INVESTIGATING THE USE OF SIMULATIONS IN ENHANCING CLINICAL JUDGEMENT OF STUDENTS TO PRACTICE AS REGISTERED NURSES

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Certificate of Authorship / Originality

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Signature of Candidate

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Publications related to simulation published concurrently to undertaking doctoral research

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Kelly, M.A., Hager, P. & Gallagher, R. 2014, 'What matters most? Students' rankings of simulation components which contribute to clinical judgement', *Journal of Nursing Education*, vol. 53, no. 2, pp. 97-101, doi: 10.3928/01484834-20140122-08.

Other publications

Kelly, M.A., Forber, J., Conlon, L., Roche, M. & Stasa, H. 2014, 'Empowering the registered nurses of tomorrow: Students' perspectives of a simulation experience for recognising and managing a deteriorating patient', *Nurse Education Today*, vol. 34, no. 5, pp. 724-9, doi: 10.1016/j.nedt.2013.08.014.

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Simulation Related Presentations - invited keynote speaker

2014

"Innovative ways in which simulation can enhance preparation for nursing practice", International Celebration Conference of 110 years Contributions of Nursing Education of EWHA Woman's University (March, Seoul, South Korea)

2013

"Using Simulation as Preparation for Clinical Practice: Pedagogy and Research",
Korean Society for Simulation in Healthcare, (May, Seoul, South Korea)

"Simulation in nursing programs: an Australian perspective"
ChungAng University, Seoul; Choonhae College, Ulsan; Kyungpook National University, Daegu, (May, South Korea)

"Beyond CPR! Unique and innovative simulation scenarios to advance clinical practice",
Laerdal Simulation User Network (SUN) Meeting, (July, Wellington, New Zealand)

2012

Simulation for Nurse Educators: Pre-conference workshop SESAM, (June, Stavanger, Norway)
International faculty from UK (Aldridge M), Norway (Husebo S,) Australia (Kelly) and Switzerland (van Gele P).

"Simulation down under: the Australian experience". 5th Annual WISER Symposium on Nursing Simulation, (May, Pittsburgh, USA)

2010

"Transformation in simulation reflecting current practice and practice environments", 8th International Conference for Emergency Nurses, (October, Canberra, Australia)

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Abstract

On entry to the workforce nursing graduates are expected to respond to a range of clinical situations they may not have experienced during their program. The social aspects of practice such as professional behaviours are equally important for transitioning to the registered nurse role. Contemporary simulation strategies can provide students with experiences of how Registered Nurses would respond in a guaranteed range of patient care situations.

The exponential rise of healthcare simulation over the last 15 years is reflected in the prolific number of publications about its use, participant evaluation and satisfaction, or improvements in skills technique. Few of these evaluations capture the impact of the simulation learning experiences beyond the immediate timeframe of the activity. Similarly, there is little research about how simulations may contribute to the 'thinking' aspects and holistic nature of professional practice and the pedagogy of simulation practices. This research explored the contribution of simulation for final year nursing students' learning and clinical judgement capabilities; and the effect of simulations on students' subsequent practice as new Registered Nurses in the year following graduation.

Methods

A multi-phase mixed methods approach was used in the research which comprised two studies. In Study 1, 108 final year nursing students responded to a pre- post-simulation survey. Opinion was sought about self-rated skills, knowledge and dimensions of practice prior to and following the simulation. The post-survey asked students to rate 11 components of the designated simulation to the application of clinical judgment. Study 2 comprised group interviews with nine students at degree completion, and 1:1 interviews during the first three months of registered nurse practice.

Standard statistical analysis was applied to quantitative data and word clouds were created from the survey free text responses. Data from group and individual interviews produced a number of themes following iterative analyses. Students from three study streams were represented in both studies: 3-year program, 2-year accelerated graduate entry program; and 2-year accelerated enrolled nurse program.

Key findings

Prior to the simulation students felt least able about: caring for *patients*, their *knowledge* and *clinical* abilities. Following the simulation there was greater importance on the *patient*, *communication* and *assessment*. The top three simulation components which assisted students with clinical judgements were: *post-simulation reflection*, *facilitated debriefing* and *guidance by the academic.*

At course completion students reported the simulations provided them with greater insight into the professional traits required for registered nurse practice as the activities presented opportunities to *glue things together*, draw on *tacit knowledge* and appreciate the *holism of practice*. Learning within simulation was *situated, experiential and contextual* but also elicited *affective elements* of learning, that is: emotions, behavioural norms and professional attitudes. Immediate effects on practice were greater attention to noticing patient cues and a willingness to inquire further and respond in meaningful ways.

In the early months of practice, participants recalled the simulation experiences during sequent patient care situations of *similar* or *contrasting* contexts. Each new graduate nurse cited at least one instance where they were able to anticipate what may happen next in the patient care trajectory and responded by making judgements and decisions relative to the urgency of a situation. Clear connections were made between the simulations and their contributions to clinical practice.

Conclusion

Unlike other educational strategies, simulations provided unique learning opportunities for nursing students which contributed in meaningful ways as preparation for independent practice. In addition to improving confidence for practice, these new graduate nurses were able to make appropriate clinical judgements often within challenging situations, which influenced patient outcomes in positive ways.

Terminology

Bachelor of Nursing (BN)	a university degree of 3 years duration (standard program) which provides students with the qualification to practice as a Registered Nurse in Australia
Course	An alternate descriptor of the Bachelor of Nursing and it's many streams
Debriefing	The defined time set aside after a simulation for facilitated discussion about the events which occurred in the learning activity
Enrolled Nurse (EN)	A healthcare worker who has a minimum Diploma of Nursing qualification usually received through a Vocational Education and Training (VET) sector or private education provider. ENs practice under the supervision of Registered Nurses.
Graduate Entry (GE)	Students within the 2-year GE program possess a Bachelor Degree in another discipline, more latterly a health related field
New Graduate (NG) nurse	Newly graduated nurses who generally undertake a 12 month employment contract with hospitals or other health services. During the NG year educational and clinical support are provided in the form of orientation and other study days and mentoring in the clinical areas by staff and clinical educators.
Program	An alternate descriptor of the Bachelor of Nursing and it's many streams
Rapid Response	A team of experienced doctors and nurses who respond to a call by other clinical staff to assist with acute episodes of patient deterioration

Simulation	A learning activity which usually occurs in a dedicated space (simulation laboratory or centre) and replicates clinical practices and situations to rehearse responses and improve performance
Simulation experience	The participant's personal experience of the simulation learning activity; or a collection of units of 'simulation' which together form a total experience
Simulation learning activity	Activities that are usually planned and scheduled into (undergraduate) curricula; also - simulation
Subject	A unit of study within a course or program. Comprises 6 credit points towards the required 72 credit points for a university Bachelor degree. Full time students usually undertake 4 subjects per semester
Team-based simulation	A simulation comprising 2 or more participants who may be present in the simulation 'space' or another location but contactable by telephone or other communication device
Team Leader (TL)	A person taking charge of a shift; usually the most experienced nurse who is employed by the facility (hospital) rather than a casual or temporary employee
Tutor	Teaching staff who are usually academics of the respective Faculty or School of Nursing. Some tutors may be employed on a contract basis as needed per semester
Tutorial	A more informal occasion for learning which is either conducted in laboratories or classrooms with a duration of 2-3 hours

Chapter 1: Introduction

1.1 Renewed learning strategies - the rapid rise of simulation in healthcare

In recent years there has been increasing use of simulation as a learning strategy in healthcare education to either prepare students for practice or as continuing professional development for qualified clinicians. Issues driving this move are: increased competition and difficulty accessing student clinical placements; the desire to decrease medical errors and improve patient safety and quality care; and the expectation of competent practitioners by employers and the public. The focus of this research is to explore the ways in which simulations assist final year students in their practice as Registered Nurses on entry to the workforce. Specific attention is drawn to the development of clinical judgement through these contemporary learning strategies.

There is a need to prepare nursing graduates who are 'work ready' to provide competent and safe patient care across a range of clinical settings (Jones & Cheek 2003; Wolff, Pesut & Regan 2010). Clinical practicum within undergraduate programs cannot always guarantee that students receive a comprehensive range of patient care experiences. The type of experience depends on the time, place and appropriate opportunities for supervised practice. Exposure to core patient care situations within simulation scenarios ensures students have encountered desired clinical events and understand the care and patient management expected of them. In fact several countries are beginning to replace portions of clinical practice within nursing programs with simulation encounters.

As one illustration, a current multi-site study in the United States commissioned by the National Council of State Boards of Nursing (2009) is investigating the effect of substituting varying percentages of clinical placements in nursing programs with simulation. A control group can experience up to 10% of clinical hours as simulation

(business as usual) with other groups receiving either 25% or 50 % of simulation in place of clinical hours. Measures within this longitudinal study include clinical competency, knowledge and learning. Insufficient clinical placements are in part driving the momentum for sourcing alternate clinical experiences with simulation a promising adjunct, but elucidating the benefits of simulation for learning and practice requires consolidated and more robust investigation.

Similar to the aviation industry, health groups (Australian Commission on Safety and Quality in Health Care 2011, 2013; Joint Commission 2009), government authorities (New South Wales Governnment 2005;2010) and the World Health Organisation (World Health Organisation 2013) have made strategic moves to improve patient safety awareness. Attention to accountability at an individual and organisational level, and on the systems processes within health services, has been the focus of programs to improve quality and safety for better patient care and outcomes (Australian Commission on Safety and Quality in Health Care 2013; Clinical Excellence Commission 2014). These initiatives are also featured in curricula and programs which prepare healthcare students for professional practice (Hicks, Geist & House Maffett 2012; Spence et al. 2012). Simulation activities are useful in highlighting areas where potential error can occur within clinical practice to improve awareness of and performance for safe patient care.

1.2 The intersection between patient safety, simulation and preparation for practice

Three key aspects related to the healthcare workforce have gained prominence in recent times and intersect in symbiotic ways. The connections between: 1) patient safety, 2) simulation and 3) preparation for professional practice are introduced in this section and discussed further in Chapter 2.

1.2.1 Patient safety and simulation

For over a decade, healthcare groups and government agencies around the world have been actively promoting a patient safety agenda. The World Health Organisation now provides a patient safety curriculum that can be used in any healthcare program for any discipline anywhere in the world. Triggered by the seminal report from the United States (Institute of Medicine 1999), there is a concerted effort to reduce errors related to the care and management of hospitalised patients particularly errors which contribute to fatalities. The report revealed that more that 44,000 (and possibly up to 98,000) people had died in US hospitals each year as a result of medical error. A number of strategies were put forward to reduce these massive figures with the challenge to halve the death rate by 2005, and several other countries including Australia adopted the strategies. Attention has been focused on overhauling patient care practices from a **systems** and **individual** viewpoint including education and simulation strategies. Specific courses and programs with embedded patient safety objectives were developed and rolled out to hone the technical, behavioural and team skills of the healthcare workforce (Armstrong, Spencer & Lenburg 2009; Sittner et al. 2009). Subsequently, the patient safety agenda has been incorporated into undergraduate curricula to prepare the clinicians of tomorrow (DeBourgh & Prion 2011).

Over the same time period, improvements in technology led to the emergence of a range of sophisticated human manikins and task trainers offering physiologic or sensory feedback to allow practice and refinement of technical skills in a laboratory setting (Bradley 2006; Owen 2012; Rosen 2008). Health related simulation and clinical skills centres emerged worldwide in both education and hospital settings, where simulated patient care scenarios using human manikins could be enacted in an authentic clinical environment, audio visually recorded and reviewed. The role of simulation in providing opportunity to learn from errors without harm to patients has been one of the key reasons for investment in such resources and environments. This is a deliberate departure away from performing skills for the first time and learning '*on the patient*' to the safe

confines of a simulation laboratory, in part due to more realistic equipment and a more informed public who are no longer willing to be 'experimented on'.

Initially simulation scenarios were based on events which required patient resuscitation to test the response times and techniques, including teamwork and communication. The scope of scenarios has since expanded dramatically to include rehearsal of surgical and procedural techniques and challenges in the operating theatre environment. Hospital-based simulations are often based on 'replaying' the sentinel events which led to increased patient morbidity or resulted in higher mortality rates. A popular scenario, particularly for junior nurses and doctors, is that of a deteriorating patient who they are likely to encounter after-hours when there are less of the experienced clinicians on-site and accurate decision-making and timely treatments are of paramount importance for best outcomes.

The opportunity to provide feedback to participants following the simulation, often from experienced clinicians, lends itself well to promote reflection on and improvement of practice. However this requires a large shift in the healthcare culture, moving from preservation and privacy about one's own practices to being more open and willing to change for improved patient safety. Ensuring confidentiality within simulation scenarios which replicate participants' practices plays a part on changing practice cultures.

1.2.2 Patient safety, simulation and preparation for practice

In Australian settings, the uptake of simulation activities has initially occurred in hospital affiliated simulation centres and with practicing clinicians. More recently, higher education providers have begun to incorporate team-based simulation scenarios with sophisticated manikins and trainers in purpose built facilities for undergraduate healthcare students (Cant & Cooper 2010; Rochester et al. 2012).

As patient acuity and length of hospital stay increases, service providers are more cognisant of patient safety and mitigating medical errors which may increase costs, patient morbidity and mortality (Groves, O'Rourke & Alexander 2003; Maricle, Whitehead & Rhodes 2007). The flow-on effect for healthcare students – and newly graduated nurses and doctors – is ensuring novice clinicians are better prepared to manage and contribute to patient care. Desired attributes of new graduate nurses include: awareness of their scope of role; effective, clear communication and teamwork; and a willingness to seek assistance early when situations extend beyond their knowledge and skill capabilities (Nursing and Midwifery Board of Australia 2006;2013). Simulation provides an appropriate vehicle to develop and refine these new graduate attributes prior to caring for patients in the clinical setting.

Simulation is increasingly becoming embedded within undergraduate nursing and medical curricula with the intent to hone the required skills prior to clinical practice experiences (Hope, Garside & Prescott 2011; Rochester et al. 2012). Towards the end of the health curricula opportunity is afforded to use simulation in more challenging ways to prepare students for independent practice incorporating the patient safety message. Increasingly, more diverse simulation scenarios are being created for nursing students to encompass the wider range of practice and types of experiences which may be difficult to secure or guarantee in clinical settings. However, the manner in which simulations are developed, delivered and debriefed can vary but should follow ‘best practices’ (Arthur, Levett-Jones & Kable 2013; Hager & Holland 2006; Jeffries 2007; McGaghie et al. 2006) for quality experiences. Ways of integrating simulation into curricula has also been debated, as has the most appropriate learning theories to inform simulation practice (Anderson 2007; Shinnick, Woo & Mentes 2011). These are areas which require more focus and investigation.

Integral to preparing students or novices for the challenges of registered nurse practice are developing the ‘thinking’ aspects or clinical judgement capabilities, key characteristics

of experienced and expert clinicians. Learning to think (and act) like a health professional has been the focus of many researchers and fits well with simulation learning strategies. One particular scholar (Tanner 2006) has developed a research based model elucidating the phases of clinical judgement, which provides a framework for use across educational, simulation and clinical settings.

1.3 'Thinking like a nurse' – development of clinical judgement

Central to professional nurses' work and performance is the development of clinical judgement described as "the ways in which nurses come to understand the problems, issues, or concerns of clients/patients, to attend to salient information and to respond in concerned and involved ways" (Benner, Tanner & Chesla 2009, p. 200). Even though skill performance and knowledge are fundamental elements of nursing practice, analysis of relevant data and careful decision making drawing on previous experiences to address individual patient needs defines the quintessential role of the nursing professional. These professional attributes are also essential for safe patient care and best outcomes (Duffield et al. 2007). A research based model of clinical judgement was published by Tanner (2006) which describes the processes nurses use to determine and anticipate patient care requirements (framed as *noticing, interpreting, responding* and *reflecting*). The model describes and articulates these quintessential dimensions of nursing practice (see Sections 2.4.1 and 4.1.5) which is a useful framework for curricula and is applicable to simulation.

Investigation of judgement in relation to practice has also been explored in other professions and in relation to workplace learning. Accounts of how novices commence initiation into practice have been described by Hager and Halliday (2006) such that at times, inexperienced workers act or react without reason but move towards forming reasons for actions related to standards of goodness in practice. Understanding how novices think and guiding them towards more informed reasoning processes could improve performance in the workplace and even contribute to safer patient care. Ensuring

students become aware of how to think and make appropriate decisions is key to workforce development.

1.4 Informing simulation practice through relevant learning theories

Healthcare simulation is emerging from its period of infancy and maturing as uptake grows followed by research and shared practices. In the rush to 'jump on the bandwagon' deliberate thought and planning about the use of relevant pedagogy and educational theories to frame simulation practices has been somewhat of a secondary consideration. Researchers and scholars within the healthcare simulation community are now calling for more attention to and research within simulation pedagogy (Berragan 2011; Burke & Mancuso 2012; Schiavenato 2009). This is one aspect which will be examined in more detail in this doctoral research.

1.5 Government interest and funding in healthcare simulation

In recent times, simulation has come to the attention of Governments and is currently considered to be a more efficient and scalable adjunct in preparing entry level practitioners for the workforce (Health Workforce Australia 2014b). In late 2008 substantial funding ($1.6 billion) was allocated through the Council of Australian Governments (COAG) to plan for an adequate future health workforce to meet the projected growth in population and shortfall in the workforce. In the *National Partnership Agreement on Hospital and Health Workforce Reform* plan, areas such as effective preparation for practice; productive work practices; and leadership and workplace culture were specified (Council of Australian Governments 2008, p. 29).

Tasked with leading the national coordination and reform in this area, *Health Workforce Australia* (HWA) has funded and overseen a multitude of projects within four categories. These broad foci are: clinical training; simulated learning environments (SLE); integrated regional clinical training networks; and clinical supervision support (Health Workforce

Australia 2014b). Within the SLE domain attention is directed to: expanding simulation capacity; enabling the adoption of simulation; and developing the evidence. Within the latter domain HWA are currently investigating how simulation can be embedded in the professional entry curricula for health students at a profession-wide level. This analysis will explore the possibility of simulation being used to replace components of clinical training in a manner that is not detrimental to learning outcomes (Health Workforce Australia 2014b).

