“Yes was a great experience helped me to better understand postoperative care after seeing what goes on in the theatre”

“Yes was a good opportunity for students who wish to specialize in theatre nursing”

“Yes I found it interesting”

“Yes, I did find it interesting and the staff were friendly and helpful and explained everything”
“Yes, it was a lot more easy going than most prac’s and it was a great opportunity to see op’s that surgical patients go through”

“Yes it was very interesting. I think it is good to realize what the patient goes through when they return to the ward”

“Yes I did. I found a lot of new procedures, and better understand post-op care requirement after seeing what has happened in the theatre. It was really fun and has given me better insight”

“Yes, it was interesting to see another side of nursing & all the amazing things the surgeons can do”

“Yes, it’s an area that you are able to see all the anatomy and physiology that we can learn theory. Apply theory to practice - that is how I can gain my skill and knowledge. Also I love to be a theatre nurse therefore I enjoy as much as I can”

University no. 9 – Theory no guided practice

“Personally I did not enjoy O.R nursing. I find the theatres claustrophobic and didn’t enjoy the smells and noises / i.e. bones breaking. I also prefer to nurse patients when they are awake”

University no. 9 – Guided practice – no theory

“Yes, a lot to learn”

“Yes by being able to see the procedures done helped to provide better care to patients on the surgical wards”

“Yes, I liked learning about specific surgeries & seeing how things were done & why patients were so sore after any surgery”

“Yes new environment allowed me to be hands on”

“Yes, very interesting and the staff were all very helpful & supportive”

“Yes interesting to see behind the scenes because usually just pick up patients & pick up – was good to see what really happens”

“No because my mentor wasn’t very supportive”

“Yes I did. It was a different experience from the ward. Very challenging for me. I understood the procedures and why the patients are in pain after surgery”

University no. 9 – Perioperative subject (guided learning & practice)

“Yes – fascinating to see real anatomy & how they cut and sew things up”

“No not enough proactive teaching from the staff & also a different mentor each shift”

“Yes was very interesting seeing a different side of nursing”
“Yes I did”
“Yes it was a lovely place to work & so many learning opportunities”
“Yes, though the theatre atmosphere was tense between the nurses which made it a little uncomfortable”
“Yes, interesting and exciting”
“I enjoyed watching the procedures but not the staff I worked with”
“No the environment does not allow the patient nurse contact as the patient is usually under anaesthetic / recovering from. I would prefer an area that allows me to talk to my patients”
“I really enjoyed it because it showed me another side of nursing I can go into. Also now that I am working on the wards, I have first hand experience on what patients’ ops are about”
“Yes loved it and have now decided I want to become a theatre nurse. I enjoyed that I got to see different things every day”
“Yes it was a new experience”
“Yes, I was provided lots of experience at my hospital. Staff were very helpful which also contributed to this experience”
“Yes, because it was a new experience and I was able to see a number of procedures”
“Yes, I got to get involved in the procedures, everyone willing to help”
“Yes, different style of nursing”
“Loved it! I love the technical side of it & I find it a new challenging area after being on many wards”
“Very much! I’ve worked in the environment before as such felt comfortable I liked the professionalism, the teamwork, and the inward direct care”
“Yes, loved it”
“Yes, I enjoyed learning about O.R and I found my prac. Very interesting. Also I liked how everyone involved in a team – surgeon, anaesthetist scrub & scout nurse as it put us all on equal working level”
“Yes, it was unlike other areas of nursing. Always something interesting to see & do”
“Yes, really enjoyed the tight teamwork”
“Yes but the staff at my at my placement were not too supportive so I felt I didn’t enjoy it as much as I would like”
“Yes, very technical interesting to see anatomy on the inside”
“Yes close team, very supportive plenty of learning opportunities in a safe environment”
“Yes, I had already done surgical ward placements & it was interesting to find out patients’ presented the way they did”
“Yes liked the environment, the staff and it was interesting”
“Yes, it was interesting to learn so much that I didn’t already know and also to consolidate what I learnt at university”
“Not really. I found it quite boring sometimes especially when I was in roles other than the instrument nurse”
“Absolutely, teamwork environment”
“Yes, interesting area - very different from ward nursing. Also assisted in my surgical ward nursing”
“Yes, interesting on discovering what happens in theatre”
“Yes, very interesting to see how the conditions we deal with on surgical wards are fixed & also helps relate to the patients recovery post-op”
“I did. I got a lot of hands on experience and the staff were all very pleasant”
“Yes exposed me to the different area of nursing, one where the patients are mostly not conscious and ability to observe how patients are treated surgically (inside)”
“Yes, was interesting”
“Yes, was great to see a different aspect of nursing that a lot of other students do not”
“Yes, it was very interesting and informative”
“Yes, in teaching hosp we were encouraged to participate”
“Yes, I think I found niche”
“No- was no patient contact, not my sort of thing”
“Some parts yes and other parts no. I enjoyed recovery and watching operations but not the roles of nurses”
“Yes, very interesting & I was able to use & put into practice the things I had learnt during the semester”
“Yes connected wound care to operations”
“Yes, interesting to see how the team works during the op”
“Yes, was able to participate in all roles, surgical, scrub, scout, & recovery”
“Yes enjoyed the experience, not particularly my area of interest but gained a greater understanding of what procedure the patient goes through (pain levels etc..)”
“Yes, it meant that I had more understanding for caring for pre and post-op patients on the ward”
“Yes, I felt at home in theatre. I enjoyed the structured plan of O.R plus I had always been fascinated by all the operations”
“No, not enough or no patient one to one communication”
already recorded