This more recent acknowledgement by government bodies of the role of healthcare simulation in preparing students for entry level practice has expanded awareness of and participation in simulation practice, education and research. The cumulative events of interest in, and support for, simulation as pedagogy from the education and service sectors as well as government necessitates that further investigation is required to determine the contribution of this learning strategy for practice performance particularly on entry to the workforce.

1.6 Introducing the research questions – a deeper perspective on simulation learning

To address the questions raised throughout this introductory (and subsequent) chapter/s, the research questions which frame this doctoral work are introduced here. The questions were pursued using a mixed methods approach incorporating a temporal or longitudinal follow-up of a smaller group of students as they entered the registered nurse workforce. The overall aim of the research was to investigate the use of simulations in enhancing the clinical judgement of students to practice as Registered Nurses.

Nested within two studies, with data collected over three time points, the following questions were addressed:

- *what learning occurs through using simulation activities?*
- *what are the factors within the simulation that assist students to develop and apply professional judgement within the scenario context?*
- *how can simulations be productive in preparing for practice (within the context of student groups/ culture/s)?*
- *has what was learnt on the course/ within the simulations helped within subsequent work as a newly graduated nurse?*

1.7 Organisation of the thesis

The thesis comprises eight chapters. Within Chapter 2 the issues around the emerging importance of simulation in the preparation of health professionals are explore, with particular focus on nursing, but also in relation to medicine and the healthcare team. Information about the range of simulation practices will be introduced. In Chapter 3 the simulation research to date, current focus and areas which require further investigation are reviewed. A particular area that needs attention is the learning theories and frameworks relevant to contemporary simulation strategies, in particular those used with undergraduate nurses. This is outlined in Chapter 4. The methodology and methods adopted for this mixed methods research are offered in Chapter 5 followed by presentation of the findings in Chapter 6. Discussion about the findings, in particular the data which provides new insights and contributions to the literature, are incorporated into Chapter 7. And finally, concluding comments and implications of the research for simulation practice are provided in Chapter 8. A number of appendices offer additional information about the processes and methods used in the research.

Chapter 2: The Emerging Importance of Simulation in the Preparation of Health Professionals

The specific requirements for and challenges in preparing healthcare students for professional practice to provide context for the educational approaches used in teaching and learning will be outlined in this chapter. Discussion will incorporate the range of contemporary simulation strategies used in healthcare education and the emerging importance of using such learning strategies in the preparation of students for professional practice. In Australia there are multiple entry pathways into nursing programs resulting in a diversity of student cultures, backgrounds and approaches to learning. On entry to the workforce there are differences in the expectations held by these new graduates to those of service sector clinicians. The transition year into practice remains a time of anxiety and adjustment. In addition to having the requisite knowledge and skills, understanding how to reason and make judgements comes with practice experience. Opportunity to rehearse patient care situations in authentic practice environments can provide students with greater insight into the professional registered nurse responsibilities and behaviours. These experiences are being offered through simulations in nursing programs with the intention of further connecting theory with practice and easing the transition from student to practicing clinician. For this research, the focus is exploring the contribution of simulation to clinical judgement for final year nursing students to practice as Registered Nurses in the year following program completion.

2.1 Current Challenges in Healthcare Education

The challenges of ensuring theoretical concepts provide meaning within a practice situation is a concern for all of those involved in healthcare education. In a wider context, the landscape of healthcare is changing. The scope of traditional roles is evolving, the range of treatments is more sophisticated and expensive, patient expectations of their

healthcare experience are higher as is their level of acuity. In addition the healthcare workforce is under pressure to provide care with fewer resources and reduce the rates of medical errors.

The profile of Australian healthcare settings, workforce and patients reflects multicultural diversity (Parker & McMillan 2007). Inherent in this type of profile would be differences in cultural norms and expectations of self, others and treatment options. Additionally, the patient mix and composition of healthcare team members would differ shift by shift, day by day. Hence the demands of professional practice are varied and the preparation of students for independent practice needs to keep pace with the demands of contemporary healthcare settings. Expectations of new graduate practitioners in healthcare settings may differ from the generalist capabilities of nursing graduates, thereby leading to angst and frustration for employers and new graduates (Malouf & West 2011; Purling & King 2012; Wolff et al. 2010).

With this background, the rise of simulation as a learning strategy to prepare students for such challenges of their professional roles has gained significant interest, momentum and more recently government support and funding (Agency for Healthcare Research and Quality 2014; Health Workforce Australia 2014a). Simulation can also provide guaranteed opportunities for students to learn the universal, assumed elements of practice which are not always possible during clinical practica. These elements include: effective communication, anticipating patient care needs and trajectory, teamwork, and flexibility particularly with time management and reprioritisation when situations change. Hence, the focus of the research reported in this thesis is on final year nursing students and how simulation contributes to practice early in their new graduate (NG) year. As background, discussion about the expectations and challenges faced by new graduate nurses as they enter practice is provided to position the context of this doctoral research.

2.2 Entering nursing practice – the new graduate year

The new graduate year is typically stressful and anxiety producing as novices adjust to a new role and socialise into healthcare practice and the nuances of particular workplaces (Malouf & West 2011; Purling & King 2012; Wolff, Pesut & Regan 2010; Wolff et al. 2010). This is because students attempt to apply theoretical knowledge to practice situations, gain expertise and refine technical skills - often considered to be the 'real' work of nursing. Similar stressors occurring during student clinical practice experiences within their degree program have been reported (Newton & McKenna 2007).

Gaining insight into the registered nurse role and the inherent responsibilities is a goal and particular focus in the final year of nursing programs (Hegney, Plank & Parker 2003; Kelly & Ahern 2009; Wotton et al. 2010). None the less, opportunities to develop an appropriate range of applied practice related skills and insights are becoming increasingly challenging to arrange, due to competition for clinical placements, sicker patients and patient safety concerns, and the resource implications of adequate supervision (Duffield et al. 2011; Hegney, Plank & Parker 2003). Such pressures have contributed to the attraction of simulation to augment the development or refinement of clinical practice skills and experiences that are difficult to obtain in the clinical setting. There is also opportunity for students to gain exposure to the domains of registered nurse practice during simulations, rehearsing the role and inherent responsibilities within the safe confines of a proxy clinical setting.

Insights from new graduate nurses about issues which impacted on their transition from student to Registered Nurse are explored in the following section. Literature is confined to the last 10 years to reflect current opinion although similar concerns date back decades, to the early 1990s when seminal changes occurred in Australian nursing education. Commencing in 1985 in New South Wales, 3-year hospital-based nursing certificate courses changed to a 4-year diploma program offered through Colleges of Advanced

Education. When these Colleges merged with universities as part of a national Australian education reform at the time, nursing became a Bachelor Degree program. These major changes posed substantial challenges for nursing graduates during these times as other health professionals and the general public adjusted to these new circumstances. Remnants of differing beliefs about the 'old' and 'new' ways of preparing nurses occasionally surface but general opinion is acceptance of the contemporary approaches to nursing education in Australia.

2.2.1 Transition to practice – areas of concern voiced by new graduates

Examination of university educated nursing graduates' experiences, adjustments and performance in their first year of practice has been an area of abundant research. Although much of the early work arose throughout the 1990s (Clare et al. 1996; Gardner 1992) in response to the educational reforms, researchers continue to track entry level practitioners and investigate their patterns of retention and attrition from the workforce. Another driver for this focus is the predicted acute shortfall in the nursing workforce concurrent with an increasingly ageing population and sicker patients staying longer in hospitals adding to the demands of health service delivery (Duffield et al. 2011). These factors put pressure to bear on the university and health service sectors to pay attention to the needs of entry level practitioners and be informed about the issues which influence recruitment and retention to maintain an adequate workforce. With these contexts in mind, recent literature about the areas of concern voiced by new graduate nurses as they transition into practice is presented as a prelude to substantiating the position healthcare simulation holds in preparing students for the registered nurse role. A focus on the Australian research in this area has been deliberate, however issues raised are generally concerns experienced internationally.

In one Australian study, Kelly and Ahern (2009) conducted follow-up interviews of a small number of nurses (n=13) in their first year in the workforce to examine issues which impacted on their practice. A key finding from Kelly and Ahern's data is that these

graduates felt under-prepared for registered nurse practice in the areas of *accountability, responsibility, decision making* and the *reality of the all encompassing role of the Registered Nurse.* These issues were reported despite the variations in previous nursing experience (two who were also Enrolled nurses) and life experience (three aged 40-50). This study highlights that irrespective of previous work or life experiences the transition from student to Registered Nurse requires substantial adjustment of expectations. Although data were collected in 2000 and 2001, such opinions and expectations persist today although the workforce is changing due to staff turnover and retirements.

More recently in another Australian study (Malouf & West 2011) nine new graduate nurses were followed and interviewed at three, six and twelve months of beginning their first year in practice. The number of ward or unit rotations during this first year ranged between three and nine. The major focal points for these nurses were '*fitting in'* and the need to '*prove themselves'* in practice. The theme of 'fitting in' that is to be *socially accepted* by ward staff was pervasive over time and was the predominant concern identified. Making connections with established social groups of nurses on hospital wards was deemed more important for some new graduates than coming to terms with patients' specific clinical conditions.

New graduates highlighted that the philosophies of the nurse manager and the workforce gender mix (more females equated with more cliques and a negative culture) determined ward behaviours and level of acceptance (Malouf & West 2011). Social acceptance is difficult to achieve as fluctuations in workforce numbers and skill mix often necessitate last minute staff transfers to other wards or units for a shift, day or week to balance expertise and ensure delivery of safe patient care.

Similar findings about Australian new nurses' issues in the transition year have been raised in other research. A recent study of graduates in New South Wales (Parker et al. 2014) offers a state-wide opinion about practice issues. The study included 282 new graduate

nurses in an initial survey and 55 participated in one of seven focus groups in this mixed methods study. While corroborating results from previous studies (Kelly & Ahern 2009; Malouf & West 2011) about the need to 'fit in' and the socialisation aspects, Parker et al (2014) report that participants highlighted *lack of support, unrealistic expectations* of staff about their abilities to perform from day one and the *nature of the workplace environment* as significant factors which impacted on their *emotional wellbeing* and *performance* as new graduate nurses.

Parker and colleagues note that some new graduates were stressed about their *ability to provide safe patient care* and would consider leaving the profession due to the high pressures and stressful introduction to registered nurse work. Also, participants noted that new graduates should be better prepared "to deal with the cultural tensions and social interactions that will impact them in their initial period of employment" (Parker et al. 2014, p. 6).

Graduates with prior nursing experience (enrolled nurses [ENs], assistants in nursing [AINs] and foreign nurses: n= 68%) were somewhat more resilient and adapted better to workplace culture due to earlier insight. There is potential that prior exposure to health workplaces would confer some advantage in social acceptance but this requires further investigation.

Similar issues are highlighted by Newton and McKenna (2007) during the follow up phase of their research on nursing students and 25 new graduates from four hospitals across Victoria. Data from focus groups at four time points corroborated findings from other studies. Again, coming to an understanding of the social hierarchy in each clinical setting helped graduates from this study identify staff who they could more easily seek assistance from. The number of rotations to different wards within the first twelve months was again a concern as this meant 'starting all over again' which prolonged the *need to 'fit in'* and be accepted. By the end of the first year in practice these graduates had reached a point

where they understood the reasons for and connections of their actions rather than 'just doing something'.

The concerns voiced by new graduates from the cited studies in most instances did not elucidate issues which might be specific for graduates of accelerated nursing programs. The next sections aim to shed light on specific issues these groups of students contend with in the workplace after graduation.

2.2.1.1 Graduates from 2-year accelerated programs: Graduate Entry and Enrolled Nurse students

There is scant literature which specifically examines the adjustments required by students from Australian accelerated nursing programs during their transition year to practice. A number of studies, predominantly from the United States, have examined the graduate entry nursing programs and students' perceptions of how prepared they were for entering the workforce. However few studies have examined how these graduates, with presumed advantage from life experiences and prior education, adjusted to independent registered nurse practice. Literature reporting opinions from students who have completed 2-year graduate entry programs and 2-year enrolled nurse student programs are discussed over the following pages.

2-year graduate entry program students

One of several entry pathways into nursing is an accelerated program for applicants who hold a Bachelor degree. Accelerated programs came into being in the 1970s in the USA (Pellico et al. 2012; Penprase & Koczara 2009) compared with the 1990s in Australia (Gardner 1992). One distinct difference between these offerings is the type of degree conferred at program completion – a Masters qualification from USA programs and generally, a second Bachelor degree from Australian programs. Other historical distinctions are elucidated in the following integrative literature review.

Pellico et al. (2012) provided insights about the differences of graduate entry nursing programs in North America as compared with similar titled programs in Australia. These distinctions are important for context as conclusions drawn from research in other countries are not always directly applicable to Australian settings. The graduate entry programs examined by Pellico et al. (2012) conferred a Master's degree and prepared graduates to work as Advanced Practice Nurses. The majority of Australian programs have offered graduate entry students a Bachelor degree, with more recent trends towards a Masters qualification. Irrespective of the degree level, graduates from Australian programs become part of the registered nurse workforce rather than being groomed for distinct advanced practice roles.

In preparing this integrative review, Pellico and colleagues (2012) faced similar challenges of a scarcity of literature which characterised graduate entry nursing programs and how these students coped with being in the workforce. The researchers sourced only 27 studies from the period 1956 to 2011 despite this particular program being offered in 65 schools of nursing in 2011. In addition to providing general demographical information, the main aspects of interest from Pellico et al's (2012) review for this doctoral research are the graduates' perceptions of their transition to practice. In general terms the graduate profile drawn from the publications within the review was primarily of students aged between 24 and 54, who were single Caucasian women the majority possessing an arts or science degree prior to a career change to nursing. Key attributes perceived to assist level of coping upon entry to the workforce were their *high level of motivation* for the profession, prior education and *assertive dispositions* linked to their *aspirations* of helping people (Pellico et al. 2012, p. 30).

Despite being prepared for Advanced Practice Nurse positions, many graduates took up 'regular' registered nurse posts in hospital wards for at least one year, to gain more insight and experience prior to assuming an advanced role. Specific strategies used by these graduate entry students in transitioning to the registered nurse role were *positive self-talk*

and *seeking favourable managers* (Pellico et al. 2012, p. 34) which younger less experienced graduates may not be attuned to. Similarly, nurse managers drew distinctions of the graduate entry group as *showing initiative, being resourceful,* demonstrating *advocacy* and being *good communicators* although there were *weaknesses in clinical skill performance* compared with Bachelor prepared nurses (Pellico et al. 2012, p. 35).

Australian graduate entry students possess similar distinctions, dispositions and challenges during their university course but little has been written about how they cope in the workforce subsequent to graduation. A small degree of insight about graduate entry students has been described by Parker et al (2014) (see section 2.2.1) but questions remain about graduate entry students' opinions of how well their nursing program prepared them for their transition year into practice. Neill (2011, 2012) has provided the most insight into this population of students from the Australian context, important information to inform curricula as these programs increase globally to assist workforce demands. Like Pellico et al. (2012) Neill (2011) found a scarcity of publications (only 12 between 1996 and 2010) on the course experiences or graduate outcomes of accelerated graduate entry nursing students. Issues raised were categorised into either course detractors or facilitators, several of which were also raised in Pellico et al.'s (2012) review, with additional aspects around the *stress levels, pace, format and workload of the accelerated curricula, occasions of unsupportive faculty or clinical experiences, and personal difficulties including financial issues*. Conversely course components which facilitated completion were the *social support of their peers and family, previous study skills and life experiences,* and *their high motivation and maturity.*

Based on these findings, Neill (2012) further explored the graduate entry student group with regard to their pathways to nursing. One component of the subsequent study was the follow up of a small group of six graduates into practice providing beginning insights into how this student cohort managed their transition into the workforce. Two concepts were drawn from the email interview dialogue – that students felt *prepared yet anxious*

about their practice and performance, and raised the issue of instances of *unprofessional behaviour* from some Registered Nurses (Neill 2012, p. 92). It appears that nursing graduates who have greater life experiences and have worked in other fields had expectations of workplace behaviours which on occasion conflicted with others' in the work area. This brings the issue of *socialisation* into focus again, not only in relation to the workplace and established local cultures in this instance but to the profession in general.

As mature graduates, the accelerated student group has made a deliberate career change to nursing, have a greater vested interest in realising the success of their choices and take a more active role in both their studies and approaches to practice (Neill 2012; Pellico et al. 2012; Penprase & Koczara 2009). Although only a small proportion of the student body, the graduate entry cohort nonetheless has distinct learning needs which need to be acknowledged and satisfied. Further, these mature students' experiences can be harnessed to contribute to other students' learning and professional preparation in meaningful ways. As numbers increase, further insights about graduate entry student groups, their course experiences and how they transition into practice would inform curricula and the graduate entry programs provided by the service sector.

2-year enrolled nurse entry program students

Information about how graduates from another accelerated program (2-year enrolled nurse students) cope as they assume the role of Registered Nurse is somewhat easier to locate. The transition to university study and preparation for registered nurse practice is not an easy adjustment for many of the enrolled nurse students.

Hutchinson, Mitchell and St John (2011) explored the adjustment issues of this student group during their first year in the accelerated nursing degree program. Ten students ranging in age from early 20s to late 50s who had a broad range of previous nursing experience (18 months to 34 years) were interviewed. This student group was found to be coming to terms with understanding the differences between their own roles and that of a

Registered Nurse. These students believed the substantive difference between the nursing roles was being able to administer intravenous medications and did not perceive that other fundamental knowledge domains and the ability to think critically were required for registered nurse practice and decision making (Hutchinson, Mitchell & St John 2011, p. 194).

Interviews by Kilstoff & Rochester (1996) of six graduates from an accelerated 2-year enrolled nurse program indicated two main areas of tension during their transition to practice year – that of *role adjustment* and *dissonance with values*. These graduates felt dissatisfied with their performance in the transition year and believed their colleagues were dissatisfied with them. In general the role adjustment from enrolled nurse to Registered Nurse was more difficult than they had anticipated. Rather than swiftly adding to their existing repertoire of skills, all respondents found the working role of the Registered Nurse to be quite complex, broad and more mentally and physically trying than they had anticipated. Furthermore, the graduates seemed confused about what was expected of them and unprepared for the role adjustment of independent decision making - that for the first time there was often no one to turn to, compared with their supervised role as an enrolled nurse (Kilstoff & Rochester 2004, p. 15). Similar to new graduates from other programs of study these beginning practitioners reported a lack of preparedness specifically for the concepts of *workload, shift work, teamwork and managerial responsibilities* associated with the role of the Registered Nurse. Despite being accustomed to shift work as enrolled nurses, it appears the added pressures of responsibility for decision making about patient care had a greater toll.

Similar findings were revealed by Nayda and Cheri (2008) this time in four rural Australian hospital settings. From interview data with four new graduates from a 2-year accelerated program, adjustment issues were amplified as most were practicing in the same facility they had previously worked in as an enrolled nurse. High expectations, of themselves and from others, of their performance during the transition year compounded the level of

anxiety. Staff and administrators expected these new Registered Nurses "to be experienced beyond the new graduate level resulting in poor skill match to workload allocation and lack of support" (Nayda & Cheri 2008, p. 908). This research highlights the dissonance between the expectations by the service sector of new graduate nurse capabilities and the period of adjustment required by graduates who have had a generalist preparation for registered nurse practice.

It appears that despite the previous clinical experience of the enrolled nurse students, the transition to registered nurse practice on one hand provides similar challenges to other beginning practitioners as well as unique, additional adjustments as they come to terms with the expectations of working in a new and different role. In a commentary paper, Cubit and Leeson (2009) believe that new graduate transition programs provided by the service sector should acknowledge the specific needs of graduates who previously worked as enrolled nurses and include particular modules to assist with this role transition. Areas of support could include the development of strategies to overcome role ambiguity, how to cope with increased responsibilities, and managing pre-existing professional and personal links particularly when working in the same organisation as when an enrolled nurse (Cubit & Leeson 2009, p. 893).

Discussion will now move to the particular challenges faced by another category of students, those whose primary language is not English. Students and graduates within this group may have studied in any of the previously identified programs: the 2-year accelerated graduate entry, 2-year enrolled nurse or 3-year nursing programs.

2.2.1.2 International student graduates

The United States, United Kingdom and Australia are three of the major countries providing education to foreign students (Edgecombe, Jennings & Bowden 2013) with additional benefits to host countries of links to global educational, workforce and social networks (Council of Australian Governments 2010). The international student market is also significant in economic terms considering that 402,000 international students were studying in Australia in 2012 and over half this group - 216,000 people - were studying in

the higher education sector (Australian Education International 2013). In the university setting for this research, 26% of student enrollments in 2013 were categorised as international and in the Faculty of Health, 21% (n=637) of the 2954 students were international (University of Technology Sydney 2011).

For people categorised by Australian universities as international students, the majority have student visas to cover the duration of their program of study in Australia (Australian Education International 2013). On program completion if these students successfully apply for a *graduate skilled temporary visa* they may gain employment in Australia until a time where Australian residency can be possible (NSW Health Department 2013). However this post-graduation job market is predicted to change as employment opportunities are directed to graduates who are native Australian citizens and the Federal Governments' *Skilled Occupations List* (Department of Immigration and Border Protection 2014) changes according to economic fluctuations and market forces. The exact numbers of international nursing students who graduate and join the Australian workforce is difficult to source. In a report commissioned by Health Workforce Australia, analysis from the 2010 Graduate Destinations Survey (Hawthorne 2012) reported that 69.6% of the 2,227 nursing graduate respondents who were international students were in full-time employment with an additional 20.8% working part-time (p142).

There is another group of students who have either migrated to Australia or have a non-Australian family background or were born to overseas born parents. in Australia. However information about how these graduates fare during their transition year into practice in the Australian setting is virtually absent from the literature. Understanding the specific learning needs of graduates with international backgrounds and how they transition to practice in Australian healthcare settings requires further examination as this group constitutes a large portion of the health education and workforce sectors.

Much of the literature on this topic has focused on the migration of foreign nurses to meet workforce shortages and the differences across *cultural, religious* and *social norms* of expectations of the host country compared with the country of origin (Aiken et al. 2004; Ea 2008; Guttman 2004) rather than investigating entry into practice. There is somewhat more information about the challenges this group of students face during their nursing program clinical placements particularly with *English expression* and capabilities around *communication* and *assessment of professional competencies* (Beckett 2013; Edgecombe, Jennings & Bowden 2013).

Edgecombe, Jennings and Bowden (2013) provide analysis about issues faced by international students beyond the often cited differences in culture and difficulties with communication in academic and clinical settings. Within their literature review of 36 papers, the authors note specific difficulties that impact on students' learning and clinical performance. The ability to communicate, accommodating the nuances of Australian humour and irony, challenges international students and can lead to *social isolation* and prevent *integration* with other student groups. This may limit immersion in local contexts and the level of interaction in academic and clinical settings. In the classroom, differences between a Confucian learning culture where students follow instructions and implicitly believe what the teacher says is true substantially contrasts to the Socratic approach to learning where questioning and dialogue are encouraged (Edgecombe, Jennings & Bowden 2013). Additional cultural influences and *religious taboos* which may be seen to conflict with the practice expectations of Australian nurses relate to *therapeutic touch* and the *power differentials* between younger and elder generations which may limit their role as patient advocates.

Study success is paramount for international students and a 'loss of face' is unacceptable (Edgecombe, Jennings & Bowden 2013). Hence the fear of failure can dominate students' approach to learning and invoke unique feedback seeking behaviours towards academic and clinical staff. New perspectives highlighted in this study are students' determination

to achieve their aspirations in spite of the alienation experienced which implies *determination, commitment* and *resilience* (Edgecombe, Jennings & Bowden 2013, p. 140).

Like Edgecombe et al. (2013), Rogan et al (2006) and San Miguel and Rogan (2009) identified similar issues for international students when learning at university and during clinical placements. A number of studies evaluating a clinically focused English support program - *Clinically Speaking* (San Miguel et al. 2006) - for international students at one university have been reported (Beckett 2013; Rogan et al. 2006; San Miguel & Rogan 2009).

To start, Rogan and colleagues (2006) interviewed 15 nursing students, whose first language was not English, about their clinical experiences within the BN program. Three themes became apparent from the data: wanting to belong but feeling excluded; wanting to learn 'how to'; and 'you find yourself'. This scoping research provided direction for the *Clinically Speaking* support program within the BN and future evaluation about its effectiveness.

Subsequently, San Miguel and Rogan (2009) interviewed 10 students (from China, Vietnam, Taiwan and Hong Kong) at the completion of their BN program to determine the contribution of the 20 hour *Clinically Speaking* program to the remainder of their 3-year program. Students reported that *Clinically Speaking* changed their perceptions of the upcoming clinical experience from negative emotions and 'not knowing' how to interact, to positive emotions and 'knowing' what to do and say particularly with patients. In addition, students identified the important roles played by both the clinical facilitators and Registered Nurses in enabling a sense of support and inclusiveness to their overall clinical experience.

More recent data about the specific practice performance and needs of the same group of international nursing students were reported from the clinical facilitators' perspectives

(Beckett 2013). Analysis was undertaken of students' clinical assessment forms over the 2 ½ years subsequent to their *Clinically Speaking* program. While providing some insight into students' clinical performance, the written comments highlighted the need for more detailed student feedback and improved facilitator awareness of culturally bound student behaviours.

The relative positions of authority of the teacher or the Registered Nurse often result in students' unwillingness to ask questions and, rather, waiting to be told what to do (Rogan et al. 2006). Professional demeanours can also be culturally bound for example *being respectful* in one culture may entail making eye contact whereas in other cultural contexts, it may be equally respectful not to make eye contact (Beckett 2013, p. 118). The authors posit that the expectations of nurses who facilitate students during the clinical placements in Australian hospitals may be influenced by their own cultural backgrounds as well as the workplace culture. Students may not be cognisant of expected behaviours or the effects of their behaviour on the way they are assessed. If the expectations of clinical performance are made transparent to students prior to their time in the practice placement, students' anxieties may be somewhat allayed. Insight into such expectations and professional behaviours could be facilitated through appropriate simulations which incorporate ways of modeling Australian nursing practices.

2.2.2 Transition to practice – areas of concern from the service sector

Research on new graduates' performance from the viewpoints of practicing clinicians and managers in the service sector provides another perspective about the university 'product' versus what is expected of new nursing and medical recruits into the workforce.

A large study conducted in British Columbia by Wolff, Pesut and Regan (2010) sought opinion about new graduates from multiple groups. Focus group interviews were conducted of nurses with varying years of experience from the clinical practice, education and regulatory sectors (N = 150). The researchers found that expectations and understandings of new graduate practice readiness were influenced by the historical and

social context within which participants' nursing education and professional practice was grounded. Although the context of pre-licensure preparation for nurses differs between Canada (diploma and degree) and Australia (degree only), similar concerns are shared or applicable. The repeated issue of perceived conflicting responsibilities and accountabilities of the education and practice sector for the preparation of pre-licensure nurses may only be resolved by collaboratively designed transition programs which span the final six months of university study and articulate to the first six months into practice.

Further similarities to an historical Australian context arise from the different characteristics of Canadian college-based diploma graduates to nurses educated in baccalaureate programs. Participants in the Wolff et al. (2010) study commented that baccalaureate graduates were more likely to question orders and practices in ways that would have been unacceptable in college-based or traditional hospital education programs. Rather than new graduates conforming uncritically to the status quo, the clinicians, most of who were educated in traditional hospital or college-based diploma programs, questioned the commitment of the new recruits to the workplace environment. Similar perspectives were reported in much of the Australian nursing literature in the years following the changeover of hospital-based training to university degrees (Clare et al. 1996). Over 25 years later, objections about university prepared nursing graduates have subsided and moved away from the divisive concerns and perspectives reported in this Canadian study (Wolff, Pesut & Regan 2010). Perhaps a reflection of generational differences, comments were made by study participants about new graduates embracing a work/life balance, and a tendency to evaluate workplace cultures in terms of their own values and to leave if the culture did not meet their ideals (Wolff, Pesut & Regan 2010, p. 188). The historical and social contexts which have influenced more mature nurses' professional practices seem apparent from their responses in the Wolff et al study.

In subsequent commentary by Wolff et al. (2010) about the meaning of new graduate nurses' readiness for practice, the dichotomy of opinion held by graduates and the service

sector persisted, however consensus was reached on several salient points. From the same focus group participants as cited above (Wolff, Pesut & Regan 2010) there was agreement that entry level practitioners have a generalist preparation with some job specific capabilities, that provision of safe patient care was a realistic expectation, and in order to adapt to the changing healthcare settings graduates needed to possess a *balance of doing, knowing, and thinking*. The latter in particular points to the importance of including opportunities for undergraduate nursing students to experience situations which promote clinical judgement within occasions of practice oriented leaning. However, examples of unrealistic expectations by healthcare managers were of new graduates being able to function from the outset in acute care units/wards or understanding how to respond in highly focused specialist contexts and in new and changing circumstances (Wolff et al. 2010, p. 6).

A broader study of newly graduated nurses (n=26) and doctors (n=15) was undertaken by Walker et al. (2013b) who included interviews with five organisational representatives to determine opinions about the work readiness of new graduates. Despite data being from one site (a regional hospital in Victoria, Australia) some common yet diverse issues were raised by all three groups during interviews. Four factors considered to be critical for work readiness were drawn from analysis of interview data: *social intelligence, organisational acumen, work competence* and *personal characteristics*. Points of difference which were important for the organisation lay within the areas of work competence and organisational acumen. Managers expected newly qualified nurses and doctors to be aware of and undertake procedural practices according to the hospital policy and protocols but admitted the difficulties related to this expectation due to frequent workplace rotations within and between different hospitals (Walker et al. 2013b, p. 121). Employers also expected graduates to have developed adequate clinical skills and knowledge at university before entering the workplace, a theme common to other studies (Wolff, Pesut & Regan 2010; Wolff et al. 2010). Points of agreement between all three groups in Walker et al's study were the ability to effectively communicate and interact

with a diverse range of people (peers, patients and relatives) and to work as part of a team *(social intelligence)*; and integral to *personal characteristics*, were ways in which to manage hostility or conflict, and knowing when to ask for assistance (Walker et al. 2013b, p. 121).

Although there appears to be a level of awareness of graduate capabilities amongst managers in the healthcare service sector, it appears that work force demands for adequate staffing and managing organisational risk play a greater part in the service sector expectations of 'work force readiness'. In light of higher patient acuity and the focus on patient safety, expectations of new graduates' performance will likely remain as reflected in the aforementioned studies. Aside from recommendations for more support and mentoring from the service sector during graduates' transition year into practice (Beckett 2013; Kelly & Ahern 2009) more might be able to be achieved in the shorter term by incorporating strategies which could enhance the 'work readiness' of nurses and doctors, particularly during the final year of preparatory studies.

A multitude of professional attributes have been described in the preceding studies but an additional component of nursing practice is the notion of 'becoming' a professional. The view that entry level practitioners should be capable of doing, knowing and thinking (Wolff, Pesut & Regan 2010) will be expanded within a discussion in the next section about students' transition to the professional role.

2.2.3 A process of 'becoming' - the professional role transition

The processes involved with 'becoming' a health professional commences in the first year of practice and continues according to individuals' personal and professional attributes and experiences. Adjusting from a dependant role to an autonomous role demands graduates draw from all aspects of their educational preparation and adapt their practice according to the needs of their patients and workplace requirements. Navigating this pathway is also a process of maturing as a professional and coming to understand and anticipate care requirements of patients and their families. Even with prior nursing

experience it is notable that graduates who were experienced Enrolled Nurses still identified this transition process as a key feature in assuming the responsibilities of registered nurse practice (see Section 2.2.1.1).

Benner (1984) characterised the stages of 'becoming' in her seminal work "From novice to expert …" adapting the Dreyfus (1979) model of skill acquisition to the nursing context. Although it is important to keep these transition stages in mind and discuss such processes with nursing students it is only through the *experience of 'becoming'* that the full meaning of professional practice is realised.

From a grounded research perspective based on examining the journey of 14 nursing graduates Duchscher (2008) proposed three stages of 'becoming' in the graduates' first year of practice. From an initial standpoint of grasping the *'doing'* of practice, nurses transitioned through the stages of *'being'* and *'knowing'*. Particular adjustments for the graduates were "the capacity for multitasking and the inherent challenge in higher-order decision making that requires the melding of variant sources and levels of information complexity" (Duchscher 2008, p. 448). After 4-6 months into practice, it appeared that graduates were ready to be exposed to more unstable patients but would still require close support of more experienced nurses to assist with decision making and management strategies (Duchscher 2008). Apparently the awakening of insight was slowly becoming evident during this timeframe.

There are marked differences between the graduate nurses and clinical situations cited in Duchscher's research and Australian contexts. While the Canadian nurses in Duchscher's (2008) study were yet to complete their final licensing examination, they were also working in acute care settings and were not supported within a transition to practice program. In Australia, the majority of new graduate nurses undertake a 12 month supported transition program, are employed after attaining final licensure but, similarly, work in hospital settings where most patients are acutely ill due to contemporary health service demands. However, some elements of Duchscher's research are useful and

applicable to Australian nursing graduates. The analogy of coming to terms with professional practice as 'a journey' which was "not necessarily linear, prescriptive or always progressive, but was evolutionary and ultimately transformative" (Boud, Keogh & Walker 1985, p. 444) holds true irrespective of context or profession.

Scandinavian researchers have provided much insight into the professional transition processes experienced by new graduate nurses. In addition to commonly cited desires of *'fitting in'* and the *socialisation* aspects which challenge assimilation and acceptance, *mastering the professional role* and coming to terms with the meaning of *autonomy* were highlighted as key issues for new graduates during the transition to practice period.

In a large Swedish national Longitudinal Analysis of Nursing Education (LANE) study, Pennbrant et al. (2013) examined responses from 330 Registered Nurses about their experiences, problems and opportunities of being a new Registered Nurse at two and four years post-graduation. Qualitative analysis of data from postal surveys enabled the researchers to develop a model which related to the early stages of professional practice. The central aspect of this model was characterised as 'mastering the professional role', influenced by the processes of developing professional self-efficacy, developing clinical competence, and evaluating and re-evaluating their educational experiences. The researchers proposed that the level of professional development attained by these new nurses could lead to them either remaining in the profession, pursuing further nursing education, or leaving the profession altogether (Pennbrant et al. 2013, p. 744). So the imperative of supporting new nurses to develop their practice expertise and sense of professional self-efficacy are compelling factors for not only educational providers but are key issues related to workforce retention as well as recruitment.

A more comprehensive view of what constitutes professional-self is provided by Björkström, Athlin & Johansson (2008). Within their longitudinal study of Swedish nursing students at three time points, the beginning (n=163) and end of their degree (n=124) and 3-5 years into practice (n=82), aspects of professional-self and changes to these aspects

over time were investigated. Twenty elements related to professional practice were included in the 7-point Likert scale survey. Although the majority of elements rated medium to high scores, six of these improved statistically over the three time points, and included: *drive, objectivity, flexibility, ability to teach, communication* and *sociability*. The findings corroborate outcomes from similar studies but particularly bring attention to the areas of flexibility and objectivity, not commonly raised in other research. Although cultural and social values likely contributed to these findings, similarities can be drawn in particular to Australian nurses due to the commonality of the three year Bachelor of Nursing program and social cultures.