University no. 7 – Perioperative subject (guided learning & practice)

“Yes however at times the limited learning opportunities in terms of me ‘participating’ can be very frustrating”

“Yes, support of staff”

“Yes, liked one on one situations and the orderly practice”

no comment

“Yes, very supportive educative teamworking environment. Everyone got on & was willing to assist you to best support the patient”

“Yes, interesting to see all of the different procedures. Not enjoyed as a first year, I was limited in what I could do”

“Yes, so far but I have only just started my placement”

“Yes, it is an interesting place. The things are different to other wards. I learnt heaps”

“Sometimes, I enjoyed watching different procedures. I didn’t like the lack of patient contact”

“Yes, conducive to learning. Supportive environment”

“Yes the staff were supportive”

“Yes & no. I enjoyed recovery – the support offered & autonomy of the nurse. Didn’t enjoy anaesthetics or scrub - nurses didn’t really want me there”

“I thoroughly enjoyed it. I felt that I had the opportunity to learn an extensive amount about anaesthesia, anatomy, physiology and internal medicine”

“Yes, interesting to see what happens before arriving on the ward”

“Yes, very friendly staff. Happy to help and very supportive”

“Yes I did. It’s different from normal wards and it’s interesting to see the operations”

“I loved it. It was a great experience. The staff were great & showed me what happens after & before a patient goes to surgery”

“Yes, I enjoyed watching the operations”

“Yes I did I loved it. I found it very interesting and found all the staff to be supportive”

University no. 7 - No formal perioperative guided practice

“Yes, good staff, lots of opportunities to improve skills”
University no. 7 - No formal perioperative experience (follow-through)

231  no exposure / no comment
232  no exposure / no comment
233  no exposure / no comment
234  no exposure / no comment
235  “Yes because there is only one patient to look after. The patient contact is limited and there is no ‘heavy’ nursing work, ie personal care”
236  no exposure / no comment
237  no exposure / no comment
238  no exposure / no comment
239  “Yes, 1st rate team. Got to scrub in. Very friendly surgeon, great nurses”
240  no exposure / no comment
241  no exposure / no comment
242  “Not really as I feel its not for me although I was just following patients through from the ward I was placed on at the time”
243  no exposure / no comment
244  “No, Boring – didn’t do anything but watch!
245  “Yes got to see multiple (different) operations. Saw first hand anatomy (not just pictures in textbooks)”
246  no exposure / no comment
247  “Yes, very informative surgeon”
248  no exposure / no comment
249  no exposure / no comment
250  no comment
251  “Yes, was very interesting”
252  no exposure / no comment
253  “No because it was too hot. I felt like I was going to faint and I had no idea what was going on”
254  No; too hot, had no idea of what was going on. Staff didn’t know I was there.
255  “Yes, getting to look inside the body helped me to understand it a bit better”
256  “Yes it was a specialty day I choose. I loved being in all the action and I am usually on the surgical ward so I found it interesting to see the whole process by following it. Interesting to see the whole process followed the patient from start to finish”
257  no exposure / no comment
258  no exposure / no comment
259  no exposure / no comment
260  “Nil experience – saw one operating which was interesting”
261  previously recorded
262  “Yes the nurse who showed me around was very nice”
263  no exposure / no comment
264  no exposure / no comment
265  “0, except work experience outside my degree, approx 10 hours”
266  no exposure / no comment
267  previously recorded
268  no exposure / no comment
269  “Yes, something I had never seen before”
270  no exposure / no comment