Finally, Skår (2009) provides a perspective about the *meaning of autonomy* from in-depth interview data provided by 11 nurses within the first three years of practice. The notions of having a *holistic view, knowing the patient, knowing that you know* and *daring (to act)* are similar to what other researchers have stated (Benner 1984; Benner, Tanner & Chesla 2009; Tanner 2006). Of interest within Skår's (2009) research is the notion of novice nurses' knowing what to look for and how to act when patients become acutely unwell. The importance of such experiences links with patient safety imperatives and has become a focus area in both pre-licensure education and continuing professional development.

Ways to enable the professional role transition and enhance the attributes summarised in the above research for nursing students towards the end of their degree are some of the areas of focus in this doctoral research. Many have coined the phrase 'preparation for practice' which is not just confined to students at the completion of their studies but increasingly as preparation for clinical experiences during their degree program. The next section expands on the challenges of linking theoretical knowledge with the aspects of practical know how in nursing as a practice discipline.

2.3 Preparation for practice - blending theoretical knowledge with practical know how

Nursing is a practice oriented discipline. Historically novice clinicians and Australian nursing students have learnt 'on the job' with theoretical components delivered in hospital-based Schools of Nursing and from the 1980s at university. A period of theoretical preparation is delivered prior to students undertaking short clinical practice experiences to ensure fundamental principles are addressed and that basic capabilities are compatible with the requirements of the health service sector. Students are provided with clinical practice experiences from first semester of their first year at the University of Technology, Sydney. Supervised by a clinical facilitator in a 1:8 ratio, students undertake clinical placements between 1-2 weeks at a time which increases in frequency and duration over the 2-year accelerated or 3-year Bachelor of Nursing programs.

There is often tension between educational providers and the service sector about the theoretical and practice components of nursing education. Education providers need to ensure satisfactory completion of degree requirements and hospitals are primarily concerned about the pragmatics of delivering patient care within busy ever changing hospital environments. Yet decreasing availability of clinical placements and increasing concern for patient safety and quality care impact on students' learning opportunities within clinical settings. The imperative to provide meaningful, authentic, practice-oriented learning experiences has led to the popularity of simulation in providing exposure of students to common patient events and insight into how these events should be managed by the healthcare team. For practicing clinicians such learning experiences are required for continuing professional development hours while, for students, the focus is on preparation for registered nurse practice.

2.3.1 Traditional skills practice and role play

For decades, healthcare educators and academics have used static human patient manikins, medical models and role play activities to demonstrate procedures to prepare students for clinical practice (Owen 2012; Rosen 2008). In the early 1900s in the USA, a realistic full body patient manikin with jointed hips, knees, elbows and shoulders was developed to help nurses practice clinical procedural skills (Herrmann 2008). Previously, only straw filled dummies were available which offered a degree of authenticity but limited scope for practice (Owen 2012). Modifications over time enabled injections to be given into arms and catheters and tubes to be inserted to drain 'body fluids' from internal reservoirs. In the 1940s, a male version of the manikin was developed for the US army to train medical corpsmen in 'hospital' techniques (Herrmann 2008).

Over subsequent decades human patient manikins have been used in the healthcare arena primarily to practice resuscitation skills including cardiac compression and lung inflation (Bradley 2006; Owen 2012). As designs improved over time, manikins or task trainers facilitated more advanced practices such as inserting tubes into airways (intubation), cannulae into veins (intravenous cannulation) and delivering an electrical shock to change heart rhythm (defibrillation). Aided by further advances in technology, capabilities of contemporary human manikins additionally include chest rise and fall; palpable pulses; normal and abnormal lung, heart and bowel sounds; eyes that open and close as well as respond to light stimulus and vocal responses (recorded and real time) (Cooper & Taqueti 2004). The realism of contemporary manikins has enabled healthcare practitioners and students to practice and refine skills within a university simulation setting or within hospital education centres. Such technological advancements have accelerated the adoption of a different kind of simulation experience. Beyond technical skill practice, the move towards rehearsing patient care events within a team scenario offers opportunities to practice non-technical or behavioural skills such as communication, teamwork and leadership.

Performing procedures on real patients, as in practice settings, calls for person-to-person interaction, appropriate ways of communicating and in some circumstances advanced skills in de-escalation and negotiation. In addition, specific discourses pertain to nursing and medical practice and healthcare in general, so it is paramount that novices learn and use appropriate terminology when communicating with patients and their relatives to ensure clear understanding of medical assessment findings and treatment options. These aspects of communication skills and the connections between potential medical errors have become a more prominent focus for educational activities and are a central aspect of team training and learning through simulation (Gordon, Darbyshire & Baker 2012; Kelly & Jeffries 2012; Shearer 2012). Many university and hospital based simulation activities currently incorporate patient interactions, particularly around acute changes in physical conditions, and role play within a team or taking on the roles of family members (Endacott et al. 2010; Endacott et al. 2012; Kelly et al. 2014).

Role play has a long established history as a technique to rehearse interactions between health clinicians and patients, particularly in the domains of mental health scenarios and medical education. Standardised patients have provided a service to medical student training for decades, more traditionally to assist examination of clinical assessment skills and history taking. Within nursing education, role playing mental health scenarios with colleagues has been a mainstay of rehearsing how to respond in acute situations which require particular expertise in de-escalation techniques (Edward et al. 2007; Kameg et al. 2009; McNaughton et al. 2008; Shawler 2008). But there has been a resurgence of role play in contemporary simulations particularly in team based scenarios across other clinical spectra.

2.3.2 Teamwork, effective communication and clinical judgement

Preparing nursing and medical students for professional practice goes beyond adequate task performance. As stated within the Australian Nursing and Midwifery Council (ANMC) competencies (2006;2013), Registered Nurses are required to work independently and interdependently assuming accountability and responsibility for their own actions (p2).

University nursing curricula are guided by these competencies which are used to assess nurses to grant or renew their license to practice. Four domains within these competencies aim to capture the scope of nursing: *professional practice; critical thinking and analysis; provision and coordination of care;* and *collaborative and therapeutic practice*. There are many elements and units within each domain which take account of the diverse roles and responsibilities nurses assume to deliver holistic care to healthcare consumers and their carers. These elements and domains of practice take time to develop and experience, knowledge and ongoing learning assist with advancing from a 'novice' towards an 'expert'- to use the terms that Benner (1984) adapted from the original Dreyfus and Dreyfus model of skill acquisition (Dreyfus 1979; Dreyfus & Dreyfus 1986) to describe nursing work and development of expertise.

A significant component of advancing the 'thinking' aspects embedded within nursing practice is to embark on a systematic analysis to determine patients' needs, arrive at one or more clinical decisions and enact relevant responses to meet these needs. For expert nurses the *nuances of practice* are based on *intuition* and *multiple prior experiences*. Based on observations of expert nurses and their decision making processes, Tanner (2006) proposed that novice nurses and students need to learn how to 'think like a nurse' and key to this notion is the development of practical thinking and clinical judgement (as noted and described in section 1.3). Tanner's theoretical framework supporting the development of clinical judgement is expressed as an integrative model highlighting four key phases: *noticing, interpreting, responding* and *reflecting* (Appendix A). This model can be used by practicing clinicians to further practice development as well as with students, in particular preparing them for practice and the workplace. Tanner's model of clinical judgement and other pedagogies which provide suitable frameworks for nursing education, including simulation experiences, will be discussed in more detail in Sections 2.4.1 and 4.1.5 and plays a major role in this research. There has been much activity and guidelines developed for simulation practices but little research of the pedagogies which support simulations, as revealed in the next section.

2.4 Contemporary simulation teaching and learning strategies

Like other professions within and beyond healthcare, theory needs to articulate with and complement practice development. Clinical practice experiences help embed and contextualise theory and enable important informal learning opportunities (Hager & Halliday 2006, pp. 193,226). Similarly, simulation learning encounters can provide contextual patient care experiences and opportunities to pause, discuss and safely explore important concepts, to model best practice, to debrief and reflect, and to build and consolidate clinical experiences. As previously mentioned simulation within healthcare is not a new concept and has been used for many years in medicine, nursing and other disciplines. This section provides a broad perspective of current approaches to healthcare simulation development and delivery featuring the models or seminal literature which have influenced practice.

2.4.1 Fundamental aspects of healthcare simulation

As a pioneer in the modern healthcare simulation movement, Gaba (2004) proposed eleven dimensions important to consider for the future development of simulation learning and practice in health. Although Gaba was heavily influenced by simulation concepts from the aviation industry these eleven dimensions have been found to be applicable across healthcare disciplines and the types and range of simulation scenarios which have emerged since the dimensions (Table 1) were published.

Table 1: Gaba's 11 dimensions for healthcare simulations

Dimension	Focus
1	The purpose and aims of the simulation activity
2	The unit of participation in the simulation
3	The experience level of simulation participants
4	The healthcare domain in which the simulation is applied
5	The healthcare disciplines of personnel participating in the simulation
6	The type of knowledge, skill, attitudes, or behavior addressed in simulation
7	The age of the patient being simulated
8	The technology applicable or required for simulations
9	The site of simulation participation
10	The extent of direct participation in simulation
11	The feedback method accompanying simulation

These dimensions for healthcare simulation are important to note as seminal work in the field which have been highly cited in the simulation literature. With regard to this doctoral research Gaba's 11 dimensions have informed simulation delivery in the study setting but will not feature in the analysis or discussion.

Another frequently cited work is a systematic review undertaken by Issenberg et al (2005) which sought to determine the features and uses of high-fidelity medical simulations which facilitated learning. Distillation of papers through a number of selection criteria resulted in examination of 109 articles. Papers with a focus on effective learning (demonstrated participation, improvement in knowledge, skills and attitudes) were included in the rigorous review process.

A key outcome of the review was the determination of 10 'conditions' which contribute to effective learning in medical education:

1. Provide feedback during the simulation learning experience
2. Learners should repetitively practice skills on the simulator
3. Integrate simulations into the overall curriculum
4. Learners should practice with increasing levels of difficulty
5. Adapt the simulator to complement multiple learning strategies
6. Ensure the simulator provides for clinical variation
7. Learning on the simulator should occur in a controlled environment
8. Provide individualized (in addition to team) learning on the simulator
9. Clearly define outcomes and benchmarks for the learners to achieve
10. Ensure the simulator is a valid learning tool

These 'conditions for effective learning' in simulation complement Gaba's guidelines (Table 1) and have informed simulation practices, in particular considerations about the learning environment and the range of activities related to the learner's background and level of experience. However, specific educational frameworks or pedagogy are not overtly featured in either of these simulation training guidelines.

Subsequent reviews and analyses have been undertaken by Issenberg and other team members (McGaghie et al. 2011a; McGaghie et al. 2011b; McGaghie et al. 2010) which provide useful and detailed historical records of the advances in simulation based medical education and research. Some of these reviews will be explored in more detail in the Chapter 3 along with literature reviews about simulation use and research from the nursing perspective to highlight the different areas of interest across disciplines related to practice and education.

Frameworks specific to the discipline of nursing which have informed simulation initiatives are those by Jeffries (2005), and Tanner (2006) - by extension of a theoretical model on clinical judgement to learning within simulation. Jeffries (2005) incorporated a model to

illustrate the framework for designing, implementing and evaluating simulations in nursing education (Figure 1). The graphic representation clearly highlights distinct yet overlapping areas between the teacher, student and educational practices which influence learning, the simulation design characteristics to consider in planning and delivering activities and proposed learning outcomes using this educational strategy.

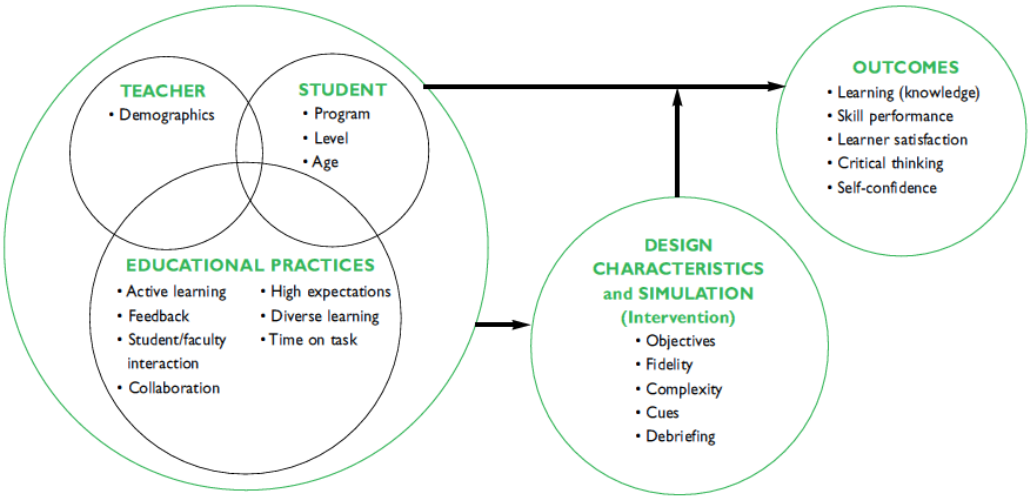

Figure 1: Jeffries' (2005) model representing the 'Framework for designing, implementing and evaluating simulations'

Jeffries' model has significantly influenced simulation practices particularly in nursing in the USA and internationally. But as the field matures in its practice and is informed by research, other perspectives will add to and influence simulation practices and evaluation.

As previously introduced (Section 1.3) Tanner's research based Model of Clinical Judgment (2006), although a generalist framework characterising how expert nurses' frame their decision making and practice, has been used to inform a number of domains within nursing education including simulation. Tanner's model (Figure 2) provides opportunity to meld the aspects which comprise holistic nursing practice with targeted educational

strategies to develop solid foundations in novice nurses to progress towards higher levels of expertise. This model will be discussed further in Section 4.1.5.

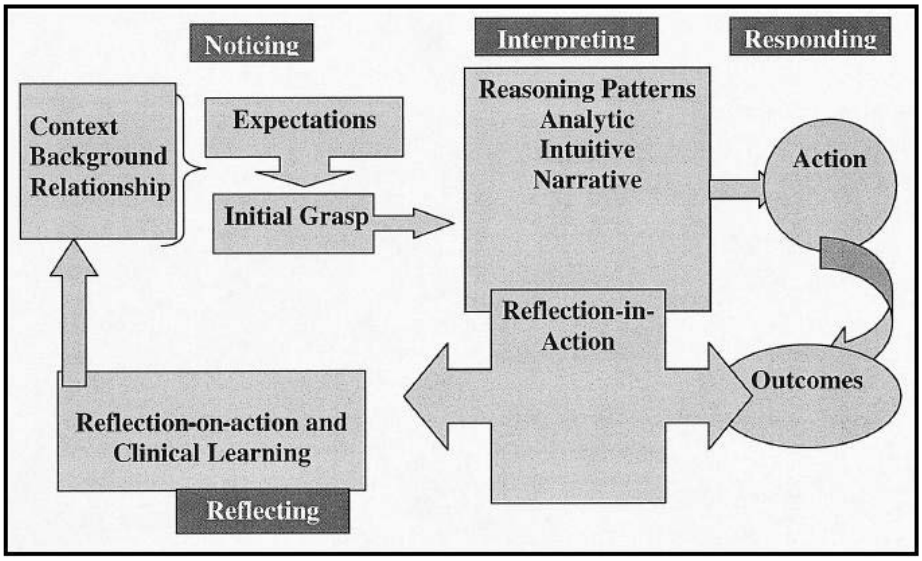

Figure 2: Tanner's Model of Clinical Judgment (2006)

Collectively, the ideas and concepts outlined in this section have provided good foundational knowledge for incorporating simulation as an educational technique for healthcare students and practicing clinicians. The scope of contemporary simulation practices however is diverse and dependent on the learning aims and intent of the educational experience. For this research, the focus is exploring the contribution of simulation for final year nursing students to practice as Registered Nurses in the year following program completion. The types of simulations designed and delivered to these students were informed by practices within other disciplines and experiences offered as continuing professional education. A synopsis of current simulation practices will be provided in the next section.

2.4.2 The landscape of current simulation practices

For many years, nurse educators have used a range of educational strategies in preparing nurses for practice. Traditionally, knowledge requirements have been more bioscience in

nature (for example human anatomy and physiology) while clinically oriented practice issues have often been discussed using paper case-based patient scenarios. The contextual nature of such paper based cases situates learning within meaningful work-related problems – analysing patient data and applying decisions to realistic scenarios. Other learning strategies widely used have been group work, facilitated discussion, role play as well as deliberate, repeated clinical skills practice on task trainers or static manikins. Although somewhat expensive, actors can play the 'patient' role in clinically based assessments or examinations to enable more authentic synchronous responses (Battles, Wilkinson & Lee 2004). This strategy has been used more in the medical field rather than in nursing education due of the high cost and relative lack of funding options. Students' practicing skills and assessments on each other has historically been used as an alternate, authentic learning strategy but most institutions in Australia now do not allow invasive procedures to be performed on any person, including oneself. Companies who manufacture healthcare simulation products have responded to these needs and along with technology improvements now offer an expansive range of authentic human task trainers and manikins for practicing and refining technical or clinical skills.

2.4.2.1 Skills trainers

For decades basic resuscitation skills for healthcare professionals and the general public have been rehearsed on 'Annie' a manikin produced by the Laerdal Company. More technically complex manikins also allow healthcare professionals to practice advanced life support (ALS) skills including defibrillation, endotracheal intubation and intravenous cannulation. These skills and equipment continue to be the mainstay of annually certification in resuscitation for both practitioners and healthcare students.

More recently several sophisticated surgical trainers have been developed to assist surgical trainees refine techniques in synthetic environments prior to performing procedures on humans in the operating theatre (Cosman et al. 2007). Hand-eye co-ordination and fine motor skills can be improved with repeated, deliberate practice on the trainers (Fried et al. 2004; Parker & Myrick 2009; Sedlack et al. 2007).