University no. 8 – Perioperative subject (guided learning & practice)
271  “Yes, got to see different parts of the anatomy. The anaesthetist was good & taught drugs involved airway management ECT”
272  “Yes, It was very different from normal medical / surgical. I liked the fast paced quick change over of patients and watching procedures”
273  “Yes, interesting seeing theory in practice”
274  “Yes, great experience in seeing how many different procedures & what the nurses role is during the operations”
275  “Yes”
276  “Yes, I enjoyed it a lot. The doctors & assistants were very good & explained a lot of procedures & reason for I”
277  “No – limited things I could do. I just observed although I learned heaps which was good”
278  “No, could not get too involved”
279  “Yes I did. Found it really interesting as I did not know anything regarding theatre”
280  “Yes I learnt a lot”
281  “Yes, seen lots of cases over a variety of different conditions”
282  “Yes, I found it very exciting & interesting. It was something new & I would do it again”
283  “Yes, you get to see some amazing surgeries and gives you an idea about the care after surgery”
“Yes, highly interesting to watch both the nurses & surgeons work at a high level. Great to see pt through whole procedure and post op care”

“Yes, it was an opportunity to see what surgeons and nurses did & to see the operation being done & see the patients afterwards & why they hurt and are sore in particular areas”

“Yes, gave good grounding on body systems vital signs”

“Yes, it was educational. The doctors were explaining the procedures, what they were doing & why”

“Loved it, atmosphere is great, learnt a lot more about anatomy of the body. Very interesting”

“No, there was a lot of bitching & very little teaching. We were just expected to watch!”

“Yes, because I got to interact with both the patient and staff during the procedure, ie scrubbed & gowned instead of just watching”

“Sort of: the clinical facilitator was not interested in giving us learning opportunities in theatre and would put us in the library to research about theatre suite instead”

“Yes it was very interesting and gross at the same time. One thing that I did not enjoy was not having a role in the operating suite – a lot of standing and observing”

“Yes, loved it. The staff were great, they included me & let me see a variety of different procedures”

“Yes, I found it very interesting – I was in paediatric recovery”

“Yes interesting, surgeons informative”

“Yes, because I found it really interesting”

“I really enjoyed my time it really opened my eyes to the whole patient care from pre, during and post-operative care”

“Yes there were a variety of different cases. Put theory into practice. Good experience to see new things”

no comment

“Yes, it’s beneficial to our nursing to see what happens and what the patient goes through in the theatre so we can understand and address issues such as pain post operatively”

University no. 8 - No formal perioperative experience (follow-through)

“Yes, interesting to look at procedures so that we know what actually happens to our patient we send off”

“Somewhat: found the team not very welcoming. Small theatre – limited range of operations. Not enough to do”
303 no exposure / no comment
304 “Yes, because it is something different”
305 “Yes, people really let me explore & taught me a lot esp. Drs”
306 “Yes, it was great to observe but I think something needs to be put in place to make it more active, help out & to be given responsibilities”
307 “Some operations (eg knee replacement, caesarean sections were interesting others (scopes) got a bit repetitive”
308 no exposure / no comment
309 no exposure / no comment
310 no exposure / no comment
311 “No, because it did not interest me”
312 no exposure / no comment
313 “Loved it”
314 “It depends on the surgeon / anaesthetist that is on, when they explain what they are doing and the rationale it makes it a very good learning experience”
315 “Yes, I enjoyed the experience of watching operations take place and observing the role of the operating team”
316 “No, not an area that I would choose to work in and felt very closed in”
317 “Yes it was something new & exciting”
318 “Yes it was different and amazing to see the internal part of the body”
319 “Yes I did because in the operating theatre I did enjoy the procedures”
320 no exposure / no comment
321 “Yes, got a chance to see new things and how different they were to ward nursing”
322 “Yes, learnt alot about anaesthetics and anaesthesia, maintaining an airway”
323 “Yes, new and exciting experience”
324 no exposure / no comment
325 “Yes something different”
326 no comment
327 no exposure / no comment
328 “Yes, learnt about instrument, procedures, duties of nurses in operating room”
329 no comment
330 “No, it’s what I enjoy. I faint from standing too long and heat”
331 no comment
332 no comment
Appendix 16: Presentations Associated With This Research

**International Presentations**

April 2012  **AORN (American Perioperative Registered Nurses) Congress** - New Orleans, USA
- *The value of operating room experience for undergraduate nursing*

May 2012  **ASSPAN (American Society of Perianaesthesia Nurses) Conference** – Orlando, USA
- *The value of operating room experience for acute pain management*

April 2010  **The Dynamic & Diversity of Nursing Art & Science 3rd World Conference** – Phuket, Thailand
- *The value of operating room experience for undergraduate nursing*

**National Australian Presentations**

November 2012  **Student-led Doctoral Conference** – University of New South Wales
- *The value of guided operating room experience*

May 2012  **ACORN (Australian College of Operating Room Nurses) Darwin, Australia**
- *The Value of Operating Room Experience for Surgical Nursing*
- *Operating room experience and post-operative surgical ward pain management*
- *The courage to care – National research reporting on undergraduate nurses responses to time in the OR*

May 2010  **Australian College of Operating Room Nurses National Conference**
- *The Value of Operating Room Experience for Surgical Nursing*

June 2010  **Primary Healthcare Tri-State conference**