Computer-based simulations and simulators are a more recent addition to the range of healthcare educational methods for skill practice and can be configured to provide users with immediate feedback to guide and direct learning in engaging, novel ways. The focus is predominantly on laparoscopic surgical skills, for example techniques to remove a gall bladder, and clinical procedures such as insertion of cannula into veins and arteries. The combination of visual media, interactivity and haptic (sensory) feedback of these computerised programs can increase the immersive nature of the experience, as has been seen in the gaming industry, and prepare students and novices to perform procedures on patients in the clinical setting.

2.4.2.2 Hybrid simulators

The need for more authentic learning experiences in developing patient care skills has seen innovations from healthcare researchers in the United Kingdom. Two separate groups have reported on the benefits of combining a task trainer with a person, appropriately integrated and partially covered with sheets or surgical drapes so that students perform procedures on the synthetic trainer yet interact with the 'patient' (Crofts et al. 2006; Kneebone et al. 2004). The 'patient' is most often an actor, or fellow student, other academic or volunteer. Examples of hybrid simulators used in this manner include:

- a person seated on a stool at the head of an examination bed with a urinary catheterisation trainer positioned in front of them
- a female person kneeling on a bed with a birthing trainer directly in front of her – to practice difficult birthing procedures (for example shoulder dystocia); and
- foam skin patches strapped onto a person's arm to rehearse skin suturing.

Feedback from the 'patient' during and following the simulation contributes the all important element of patient interaction in mastering appropriate, holistic procedural skills.

Training to enhance skill performance may result in fewer errors, reduced procedure time and understanding how to respond when things go wrong. But skills are rarely performed in isolation – a doctor, nurse or allied health professional are members of a larger team, and each team member substantially contributes to 'successful' surgical or other patient care outcomes (Anderson & Leflore 2008; Leonard, Graham & Bonacum 2004). Hence team-based simulations portraying expected and unexpected situations (for example patient deterioration, a fire in the operating room, or concerns about a surgeon's performance) have emerged as important training experiences for multidisciplinary teams of practicing clinicians and trainees (Cumin et al. 2013). Team-based simulations encompass more than skill performance and better reflect the range of professional attributes required for clinicians to work efficiently and safely in healthcare settings.

2.4.2.3 Team-based patient scenarios

Practicing elements of patient care in proxy clinical environments in a university laboratory or simulation centre with realistic human patient manikins is the predominant form of contemporary simulation. If delivered according to recommended practices (Arthur, Levett-Jones & Kable 2013; Cant & Cooper 2010), these simulations are considered to be safe experiential learning experiences (Crowley 2008). Learners can explore, make mistakes, ask questions 'in the moment' and be given feedback without consequence to patient outcomes. In addition to active participation in roles, others can observe the simulation and provide feedback during the debriefing session then assume an active role as the simulation is repeated. As the simulation movement matures the types of patient scenarios have shifted from resuscitation events towards the national health priorities of respective countries - for example in Australia, managing patients with asthma or chest pain. Furthermore simulation scenarios can encompass the types of clinical experiences which are increasingly difficult to obtain in the service sector such as mental health and paediatric placements.

Simulating clinical scenarios with full body human manikins for small groups of learners is becoming a preferred method of learning how to work within teams to deliver patient

care. Scenarios can encompass elements of technical skills, non-technical or behavioural skills, ethical and legal aspects of professional practice as well as emphasising a holistic patient care approach incorporating family and significant others.

Contemporary high fidelity manikins offer capabilities that mimic real life human features such as palpable pulses, chest rise and fall, heart, lung and bowel sounds, eyes that blink and react to light and vocal responses. With the manikin placed in a proxy hospital ward environment with accompanying artifacts (monitors, devices and other medical equipment) realistic learning encounters are possible. In particular rehearsing in teams, which represents healthcare practice, is believed to develop higher levels of thinking, analysis and reflection of clinical practice issues (Jeffries 2007; Lamb 2007; Rothgeb 2008).

2.4.2.4 Recommended simulation practices

Recommended components of patient care scenarios include a *briefing* session, *the simulation* itself, then a *debriefing* session immediately afterwards (Arthur, Levett-Jones & Kable 2013; Jeffries 2005; 2007; McGaghie et al. 2010). The importance of including all these steps is to ensure that learners are familiar with the environment, what the manikin can and cannot do, how to obtain more information to assist with 'patient' management decisions and what their role will be within the team and during the scenario. The guided debriefing session is recommended to be as long as or longer than the simulation itself (Jeffries 2007) as it is believed the majority of reflection and learning commences during this stage (Arthur, Levett-Jones & Kable 2013; Dreifuerst 2009). Some groups advocate repeating the simulation to consolidate new ideas from the debriefing into practice and so improve performance and satisfaction (Bambini, Washburn & Perkins 2009; Choi et al. 1998; Mayo et al. 2004) but there is limited evidence to support this strategy. Audio visual recording of the simulation to playback during debriefing is an option and this may be used to highlight key events, confirm what was said or done at critical points or to review patient parameters and team actions at key times throughout the scenario. Thoughtful consideration needs to be exercised regarding confidentiality of each person's performance during the scenario, participant consent to record the simulation and the

fate of the material afterwards. Although there are many reports of powerful learning occurring throughout this process, the potential for embarrassment and harm is equally possible (Jeffries 2007).

Another benefit of simulating patient care scenarios is to *model ideal professional practice*. A strategy used at the study setting in this doctoral research is to prepare audiovisual recordings of staff providing patient care within a simulation. The edited recordings can then be used in classroom discussions with students to analyse aspects of practice, or as preparation for novice learners prior to their simulation experiences. Benefit has been reported by students of viewing experts modeling the simulation scenario they are about to undertake themselves, as the audiovisual representation provides context of the simulation, nursing practice, and likely patient responses (Aronson, Glynn & Squires 2013; Rochester et al. 2012). The audiovisual recordings can also be used to demonstrate initiatives to other faculty staff or to conference delegates.

At a broader level, commentary about the use of simulation within and across curricula has emerged. While most advocates have embraced simulation as a new and exciting teaching and learning modality, the result has often been an 'add on' rather than integrated approach in relation to the theoretical and clinical content of curricula. Renewal of Australian university nursing curricula occurs regularly, with accreditation of programs on a five year cycle. This process enabled simulation to be introduced in the outgoing curricula and resulted in the integration of simulation across all years of the new Bachelor of Nursing curricula at the research site. The issues of curricula integration and best practices in simulation continue to gain attention however detailed consideration of these aspects are not a substantial focus within this research or thesis.

Examination of the areas of focus in current healthcare simulation research will be detailed in Chapter 3, highlighting gaps in the literature and positioning the contributions offered from this doctoral research.

Chapter 3: Research within contemporary healthcare simulation

There has been an exponential rise in the number of studies and publications related to healthcare simulation over the last decade. To illustrate the level of activity within the field, a search of publications was undertaken within a number of databases to determine the quantity and range of work being produced within health, medicine and nursing.

Using search terms of 'simulation' and 'medical' and the time span of January 2008 to June 2013 within the ProQuest Central database over *56,000* results were revealed. Refining the second search word to 'health' produced over *47,700* items and when substituting health with 'nursing' close to *5,200* results were found. Further refinement of this search to English language, journal publications, and dissertations and theses provided a telling picture of the growth and interest in this domain. Between 2008 and 2011 there were approximately *8,000 publications per year* in the area but in *2012* this *increased to over 11,000*.

Results from searches in databases typically accessed by clinically based medical and nursing authors, using the same search terms, produced less results than those stated above but still reflect a high level of interest and output in this area. Within Scopus 'simulation' and 'medical' provided 6,032 references while 'simulation' and 'nursing' produced 1,477. Fewer numbers were found in the PubMed database with 'simulation' and 'health' showing 2,161 publications and 'simulation' and 'nursing' only 96.

What naturally follows with this intense level of output are systematic literature reviews and on occasion, meta-analyses. Within this doctoral thesis a focussed approach to the literature has been adopted. At least 50 simulation review papers, studies with larger cohorts or research conducted over multiple sites have been used to inform the scope of current inquiry and to highlight areas which require further investigation. At this juncture

there is growing awareness in the international healthcare simulation community of the need for research which employs methodologies beyond the predominant quantitative approach commonly used in medicine.

Research employing qualitative or mixed methods approaches in simulation research are few and would provide a richer picture of the contribution simulation makes to learning and practice. Further still, temporal or longitudinal studies which investigate how simulation may have impacted on practice and patient care situations during the early stages of entry level practitioners would add knowledge about the value and future use of simulation to prepare students for professional work. These acknowledgements support the mixed methods approach of inquiry and longitudinal study used in this doctoral research.

3.1 Overview of research and publications to date

Work published in medical and nursing literature to date has focussed largely on how simulation activities can impact on *psychomotor or technical skills* measuring aspects such as acquisition, performance, accuracy, improvement, error rate as well as time to complete tasks (Crofts et al. 2006; Fried et al. 2004; Good 2003; Kneebone et al. 2007; Long 2005; Lynagh, Burton & Sanson-Fisher 2007; Melnyk 2008; Sedlack et al. 2007). While it is useful to quantify basic skill performance, these examples reflect more single loop learning experiences where “participants … are encouraged to learn to perform [but not question fundamental aspects] of organisations” (Argyris 1976, p. 367) – or in this context, practices. Hence technical skills practice may be isolated from context and represent only a portion of the work health professionals undertake. Similarly, research in the area of technical skills is limited in scope and does not account for the holistic dimensions of practice where questioning, feedback and reflection (double-loop learning) (Argyris & Schon 1974) shape the healthcare professional (Boud, Keogh & Walker 1985; Greenwood 1998).

A second area of intense research interest has produced characterisations of students' reactions to participating in simulation. An overwhelming number of studies, many from nursing, have identified improved confidence in overall performance and high satisfaction with simulation learning experiences (Anderson 2007; Crouch 2009; Fountain & Alfred 2009; Guhde 2011; Laschinger et al. 2008; Roh et al. 2013; Shinnick, Woo & Mentes 2011; Smith & Roehrs 2009; Tuttle 2009; Wagner, Bear & Sander 2009; Zulkosky 2012). It is acknowledged by the healthcare simulation community that the research focus needs to move beyond these basic satisfaction and confidence surveys towards a deeper analysis of how simulation contributes to practice (McGaghie et al. 2011b; McGaghie et al. 2010).

Frameworks which have been adopted within medical education and related simulation publications are the *Best Evidence for Medical Education* (BEME) guidelines (Paige & Daley 2009) and *Kirkpatrick's* model of the impact on behavioural change (Segers & Van den Haar 2012).

Although now inclusive of health professionals, the BEME organisation's intent is to promote scientifically-grounded educational research to enable informed decisions about initiatives which boost learner performance on cognitive and clinical measures. So the focus promoted is to reject pseudoscience, anecdotes and flawed comparison groups instead aiming for best empirical evidence (Boud & Walker 1990). This mandate would contribute to the rigour of research method but is limited in focus excluding other research paradigms.

Kirkpatrick's 40-year body of work and model for evaluating training programs is embedded in an organisational psychology framework (Kirkpatrick & Kirkpatrick 2006; Segers & Van den Haar 2012). Initially, four areas of evaluation were created: Level 1 – individual's reactions; Level 2 – individual learning; Level 3 – job behaviour; and Level 4 – organisational results. More recently a fifth tier has been added: Level 5 – return on investment (Phillipps 2011). Using this framework, there is much interest in determining if

simulation impacts on clinicians' behaviour in the clinical setting and, further, on patient outcomes and on the organisation as a whole.

There are perceived benefits as well as limitations in using such frameworks when searching for the contributions of learning (through simulation) for practice. What these frameworks exclude are the contexts and the social, cultural and material elements of learning beyond the individual person which should be acknowledged and accounted for in educational activities and research. These latter perspectives have been incorporated into this doctoral research.

Often-cited review papers

Following on from the 2005 publication led by Issenberg (see section 2.4.1), the research team (Issenberg, McGahie, Scalese and others) produced a follow-up critical review of simulation-based medical education research which covered the period 2003 to 2009 (McGaghie et al. 2010). Providing evidence of the maturing research focus and approaches, the scope of topics included in this review paper had expanded to now include: mastery learning; transfer to practice; team training; high-stakes testing; instructor training; and educational and professional context (p. 52). Some additional descriptors and terms were introduced at this stage which align more with medical practice in general and experimental research rather than considerations about education and behavioural changes. In addition to the somewhat concerning term *'learning transfer'* (Hager & Hodkinson 2009) the notion of *'translational science'* was introduced into the simulation literature. With this latter term, the authors created analogies between *learning in the simulation laboratory* and *changes to clinical practice* to conventional medical research techniques. As suggested by McGaghie et al (2010) "results from laboratory research are brought to the public in terms of … more skillful behavior in clinical settings … improved patient care … and improved patient outcomes" (p. 58). These concepts perhaps reflect the predominant focus of simulation-based medical education research on technical and procedural skills and the influence of traditional scientific

research methods that inform medical practice and thinking. However, the concern is that a medical model of research methods (i.e. from bench to bedside) is driving inquiry about healthcare simulation education which does not capture the broader and holistic nature of skills and abilities required for professional practice.

Approaches other than experimental randomised controlled studies, which provide largely quantitative data, are required to shed more meaning on practice-based concepts which simulation may influence. Indeed McGaghie et al (2010) acknowledged the difficulty with designing and conducting research with adequate rigour (for example multi-site with large participant numbers) such that findings could be generalised and used to 'prove' that simulation 'works'. An awareness of broader approaches for research inquiry emerged in a subsequent meta-analytic comparative review (McGaghie et al. 2011b) with recognition that research needs to move towards understanding the complexity of simulation-based educational activities and the impact these confer on clinicians' practice (p. 708).

Subsequent publications in general now focus on more diverse elements of healthcare which may provide greater insight into how simulations can positively influence and change practice. Other emerging areas of scholarly pursuit are around the *contribution of team-based simulations to practice* (Crofts et al. 2008; Cumin et al. 2013; Gough et al. 2012; Siassakos et al. 2011; Weller et al. 2008); using *simulation as preparation for clinical practice* (Disler et al. 2013; Kelly et al. 2014; Ricketts 2011; Rochester et al. 2012; Wotton et al. 2010); and the *relevant pedagogies* at play within the range of simulation activities (Corbet & Holt 2005; Kantar & Alexander 2012; Lasater 2007b; McGovern et al. 2013; McNeill et al. 2012; Parker & Myrick 2009; Walsh 2011; Walton, Chute & Ball 2011).

Examination of the research in these specific areas of healthcare simulation, including the limitations and areas in need of further inquiry will be provided in the following sections.

3.2 Research on 'technical' skill proficiency

To date there has been a major interest in evaluating technical skill proficiency using simulation with published results citing improved abilities. The focus on skill acquisition or refinement is also corroborated by a large number of review papers in this area. Although skill acquisition is a core feature for the majority of health practitioners, the simulation practice and research of technical skills has been predominantly researched within medical education (Ahmed et al. 2011; Al-Kadi et al. 2012; Ansell et al. 2012; Larsen et al. 2012; Ma et al. 2011; McGaghie et al. 2010; McKinney et al. 2013; Zendejas et al. 2013). Other areas of investigation have been in basic and advanced life support techniques (Gant 2007; Hoadley 2009; Perkins 2007) or of technical skill capabilities across healthcare disciplines in general (Nestel et al. 2011; Ross 2012).

One clinical domain which has progressed on many levels in the simulation field is procedural and surgical skills training. Studies in this area have largely focused on acquisition and refinement of requisite skills for novice proceduralists and surgeons such as manipulating instruments across a range of interventional contexts (Gomoll et al. 2008) and the fine motor skills required for suturing organs and tissues (Kneebone 2003; Kneebone & ApSimon 2001). The incentive resides in the learner to improve their scores or reduce the time taken to complete a procedure with fewer errors. Researchers of such studies have focused on quantitative measurement of task parameters using randomised, controlled group methods and pre and posttest surveys (Hatala et al. 2008; Kneebone & ApSimon 2001; Kory et al. 2007; Lynagh, Burton & Sanson-Fisher 2007).

Similarly, rehearsing cardiopulmonary and advanced resuscitation skills (inserting tubes, intravenous cannula and delivering electrical shocks using simulation) has been an annual competency requirement of clinicians in many hospitals (Graham & Scollon 2002; Kidd & Kendall 2007). These events have now mostly been contextualised within a simulation

scenario to enhance the situational awareness and authenticity (Long 2005; Perkins 2007) yet may still focus on participants' procedural efficiency and dexterity.

Nestel et al (2011) reported a concise summary of literature about simulation for learning and teaching procedural skills drawn from a ten year period (2000 to 2010). From an initial 1,575 eligible papers, the team reviewed 81 abstracts across health disciplines in relation to technical, procedural or clinical skills. Frameworks for classification and analysis of the selected research were: the National Health and Medical Research Council markers (Levels I to V) for research design and paper type; and for educational impact a modified Kirkpatrick rating (Levels 1 to 5) and the Best Evidence Medical Education (BEME) ranking (Levels 1 to 5). Reflecting what others have found, the majority of literature emerged from the USA and UK and included an array of methodological approaches to determine improvements in or transferability of skill refinement from the simulation to clinical setting.

Although the majority of studies reported that simulation *improved knowledge and skills* and the *experiences were highly satisfying*, the gains were predominantly short term and measured in the simulation setting (rather than in subsequent clinical practice). Of the studies which evaluated the impact of transfer of learning to clinical practice, there was positive but limited evidence (Nestel et al. 2011, p. S12). One point of significant concern is that only four studies stated an educational framework within their simulation teaching and learning strategies. This may be due to an historical 'add on' approach of using simulation for technical skills proficiency rather than integrated into curricula per se but has been flagged as an area requiring further development informed by calls from scholars in healthcare education.

In one of the few reviews where literature was sourced from several healthcare disciplines, Ross (2012) a US nursing scholar examined 19 papers across a three year period (2008 to 2011) about the level of evidence in studies which employed simulation

for psychomotor skill acquisition. Research based on quantitative methods was sought. The studies were often based on pre- and post-tests, with a focus on skill knowledge, performance and retention. The majority of literature (13 of the 19 papers) arose from the medical profession, with four papers from nursing and two from allied health. As the majority of robust results arose from the medical literature Ross (2012) called for more rigorous methods, particularly from nurse researchers, to employ "true experimental designs with power driven sample sizes and control groups to test psychomotor skill performance after simulation training" (p. e6).

Although useful in providing direction for further research about this specific facet of practice, particularly for nursing and allied health groups, this review provides limited insight about the ways in which simulation can enhance the broader, all-encompassing elements of clinical practice. Investigation is needed about how simulation can contribute to everyday practice, that is, how multiple skills can be sequenced, prioritised and altered for the individual in response to the unpredictable and often chaotic nature of healthcare settings. Targeted research on team-based simulations goes some way in addressing this area.

3.3 Research on team-based simulations

As previously noted there has been an exponential rise in research and publications about the merits of simulation for experienced healthcare professionals over the last 15 years. Early work by anaesthetists to address predicaments in the operating theatre setting used a crisis resource management (CRM) approach adapted from an aviation simulation training model of crew resource management (Gaba et al. 2001) to improve team performance and patient outcomes. Publications on teamwork have been authored by medical groups and although nurses may have participated in the simulations, their contribution to the team is often not overt in the published findings.

There is well established activity and research of emergency responses and resuscitation teams in adult and paediatric settings, either within departments or as hospital wide response services. Australian authors Fritz et al (2008) reviewed the state of simulation activity and publications related to *emergency medicine* revealing an array of uses for simulation training. Of particular benefit was using simulation to rehearse events which occur infrequently but require a level of expertise when situations arise, such as doctors using rapid sequence induction for controlling patients' airway and breathing.

To determine if simulation improved responses of *resuscitation teams* Wayne et al (2008) evaluated medical resident internists' capabilities with and without specific resuscitation training using simulation in an historical case-control study. Results indicated significantly improved use of practice guidelines in resuscitation (the quality of care) provided by residents who had undertaken the simulation-based educational program, during actual advanced cardiac life support (ACLS) events. This is merely one illustration of the research about simulation within resuscitation and trauma teams. Focus has more recently been on refining the attributes of effective and clear communication [at times with the use of actors (Siassakos et al. 2011)] and specific positioning of each team member, relative to their roles, around the patient (Høyer, Christensen & Eika 2009; Hunt, Fiedor-Hamilton & Eppich 2008; Miller et al. 2012).

To illustrate the level of recent engagement in surgical simulation for training Stefanidis et al (2012) and the Association for Surgical Education Simulation Committee published findings of a three round Delphi study seeking agreement from experts in surgical training to guide the future research priorities in this field. Independent analysis by six of the researchers was based on the ratings and opinions of 60 experts in round one, down to 37 experts in round three about areas for simulation practice and research. Many similarities were found to align with statements from other groups, as highlighted earlier in this chapter. Specifically, surgeons recommended new areas of focus for training and research: patient outcomes, safety and quality care; clinical performance; teaching and assessing

judgement and decision making; and team performance. In addition, uncertainties were raised about: the design and evaluation of simulation within curricula; best methods of feedback; and the criteria for assessment of competence in trainees and certification of practicing surgeons.

Simulation for team training has also been embraced across numerous other specialty practice areas either within or across other health professional disciplines. Cant and Cooper (2010) reported team simulations within nursing educational and practice domains and numerous examples have been cited within midwifery domains (Cooper et al. 2012). A systematic review by Gordon, Darbyshire and Baker (2012) found team simulations prolific within or across health disciplines which primarily focused on error identification; communication; teamwork and leadership; systems, and situational awareness. However the theoretical underpinning of interventions was not described in any of the 22 studies and has been identified within this thesis and other review publications as an area to be addressed.

Specific attention to creating and evaluating interdisciplinary team simulations have surfaced over the last few years. In part this has been influenced by the interprofessional learning and education movement (The Interprofessional Curriculum Renewal Consortium Australia 2014; Thompson & Tilden 2009) and concepts of co-production within healthcare (Lee, Dunston & Fowler 2012), but the attraction of healthcare students learning together is ideal as it reflects authentic clinical practice where multiple professions interact repeatedly on a daily basis to provide patient care.

3.4 Research on interdisciplinary simulations

Ongoing work on the functions of interdisciplinary teams continues within the operating theatre environment. Cumin et al (2013) from New Zealand recently reviewed literature on the use of simulation for full operating theatre multidisciplinary teams and concluded that, similar to other clinical specialty groups, challenges to conducting simulation training

activities included participant recruitment, simulator realism (manikin or task trainer), and financial costs. These are common issues which require effective ways to overcome the barriers to implementing interdisciplinary team training (conflicting schedules, level of interest and perceived value) and in particular ways to engage senior staff and surgeons.

Using the Jeffries Simulation Design Framework (see Section 2.4.1) Reese, Jeffries and Engum (2010) determined applicability of the framework for interdisciplinary simulations corroborated by positive feedback about the experience from nursing and medical students. Engum and Jeffries (2012) reported on the maturing program of interdisciplinary simulations for healthcare students and clinicians within an Interprofessional Education Collaborative comprising members from nursing and medical academia and a large US healthcare system. This multi-dimensional group determined Core Competencies for Interprofessional Collaborative Practice for an interprofessional education centred curriculum to complement a new state-of-the-art simulation centre (Engum & Jeffries 2012). Such initiatives demonstrate the commitment to interprofessional learning, education and practice which those financing the project believe can be enabled through learning within simulation.

Led by a physiotherapist from the UK, Gough and colleagues (2012) undertook a systematic review of literature and provided good insight into the level of activity and interest in healthcare students learning and practicing together using simulation. Drawing literature from 1999 to 2011, 120 initial articles were reduced to 18 and highlighted considerable variability in interprofessional simulation learning processes in relation to duration, fidelity and professions involved. Types of scenarios ranged from daily patient management situations to mass casualty or disaster management and outcome measures were typically increased confidence, knowledge, leadership, teamwork, and communication skills. As with research in other simulation related domains (Cumin et al. 2013; Engum & Jeffries 2012; Reese, Jeffries & Engum 2010), investigation needs to expand to determine transferability of skills to practice such as with longitudinal studies.

The benefits of learning and rehearsing practice situations together across disciplines is thought to promote an understanding of each other's roles and contribution to patient care, to highlight the importance of effective communication amongst team members and with others, and to understand scope of practice (Dillon, Noble & Kaplan 2009; Fernandez et al. 2007; Leonard, Shuhaibar & Chen 2010). Experiencing situations which may stretch decision making enables participants to learn appropriate processes for the provision of safe patient care. Concerted efforts continue in the area of interdisciplinary team-based simulations as the ideal way of preparing healthcare students for practice (Liaw et al. 2014; Pullen et al. 2012; Siassakos et al. 2011). As highlighted, challenges continue with scheduling occasions for students to learn together when dealing with multiple curricula and participant and staff availability.

A fundamental and substantial relationship exists between simulation training and improvements in patient safety. The next section outlines some explicit publications which raise awareness of this symbiotic relationship to ensure that both concepts are integrated within healthcare curricula.

3.5 Research on simulation and patient safety

Although a fundamental attribute of contemporary healthcare simulation, linkages between patient safety and simulation have been made overt by a number of publications and projects which highlight the symbiotic relationship between these two concepts. As outlined in Section 1.2, seminal reports and the emerging international patient safety movement (Institute of Medicine 1999; World Health Organisation 2013) caused many healthcare groups to review education curricula and training programs in an effort to reduce medical related errors and improve patient outcomes (Durham & Alden 2008; Flanagan, Nestel & Joseph 2004; Fox-Robichauda & Nimmo 2007; Gantt & Webb-Corbett 2010; Gregory et al. 2007).

Rehearsing clinical procedures in a synthetic environment prior to providing patient care became the preferred option. The types of simulation scenarios have matured over the last 15 years to be more representative of practice in a clinical environment, including use of simulated patients and broader representation of healthcare teams (Chaffin & Adams 2012; Cooper et al. 2010; Kameg et al. 2009; Kaplan & Ura 2010; Lefroy, Brosnan & Creavin 2011; Rutledge et al. 2008; Shawler 2008). In addition to literature already discussed, selected publications are now highlighted where specific patient safety content has been included in simulation, or simulation has been the vehicle to make overt the patient safety curricula.

As the enthusiasm to include simulation within nursing programs grew in the USA, Henneman and colleagues (Henneman et al. 2007; Henneman et al. 2010) reminded nurse educators that a focus on patient safety needed to be overtly embedded within simulation scenarios. In their evaluation of students' nursing practices, Henneman et al (2010) reported that errors in rule-based activities, such as verification of medications, were also frequently observed in the simulations. Like other healthcare practices which are prone to human error, 'getting it right' in the simulation laboratory and appreciating the consequences of 'getting it wrong' are important experiences to heighten practitioner surveillance for safe patient care.

A comprehensive review by Blum and Parcells (2012) emphasised the lack of literature, at the time, which specifically linked simulation with patient safety in USA pre-licensure nursing curricula. Of the 258 articles included in the review only 18 (7%) stated patient safety as a practice focus in the developed scenarios. However, the review was limited in a number of areas. Inclusion criteria were: use of high-fidelity manikins (mimicking physiological responses and patient voice); and control–experimental study design using a pre- and post-intervention survey which yielded quantitative data. Granted the inclusion criteria represented the bulk of research design over this period, the intent was to highlight the need to include emerging USA safety-based programs into simulation design.

Alignment with for example, the Quality and Safety Education for Nurses (QSEN) program (Cronenwett, Sherwood & Gelmon 2009; Sherwood & Barnsteiner 2012) or TeamSTEPPS (King et al. 2008), were specifically recommended in this review.

In addition to feedback from students and faculty as represented in Blum and Parcell's review the impact of safety-focussed curricula on participants' performance and competencies should be sourced from those who can verify subsequent practice in clinical settings as well as those on the receiving end of care – the patients.

Research in the 'simulation for patient safety' domain continues as governments and patient safety agencies aim to improve patient outcome statistics through new initiatives (Australian Commission on Safety and Quality in Health Care 2011, 2013; Clinical Excellence Commission (CEC) & NSW Department of Health 2010; Institute of Medicine 2001; World Health Organisation 2013). The publications cited above serve to provide brief insights into specific 'simulation for patient safety' literature to illustrate the diverse areas of interest and research encompassed within the spectrum of healthcare simulation.

As the largest sector within healthcare, activities and research about simulation related to nursing practice and preparation of students for the nursing workforce comprises discussion in the next section.

3.6 Research on simulation related to nursing practice

Often cited research on simulation related to nursing practice has focused on evaluation of participant satisfaction with the experience, process or topic and has been mostly descriptive in nature (Ackermann 2007; Alfes 2011; Bearnson & Wilker 2005; Comer 2005; Jarzmensky & McGrath 2008; Long 2005; Parr & Sweeney 2006; Reilly & Spratt 2007; Rystedt & Lindstrom 2001). Within the midwifery and obstetric specialty areas, emergency team training incorporating standardised team responses has shown changes to patient outcomes through simulation, specifically statistically significant reductions in neonatal morbidity and mortality (Crofts et al. 2006; Draycott et al. 2006).

Other aspects studied within simulation research in nursing are of knowledge, confidence and self-efficacy, measured in a pre- and post-test fashion which may offer some insight into what is learned within or soon after simulation encounters (Alinier, Hunt & Gordon 2004; Corbridge et al. 2008; Gordon & Buckley 2009; Grady et al. 2008). But such studies reveal merely a snapshot of information at a point in time rather than determining sustained improvements in practice or ongoing benefits.

An early literature review on the effectiveness of simulation learning experiences in pre-licensure healthcare students was undertaken by Laschinger et al (2008). The authors examined 23 studies and found the focus remained on *knowledge acquisition, skill performance, learner satisfaction* and *self-confidence*. Reflecting the largely self-evaluative focus of simulation practices at that time (satisfaction, perceived improved confidence), there were virtually no studies which evaluated the effect of simulations on students' coping ability during subsequent patient care encounters in the clinical setting. Although more challenging to investigate, this is an area which requires more attention to provide insight into the actual impact of simulation on practice.

Soon after, Harder (2010) from Canada sought evidence about the effectiveness of simulation as a teaching tool and analysed 23 studies from 2003 to 2008. The focus of these studies remained on simulation and: 1) *clinical skills performance*, or 2) *scores relating to confidence/perceived competence.* The studies available for this review reflected the continuing and limited focus on 'skills' and 'scores' rather than inquiry about the broader aspects of simulation for learning and impact on subsequent clinical practice.

Meanwhile Cant and Cooper (2010), two Australian authors, reviewed experimental or quasi-experimental quantitative research related to simulation-based learning in nurse education. The authors found that 'effective' studies featured: use of manikins in applicable clinical settings; curriculum-based scenarios; academic support throughout the

simulation; components of briefing, simulation and debriefing and; offered repeated exposure to simulations (Cant & Cooper 2010, p. 12). Granted the review focus was more specific in nature than others, Cant and Cooper's paper provided more *pragmatic* outcomes to inform the subsequent practice of and research on simulation. A specific recommendation was for robust universal methods of measuring outcomes. The tensions between existing research as highlighted in Cant and Cooper's review, and the areas of emerging interest (e.g. learning outcomes; impact of simulation on clinicians' practices) is acknowledging that other methodological approaches may be more appropriate and provide meaningful insights.

Different areas of research interest have emerged as the use of simulation matures. Educators have questioned if the level of manikin complexity (the *technical fidelity*) influences learning following simulation experiences – or if simulation is *superior* to other instructional methods. Levett-Jones et al (2011a) compared students' knowledge scores on a particular clinical issue just prior to, immediately after and two weeks following a simulation. A medium fidelity manikin (Laerdal's Megacode Kelly ™) was used in a simulation scenario with one student group while the others progressed through the same scenario with a more complex, high fidelity manikin (Laerdal's SimMan 3G™). Although slightly higher scores were found in high fidelity manikin groups there were no statistically significant differences in students' scores related to manikin type at any of the three time points. Results from this research emerged as other groups internationally were questioning if more technical and expensive equipment was necessary for improved learner outcomes through simulations. Subsequently there has been a growing diversity in the *type of equipment* (artifacts) and *differing modes* used to deliver simulation learning experiences to nursing students.

Weaver's (2011) integrative review of 24 quantitative articles on 'high fidelity patient simulation' in undergraduate nursing education contributed to the growing debate about the technical complexity of equipment for nursing student simulations and other benefits

of simulation namely the timing in relation to clinical experiences. Weaver put forward some insightful comments for consideration following analysis of these studies. Elements of the simulation design (clear learning objectives, a challenging experience) had bearing on students' perceived self-confidence following the learning encounter (Smith & Roehrs 2009). However, if the post-simulation measure was not obtained while students were in the clinical setting, Rockstraw (2007) cautioned that any improvement may be due to the controlled, supervised simulation setting where there is no risk to patients. When inquiry was made of students in the clinical setting, a portion believed their experience in the high fidelity simulation relieved some of the stress on their first day in clinical (Bremner et al. 2006). The latter concept is now an area of great research interest – determining how simulation specifically assists practices within the healthcare setting. Some label this concept the 'transfer of learning' but criticism of the term, and its limitations (Hager & Hodkinson 2009) have led to seeking a more representative term. *Learning transformation* through simulation may be a more suitable alternative.

To provide a broader and more contemporary perspective of simulation activities, two recent publications report survey data of practices within nursing education settings, one international (Gore et al. 2012) and the other representing Australian higher education settings (Arthur, Kable & Levett-Jones 2011).

In 2010 Gore et al. (2012) surveyed nurse educators from the United States (n=206) and international participants (n=48) to provide a global perspective of simulation practice and delivery. Based on Gaba's (2004) eleven dimensions of simulation (Section 2.4.1), survey questions sought to quantify how often simulation was used within nursing curricula, if students from other disciplines (e.g. medicine, pharmacy) were involved, the timing, length and type of evaluation for each aspect of a simulation activity and if theoretical or conceptual frameworks were used to develop and deliver the learning strategy. Although there were similarities and differences in practices between these two groups, overall some key points of interest emerge. Irrespective of country of origin, only 44-52% of

respondents indicated use of a theoretical or conceptual framework for delivering simulation learning activities. This is an area of concern as approximately half those who responded equally *did not* base simulation activities on relevant theoretical or conceptual frameworks.

Second, the type of evaluation used in simulations differed across the groups with international respondents preferring formative assessment methods (50% Vs 40% for US) while US participants used summative assessment more often (39% Vs 23% for international) creating a statistically significant difference between the groups for this variable (p=.03). However one element of the research method which casts doubt over the results is the inclusion of Canadian respondents into the International group. Many would consider practices across the US and Canada to be reasonably similar and if this were the case, the number of international respondents to the survey would change from 48 (approximately 19 % of all respondents) to only 18 (7% of all those surveyed). Further, the range of countries in the international group was limited and included small numbers from: Asia Pacific (n=2), Atlantic islands (n=1), Europe (n=9), Middle East (n=4) and other (n=2). Despite these acknowledged limitations, survey data provided a useful snapshot of practices at that time and a profile of the aspects of simulation which were considered to be recommended practice. Benefit is also conferred from this survey for future benchmarking and comparison of practices within a rapidly expanding and evolving area of healthcare education.

The second survey which perhaps offered more relevant context is that undertaken by Arthur et al (2011) of the 32 nursing schools (Faculties/ departments) across Australian higher education institutions. This group of researchers based survey questions on Jeffries' (2007) framework of simulation in nursing education (see Section 2.4.1) which recommended inclusion of: clear learning objectives, adequate student support, embedded complexity and problem solving, fidelity, and use of debriefing to promote reflection. Similar to the findings by Gore et al (2012) the Australian researchers found

that less than half (48%) of those surveyed used a theoretical framework or model for planning simulation teaching and learning. The focus of developing clinical judgement or reasoning in students participating in simulation is a core element for preparing future healthcare professionals yet only 25% of survey respondents reported using a relevant theoretical framework to support this element of learning. These two findings perhaps reflect the varying levels of experience across higher education settings in the use and uptake of simulation within nursing curricula at the time the survey was conducted. However, the collective findings from both surveys emphasise areas of reasonable performance in simulation delivery, and aspects which need to be strengthened to ensure simulation is embedded within appropriate pedagogical principles.

As research into simulation matures the focus has shifted to determining the impact of these types of learning activities on clinical outcomes in particular. This may be easier to research with practicing clinicians as they are established in the workforce, and any impact of simulations on the provision of patient care could be measured immediately. However a substantial amount of research is focused on the undergraduate student population due to the rapid uptake of simulation within nursing curricula and student availability compared with Registered Nurses being drawn away from patient care activities.

When considering clinical outcomes, attention should be directed beyond technical skill capabilities to the components which influence judgements and decision making. From a meta-perspective, knowing what to do should articulate with knowing when and how to do act. The contribution of simulation to these tacit elements of practice is now being investigated, particularly the development of clinical reasoning and clinical judgement to prepare students for registered nurse practice.

3.6.1 Research on the 'thinking and decision making aspects' of practice

The distinctions between clinical reasoning, decision making, judgement and critical thinking are often blurred and the terms used interchangeably. Some of these aspects

may precede others, lack substantial definition or be difficult to distinguish between. In any case, there is currently a great deal of interest in determining if simulation provides nursing students with improved decision making capabilities which are able to be drawn upon in practice for safe patient care.

As correct judgements and decisions are crucial for optimal patient care, investigation of these elements of practice parallels the current integration of simulation activities in undergraduate nursing programs in Australia. How to understand and adequately measure the qualities of reasoning and judgement are other matters to consider, as is the contribution of simulation to enhance these qualities for practice.

A group of Australian academics interested in clinical reasoning (Lapkin et al. 2010) undertook a systematic review of the use of human patient simulation manikins for development of undergraduate nurses' clinical reasoning skills. The attributes or precursors to clinical reasoning (critical thinking, knowledge, and clinical skills) along with outcomes (reduced levels of stress, confidence, judgement and student satisfaction) were included in the authors' search terms resulting in eight publications for review. Due to high variability in study design, reporting and analysis, Lapkin et al (2010) found a lack of unequivocal evidence which linked simulation to development of clinical reasoning skills in undergraduate nurses and recommended that further research be undertaken in these areas.

This group of researchers has since developed a clinical reasoning model (Levett-Jones 2013; Levett-Jones et al. 2010) and related evaluation instruments (Levett-Jones et al. 2011b) which are being used in ongoing work to assess the contribution of simulation to development of these 'thinking' skills.

In a similar vein the concept of clinical judgement, as introduced earlier (Section 2.4.1), resonated with the doctoral researcher and became a central component of the work reported in this thesis. The four aspects of clinical judgement within Tanner's (2006)

model are: *noticing, interpreting, responding* and *reflecting*. The model has gained acceptance with many nursing academics in the USA and triggered further investigation of the application of the model for assessment and development of clinical practice. It also serves as a useful framework for simulations. But the challenge arose of how to *measure* clinical judgement. Based on Tanner's model, a rubric was developed by Lasater (2007a) to measure or rate clinical judgement. The rubric outlines 11 dimensions across the four aspects of Tanner's model, with descriptors of nurses' capabilities relevant to gradations of expertise (beginning to exemplary). The intent of the rubric was to provide a common language to describe students' performance for each dimension and offer direction for students to strive for more developed levels of clinical judgement.

Subsequent use, testing and refinement of Lasater's rubric are ongoing with alternative versions under development (personal knowledge). Such activity in this area reflects a growing interest in broader aspects of simulation in healthcare education.

As simulation is increasingly becoming a core component of nursing programs particularly in the USA, regulators and accrediting bodies are seeking robust and valid instruments to assess the outcomes of this learning modality against program metrics and professional attributes. The American Association of Colleges of Nursing advocate a baccalaureate qualification as the entry-level degree for Registered Nurses and has published nine *Essentials of Baccalaureate Education for Professional Nursing Practice* (American Association of Colleges of Nursing 2008) to serve as an educational framework for nursing curricula. Two US authors took opportunity to analyse how six simulation related rubrics might measure the outcomes of the nine *AACN Essentials* statements. In addition to determining the validity and reliability, Davis and Kimble (2011) examined each rubric to see if the cognitive, psychomotor and affective elements of learning could be assessed. Only two were found to measure all three elements of learning and have psychometric properties published. One of these was the *Lasater Clinical Judgment Rubric*.

It is possible that simulation may be formally recognised as a clinical component of nursing curricula in Australia in the near future (personal knowledge). Much investigation is underway in other health disciplines (e.g. physiotherapy, dental) to determine the outcomes of a simulation integrated program for entry level practitioners using a range of metrics (Brooks-Buza, Fernandez & Stenger 2011; Konukseven et al. 2010; Watson et al. 2012). Regulatory bodies of nursing programs will no doubt seek similar 'assurances' of the validity of simulation learning activities in meeting the requirements for registered nurse practice in Australia. In addition to the information provided by metrics, broader evidence of the ways in which simulation prepares healthcare students for their professional roles and how this translates to practice and episodes of patient care would add to current understanding and influence adoption of these learning strategies. Hence investigation of the contribution of simulation for registered nurse practice, beyond improvements in technical skills capability, reflects the pivotal contribution of this research for the Australian nursing context.

Researchers from other domains of the healthcare simulation community are also seeking insight into these areas. In the education sector one acknowledged benefit of simulation is timing the experiences prior to clinical practice to prepare students for the workplace and offer some exposure to patient care situations. Reports of such studies are detailed in the following section.

3.6.2 Simulation for students as preparation for clinical practice

Much of the nursing simulation literature published in the last five years has emerged from the higher education or college sector and relates to how simulation contributes to students' preparation for (within program) clinical practice experiences. Again from a patient safety perspective, enabling students to be more prepared to provide direct care has always been a deliberate strategy, but using simulation in this way helps to bring these experiences 'alive' rather than learning individual skills by rote with less context.

There is general agreement that providing students with simulation experiences prior to clinical practice confers benefits. For those who have never entered a hospital setting, appropriately conducted simulations can provide: insight for students of what may be expected of them; an illustration of nurse:patient interactions; and an impression of what constitutes nursing work. The literature examined in this section is drawn from review papers or current publications (as outlined in the introduction to this chapter) reflecting the maturing perspectives of research in nursing education.

A review by Ricketts (2011) provided a synthesis of the research on the role of simulation in pre-registration nursing education, from literature published between 1985 and 2010. From the 74 studies included in the review, consensus opinion was that the primary aim of simulation "should be to prepare the student for practice in the real clinical setting, in a context where time and repeat practice can be manipulated to meet the needs of the student" (Ricketts 2011, p. 652). Many nursing academics work by this principle (personal knowledge) with the belief that students will gain additional insights into the particular requirements of the healthcare service sector.

While not suggesting that simulation experiences need to be personalised, Ricketts (2011) highlighted cautionary notes, for example from Bantz, et al (2007), that simulation may not meet all learners' needs given that students prefer to learn with real people. This remark is not uncommon and an acknowledged shortcoming of simulation activities, particularly for accelerated students who have previous nursing experience, often as an Enrolled Nurse or an overseas trained Registered Nurse. However further work and research on the preparation of students for clinical practice within the context of the Registered Nurse role would ensure that students are offered "quality simulated learning opportunities that are flexible and responsive to both their needs and the demands of the Health Care Services" (Ricketts 2011, p. 653). Indeed opinion raised in Ricketts' review highlights the spectrum of students' learning needs, particularly in programs which have multiple entry pathways and students with a range of prior nursing and life experiences.

One approach to improve the realistic nature of simulations and student engagement is to use actors as simulated patients. The cost of such a resource however, particularly in the Australian setting where student cohort sizes are much larger, can be prohibitive. This is less an issue in the USA where student intakes are relatively smaller. To illustrate, Dearmon et al (2013) provided nursing students with a two day simulation engaging with actors as patients, observing others and leading student group discussions. Timed immediately prior to clinical, fifty students in a foundation nursing course interacted with the 'patients' and performed all the basic tasks required in the clinical setting. Tasks included: taking a health history, performing a physical assessment, locating relevant information in the medical record, administering medication and documenting all findings whilst responding where required to questions from patients and others.

Reproducing such an authentic experience led to statistically significant increases in students' knowledge of and confidence in the skills needed for the clinical setting (using two faculty developed, untested instruments) and a decrease in anxiety following this orientation activity (using the Perceived Stress Scale and State-Trait Anxiety Inventory). The authors found that students benefited from working in assigned groups with their peers, which provided opportunity to learn directly through personal interaction with the patient, as well as through observation of other students' actions. However such studies cannot provide insights into students' ability to *apply* knowledge. Dearmon et al (2013) make specific comment about this gap which was particularly noticeable during the patient interview process, when students awkwardly struggled to obtain a health history (p37).

As previously indicated, a uniqueness of Australian nursing programs is the large numbers within student cohorts, multiple program streams and cultural diversity. Strategies to manage such large groups for simulations have been described by Rochester et al (2012)

such that multiple laboratories are used with staggered start times to provide active as well as observer simulation experiences for 375 students.

Following the first year simulation and 40 hours clinical experience in an acute hospital setting, Rochester et al (2012) held focus group interviews (n=12) to seek students' opinions of the contribution simulation offered for clinical practice. Data highlighted the following themes - *knowing what to expect; assuming roles for the simulation; authenticity and thinking on your feet; feeling the RN role;* and *preparation for clinical practice*. In the context of simulation as preparation for clinical practice, these students believed the simulations adequately represented clinical 'situations', and having to respond to questions from the 'patient' (the academic's voice) made *them think on their feet*. Students' felt some of the responsibilities of the Registered Nurse role during the simulation as they had to think for themselves and overall were able to appreciate the importance of teamwork and communication for clinical practice.

A subsequent study of a similar first year cohort sought students' opinions about perceived capability and confidence in caring for patients similar to those portrayed in their first semester simulation (Disler et al. 2013). A pre-piloted, faculty developed survey was used which comprised questions specific to the designed scenario and Australian nursing context. Data from the pre/post questionnaire (454 of 480 students; 94% response rate) demonstrated a significant increase in overall student perceived confidence in caring for patients like those in the simulation experience ($p<.0005$). Curiously, for students with prior experience in nursing (22%) the simulation significantly influenced confidence ($p <0.0001$) compared with students who had no experience. No statistically significant differences were found in confidence between international (47%) and local students (53%), nor between participants with differing levels of education prior to entering the nursing course.

Questions were asked of students about the components of the simulation which provided assistance in their learning. Components which rated highest where: guidance by the academic and clinical facilitator; the film clip watched prior to participating in the simulation; and facilitated debriefing (Disler et al. 2013, p. 138). This information offers insights of students' perspectives rather than faculty's opinions about 'what matters most' for learning in simulations. In addition, Disler et al (2013) have provided information about different student groups within the same year cohort. There is scant literature about how simulation impacts or contributes to learning and practice across student groups with diverse backgrounds and cultures.

In a large two year study in the United Kingdom Hope et al (2011) explored students' opinions, from all years of the nursing program, of the contribution of simulation as preparation for clinical practice. Phase 2 data from focus group interviews of 35 final year nursing students reported that they felt prepared for practice, indicating that simulations improved their *humanistic and problem solving abilities* as well as psychomotor, technical skills, and overall confidence. Specifically, Hope et al (2011) concluded that simulation offers opportunities for students to *enact the integration of theory and practice* in a controlled environment and so reinforce the theory-practice relationship. However, the finding of students feeling prepared for practice after simulation from this study contrasts with research on new graduate nurses (see Section 2.2.1) in that they felt underprepared for actual clinical practice. As simulation becomes an integral part of nursing curricula investigation needs to focus on its contribution to clinical practice for students and new graduate nurses.

But are processes and learning outcomes different for senior nursing students? Interest in how simulations can prepare students who are nearing the end of their study program for professional practice is gaining much attention for the added benefits of workforce development, and possibly retention, in addition to the ubiquitous patient safety agenda.

Relevant research outcomes from this area of investigation will now be explored, to position the context of this doctoral research.

3.6.3 Specific simulations for final year nursing students

A number of research groups have delivered and investigated the impact of more challenging clinical simulations for final year nursing students and the focus in this area is deliberately on Australian studies. Buykx and colleagues (Buykx et al. 2012; Buykx et al. 2011; Cooper et al. 2010; Endacott et al. 2010) have developed and investigated a series of deteriorating patient simulations to determine students' level of performance in these scenarios which are likely to be encountered during their first year of practice. In an early study (Endacott et al. 2010) the researchers deliberately stopped the simulation around the midpoint to ascertain students' level of situational awareness then analysed the simulation video-recordings and reflective interviews. Of the 51 students who participated in the study, the authors found considerable differences in the processes used by students to identify the patient cues that heralded deterioration. What became evident in the simulations was students' lack of ability to accumulate and discriminate patient cues in pressured situations and a high incidence of diversionary activities rather than targeted responses.

Having identified such novice behaviours to relatively common patient scenarios enabled this team to develop a strategic simulation program to equip students to better manage similar situations in practice. Wider application and refinement of the program has occurred across numerous settings and the program has been introduced to groups of practicing clinicians (Buykx et al. 2012; Buykx et al. 2011; Endacott et al. 2012).

The deteriorating patient simulation scenario context is popular in educational and service settings and across health disciplines. Kelly et al. (2014) report on students' technical skills and communication abilities in recognising and responding to patient deterioration through a simulation experience. Key overall outcomes of this simulation exercise and research were improvements in students' ability to assess a deteriorating patient and to

seek help from the medical officer or external service. Changes in pre- post-simulation self-rated scores of 57 students were analysed and included aspects such as influence of study program (3-year, 2-year Enrolled Nurse, 2-year Graduate Entry); gender; and years nursing experience (beyond course clinical practicum). Statistically significant improvements for the combined student group data were demonstrated in survey scores following the simulation ($p \leq 01$).

Improvements in post-scores were also seen in each of the three study program groups with the 2-year Enrolled Nurse students rating themselves higher in both the pre- and post-surveys compared with other groups' mean scores. Prior nursing experience influenced students' scores in pre-surveys with differences found in the 2-year Enrolled Nurse student group (5+ years' experience; $p \leq .01$) compared with those who had 2-5 years or less than two years' experience ($p = .02$). Similarly, post-survey scores revealed differences between groups again from students with 5+ years prior nursing experience compared with less experienced groups ($p = .02$). These results provide new insight of the impact simulation may confer by way of prior experience and different study streams within the Bachelor of Nursing degree at one university. The wider context is the contribution these types of simulations offer in addressing the patient safety agenda and as pragmatic experiences for students' future clinical practice.

Rather than single episodes of learning another approach is to provide students with a series of simulations, in this instance within a critical care nursing context. Mould, White and Gallagher (2011) evaluated the impact on undergraduate nurses (N=219) of a semester long offering of 27 varied simulations using medium to high fidelity programmed manikins, moulage and actors. As anticipated, post-simulation evaluations showed marked improvements in students' self-rated scores, but these researchers demonstrated highly positive correlations between students' confidence and competence both prior to ($r = 0.68$, $p < 0.001$) and post-simulation ($r = 0.78$, $p < 0.001$). In addition, free text responses from 44% of students corroborated outcomes from many other studies in that

they enjoyed or appreciated the experience (65%) and felt the simulations linked theory and practice (24%). Perceived stress in engaging with the simulation settled quickly, which is another benefit of repeated exposure to these 'new' learning activities.

The frequency and complexity of simulation offerings across curricula for entry level healthcare practitioners and within continuing professional development programs is one topic under current discussion and debate. Some authors question the 'dose and response' of simulation required to maximise the benefits and impact on participants' subsequent clinical practice (Schlairet & Fenster 2012). But the analogy of giving medications (the dose) and resultant biochemical processes (the response) to changes in practice behaviours from simulation experiences is extremely limiting and lacks insight into the complexity of the thinking, reasoning and judgement aspects of clinical practice.

However, the underlying question is valid and frequently asked - how much simulation, how complex the scenario context and what level of support is ideal for the range of participants now exposed to simulation in education and hospital settings? In essence, what is the ideal program of simulation and how should this be integrated across curricula or within professional development? Although generating much interest, these concepts are beyond the focus of this doctoral research but aspects may be raised where appropriate throughout discussions. What is lacking is insight about how simulations provided for students in university courses contribute to and influence practice when students graduate and enter the nursing workforce. A key component of positive learning outcomes is simulations delivered according to 'best practices' which are also grounded in appropriate pedagogies, a focus which to date has received limited attention. A brief overview of relevant pedagogies for simulation will be introduced in the next section with wider discussion reserved for the next chapter.

3.7 Research on the pedagogies which underpin contemporary simulations

There has been a growing awareness of the need for (and lack of) inclusion of theoretical educational frameworks to underpin simulation learning activities. Healthcare clinicians and educators have embraced simulation as an engaging and popular learning strategy without much investigation of the relevant theoretical frameworks to guide development, delivery and positioning of simulation within curricula. From 2009, publications have emerged with a focus and inquiry about the most appropriate learning theories applicable to simulations. The difficulty here is that simulation per se covers a broad range of activities and some healthcare professions and specialties prefer the opportunities for skill refinement, as with surgical techniques, while more recent attention has focussed on the all-encompassing interdisciplinary and team-based simulations. Hence a range of learning theories would be applicable dependent on the type of simulation and learning focus.

Recollect from Section 3.6 the survey results which demonstrated substantial lack of use (and perhaps awareness) of any type of learning theory or framework by those engaged with and delivering simulations (Arthur, Kable & Levett-Jones 2011; Gore et al. 2012). Where frameworks were used Arthur et al. (2011) provided some insight, examples being: curriculum-based frameworks (nursing process or problem-based learning), nursing theories (Benner 1984), experiential learning models, clinical judgement models (Lasater 2007a; Tanner 2006) and Jeffries' (2007) simulation framework. Supporting this need for greater theoretical rigour, publications which identify the need for incorporating learning theories or frameworks into contemporary simulation experiences are presented here as a prelude to more in-depth discussion of learning theories and pedagogy in Chapter 4.

In addressing a call from Schiavenato (2009) for greater use of learning theories in simulation, several authors have provided their perspectives on the issue. An earlier literature review seeking evidence of the use of learning theory with nursing simulations

was undertaken by US authors Kaakinen & Arwood (2009). Only 16 articles from the 120 included in the review were found to have referenced learning or developmental theory within the design and delivery of simulations. The remaining articles tended to focus on the teaching rather than learning paradigms. Theories most frequently cited were adult learning theory (Manidis & Scheeres 2013; O'Loughlin 2013); situated or experiential learning theory (Chen Johnsson 2013; Lancaster 2013; Lave & Wenger 1991); self-efficacy (Gonczi 2013; Mulcahy 2013); constructivism; reflection for practice (Tanner 2006) or the Novice to Expert work by Benner (1984) based on the Dreyfus and Dreyfus (1986) model of skill acquisition.

Similarly Canadian researchers Rourke, Schmidt and Garga (2010) revealed that only 10% of the 87 papers included in their review of nursing simulation studies made adequate use of theory-based research while the remaining 90% of publications referred minimally to theory (45%) or not at all (45%). Again the most commonly employed theories were self-efficacy, situated cognition, experiential learning, novice to expert, constructivism and problem based learning. As can be seen from the range of theories cited, multiple learning paradigms can align with contemporary simulations but a fundamental imperative should be emphasised – to ensure that these types of experiences are informed by what may be learned rather than exclusively what is taught.

As expertise in the use of simulation has predominantly emerged from the USA in both medicine and nursing, so too has current commentary about simulation pedagogy. However a broader perspective is required from fields beyond psychology and skills focussed learning taking into account more contemporary learning and practice theories from across the globe.

As illustration, Harris and colleagues (2013) promoted theoretical frameworks from the cognitive and psychomotor learning domains specifically concentrating on the repetitive, deliberate practice which experts adopt to refine their performance goals. Although deliberate practice has a place in preparing healthcare students for practice (Clapper &

Kardong-Edgren 2012) there is little focus within this framework on the thinking and judgement aspects which play a key role in the wider context of professional practice. Canadian researchers Parker and Myrick (2009) provided a different perspective advocating the behaviourist and constructivist approaches as the most relevant learning theories for nursing simulation activities as did Bradley and Postlethwaite (2003) for medical education. Further work by Parker and Myrick (2010) promoted use of Mezirow's transformative learning theory in simulation design and delivery, incorporating concepts such as 'frames of reference' to develop students' perspective, social discourse and critical reflection for practice.

Other North American authors (McGovern et al. 2013) have drawn from well known, local nursing theorists recommending use of, in this instance, Carper's (1978) Fundamental Patterns of Knowing in Nursing (specifically empirics, esthetic, personal knowing, and ethics) to support the development and delivery of holistic nursing simulation learning experiences. The wider applicability of such perspectives may be limited due to different ways of thinking, cultures and practices.

More recently, a multidisciplinary group of simulation experts (Schaefer et al. 2011) reviewed publications on the instructional design and pedagogy science of simulation, however the scope of the review was limited to papers which reported the features of design and evaluation rather than theoretical frameworks used in healthcare simulations. Useful analysis was provided from the 221 reviewed articles specifically of the reliability and validity of simulators and participant performance evaluation tools, as well as study design and the translational impact, that is, to clinical practice. However the author's acknowledged limitations from the current literature in that one of the five critical areas of future research should be around the integration and investigation of theoretical frameworks for simulations. Use of frameworks and theoretical concepts of course confer benefit beyond the learning exercise to enable reproducible research and broader analysis.

The social, participatory and contextual elements of learning are prominent components of contemporary simulation exercises. Many simulation scenarios involve interactions between two or more participants together with a 'patient', and with or without facilitators. Hence learning is likely to occur not just on an individual level but within and across the group involved with the action as well as those observing. For nursing students, simulation scenarios can also represent the holistic nature of practice and the delivery of patient care in reasonably controlled circumstances compared with learning 'on the job'. Berragan (2011) raises some insightful perspectives about relevant pedagogies and simulation where students can enact the role and assume responsibilities, that is, learn more about 'being a nurse', can engage in cultural practices within a professional context and experience some of the affective components of learning. Berragan (2011) suggests that through simulation students can engage and learn through communities of practice (Lave & Wenger 1991) with more experienced nurses as 'masters' and expand their perspectives of knowing and doing – their zones of proximal development (Vygotsky 1978). The importance of the social and cultural aspects of learning which have been noted and recommended for contemporary education (Boud & Falchikov 2006; Boud & Prosser 2002; Burke & Mancuso 2012; Hager & Halliday 2006; Hager & Holland 2006; White 2010) have equal if not greater applicability for simulation which provides opportunity for informal learning experiences, guided by seasoned healthcare professionals and educators.

There is more to uncover beyond the research studies discussed to this point about what students learn within simulation activities through an educational lens. Of particular interest is how this contemporary method of teaching and learning might help prepare students for practice and to work effectively within healthcare settings as qualified Registered Nurses.

3.8 Unanswered research questions – the impact of simulation on clinical practice

Important questions yet to be addressed relate to the tangible educational and practice benefits of simulation, a resource-intensive and comparatively expensive educational strategy. Those who finance dedicated simulation centres wish to see convincing evidence that simulation improves practice, patient safety and patient outcomes. Traditional methodology typically used in medical research may not be appropriate for measuring learning and behavioural change. Hence the healthcare simulation community is turning to literature from other fields such as education, humanities and social sciences for theoretical and philosophical support and research design to address such outstanding questions.

One key aspect yet to be fully investigated relates to what is learned within simulation encounters, from a student or participant perspective. Rather than educators or simulation facilitators determining learning objectives, an investigation into learners' needs and what is learned within simulations would be valuable new information to add to this emerging field of health education.

From a nursing perspective, important areas for practice development and research relate to empowering nurses to raise awareness of and act early on high risk patient care issues such as changes to or rapidly deteriorating physical condition (Australian Institute of Health and Welfare and Commission for Safety and Quality in Health Care 2007; New South Wales Governnment 2005;2010; NSW Health 2005). Awareness and confidence to act in practice settings develops over time and expert nurses are defined in their practice by a high level of clinical judgement and intuitive thinking (Benner, Tanner & Chesla 2009). Intuition and judgement are based on expert nurses' previous patient care experiences, anticipation of important, related issues and an advanced knowledge base. These aspects of expert practice develop over an extended time period but an important focus of nurse

education is to promote and develop these areas particularly with students and beginning nurses. Benner et al. (2009) show from their extensive, observational research that the "clinical judgment of experienced nurses resembles more the engaged, practical reasoning … (rather) than disengaged, scientific, or theoretical reasoning promoted by cognitive theorists …"(p. 1). This concept complements the practice of simulation in nursing higher education and is essential in choosing an appropriate theoretical framework to investigate how simulations may enhance student nurses' clinical judgement to practice as Registered Nurses.

Knowing the characteristics of expert nurses' ways of thinking and work practices, and the stages in development from novice through to expert, assists in promoting situational awareness (noticing) and the beginnings of clinical decision making in undergraduate students who function typically at novice or advanced beginner level according to the Dreyfus model of skill acquisition. Rehearsing and reflecting on varied patient care situations requiring judgements and decision making may help advance these areas of practice. Would improved clinical judgement capabilities lead to confident and more empowered practitioners and therefore reduce errors in practice? The question of how experiences in patient care simulations might contribute to judgement and improve practice are important issues still to be addressed (Decker et al. 2008; McGaghie et al. 2011a; McGaghie et al. 2010). Further, there is a gap in knowledge about how simulation methods can improve or support learning particularly in relation to clinical practice (Murray et al. 2008). One follow-up study (Weller et al. 2004) of change in clinical practices following a one day simulation course found that anaesthetists reported increased use of communication with colleagues, contributed more to working as a team and were able to plan for adverse events. Strengthening evidence of changes in practice beyond participant self-report would be the next logical step in determining tangible advantages of simulation for practice improvement.

3.8.1 Contribution of simulation for nursing graduates' professional practice

The challenges newly graduated nurses face on their first year of practice has been repeatedly demonstrated in the literature. Although clinical practice experiences within degree programs expose students to patient care situations, the range and regularity of common cases varies due to patient mix and other enablers. It may be possible for students to complete their degree without seeing patients being assessed or managed for asthma or cardiovascular health issues, noted as some of the national health priorities in Australia. This would be the same situation for any healthcare student. Additionally, students would rarely be given the full responsibilities of a registered nurse role in clinical prior to graduation. These collective capabilities are more often than not an expectation of new graduates as they enter the workforce. Hence there is a need to provide final year students with these more complex patient situations and enable them to 'walk in the shoes' of the Registered Nurse (or respective healthcare professional) which can be achieved using simulation. Further, unlike the limited affordances during time on clinical, discussion on performance and reflection on practice can commence using post-simulation debriefing.

These simulation experiences should not be focused just on how to provide technical skills but represent the whole of practice. Collectively honing communication to be effective in a given situation, undertaking meaningful patient assessment and forming judgements, and interacting with other healthcare team members brings together a more complete picture of nursing practice. But is there good evidence to determine if such simulations impact on subsequent practice?

As healthcare simulation matures the research areas are focusing on the thinking and holistic elements of practice for students prior to entering the workforce. In addition to increased awareness about safe patient care, simulations at this stage should be able to trigger experiences where students can embody practice. The simulations should

therefore be designed and delivered based on relevant educations frameworks and pedagogy in addition to incorporating good simulation practices.

Further insights are needed about the learning that occurs during simulations from the perspectives of both active and passive participants. It is acknowledged that both groups gain benefits during the simulations but characterising these learnings would contribute to further understanding and supporting of these roles in simulation.

Of most interest is how simulations prior to entering the workforce contribute to graduates' practice during their first year. Whilst governments look at replacing a portion of clinical experiences with simulation, drivers for this may not be purely the educational and practice benefits. However this interest and the move in these directions reflect an acceptance of the advantages of simulation. More information is still required about the 'downstream' contribution of simulation for subsequent practice – from the thinking, decision making and holistic perspectives. This research addresses these areas of current interest and would contribute new knowledge in these domains.

The next chapter, Chapter 4 will feature analysis and discussion about the learning theories and pedagogical frameworks which have been associated with healthcare simulation to date. More contemporary theories drawn from the general educational literature are put forward for consideration, and attention is drawn to the recommendations for more informal learning opportunities within higher and vocational education – particularly in relation to the professions.

Chapter 4: Learning Theories and Frameworks related to Healthcare Simulation

In this chapter the educational theories and frameworks relevant to contemporary healthcare simulations will be explored in light of their capacity to illuminate and enhance the learning involved in the range of activities classified under this type of learning strategy. The explicit focus will be on nursing education but also drawing on literature from the social sciences. Particular attention will be given to the theories whose concepts provide the most appropriate frameworks for planning and executing simulations which contribute to the development of professional attributes for students to practice as Registered Nurses. Although focussing on nursing education, the appraised learning theories for simulation would be applicable for many healthcare students who are at similar stages in their studies and preparation for the workforce. The relevance would also extend to simulations as continuing education for practicing clinicians.

Recollect from Section 3.6 the survey data which highlighted the scant use of learning theories within simulation programs in Australian higher education institutions (Arthur, Levett-Jones & Kable 2013) or internationally (Gore et al. 2012). Recent nursing authors (McNeill et al. 2012; Schiavenato 2009; Walsh 2011) have flagged this as an area requiring greater attention. There remains a lack of awareness or inclusion of theoretical constructs related to the pedagogy of healthcare simulation, an aspect which is explored to a greater degree within this doctoral research.

4.1 Learning Theories and Frameworks Related to Simulation Activities

Several theories and frameworks can be closely aligned with healthcare simulations depending on the types of learning activities incorporated into the scenario, the focus, and the level of participant experience and required support.

To provide a broader perspective on learning from collective domains Knud Illeris (2002) consolidated several learning theories and theorists within a schema classified according to *cognition*, *emotio*n and *society* (Figure 3). This perspective assists with locating the learning theorists and theories most relevant to simulation and also helps to reflect on the multiple dimensions which are often combined within simulation learning experiences dependent on the focus and context.

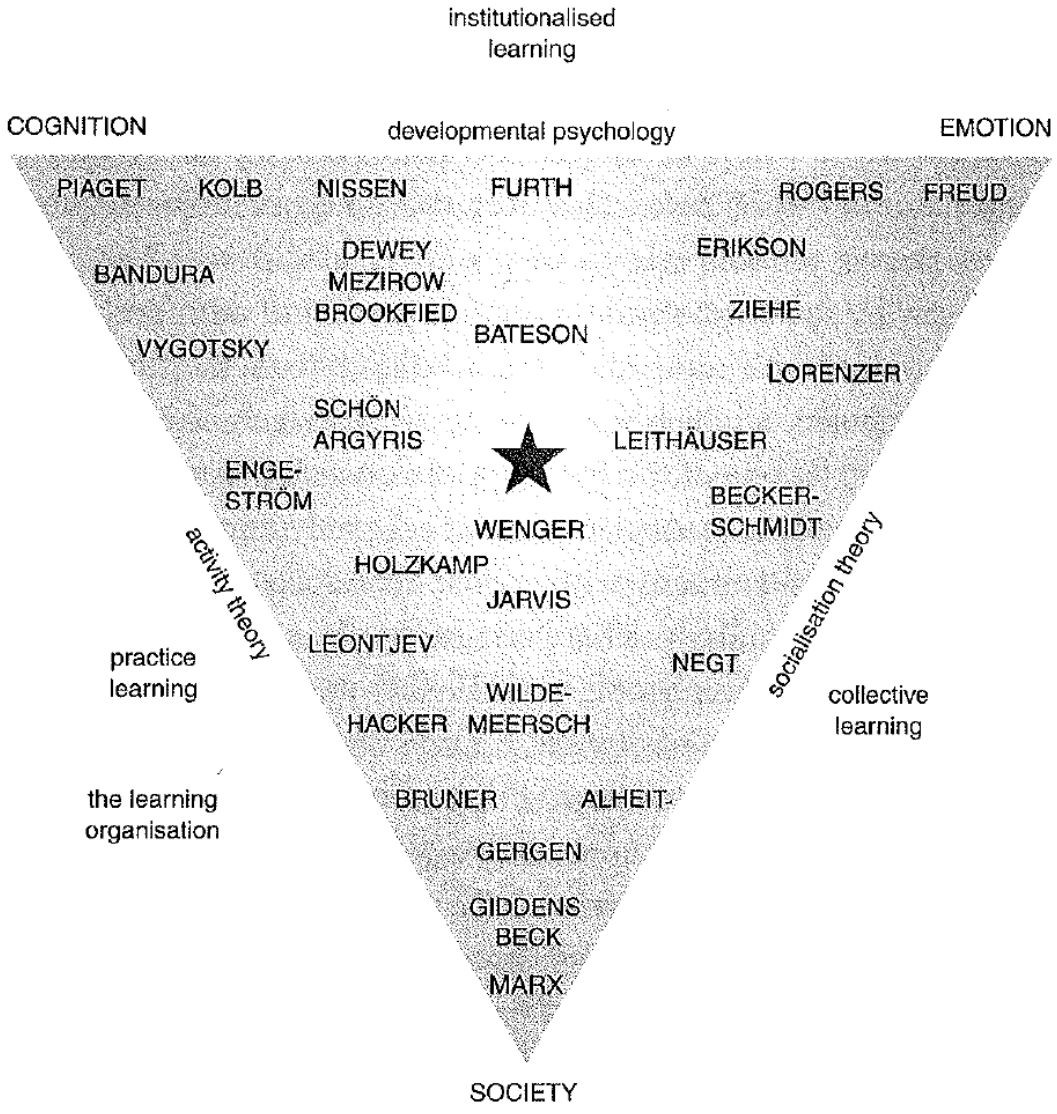

Figure 3: Positions in the learning theoretical tension field (Illeris 2002, Figure 16)

Illeris (2002) reminds us that learning should be conceptualised across three dimensions: the learning processes of the individual and /or the group (how and what is learned); psychological processes (alterations or results from the learning process); and the direct or indirect preconditions of learning – the interactions with materials and the social environment (p 14). For lasting changes of capacity *all three dimensions* (*cognition*, *emotio*n and *society*) should be incorporated within learning activities. A valid point made by Illeris resonates with the intent and potential of the planned simulation experiences:

> *"The character of the learning results with respect to usefulness and durability, that is in which situation it may be recalled and how long it may be remembered by the learner, will be closely connected with how the emotional dimension has been functioning as part of the entire process." (2002, p. 20).*

It stands to reason that if all three dimensions of learning are utilised in simulations then a broader analytical approach would be required than those used to investigate each dimension separately. For example evaluating the time taken and error rate of people performing psychomotor skills or assessing test scores in a pre- and post- manner as standalone measurements, while useful in some contexts, can limit the scope of information about the impact of simulation encounters on learning and subsequent practice.

As outlined in Chapter 2, the range of simulation related learning activities is broad. With more recent uptake of contemporary simulation in nursing education and practice, the focus and contextual diversity of patient care scenarios has flourished. This has been driven in part by ever decreasing opportunities for clinical placements within undergraduate programs but also by the recognition that simulation offers greater contextual learning experiences than traditional teaching and learning strategies such as lectures. In essence simulation provides more opportunities for experiential and unintentional learning where practices and judgements can be explored and reflection

encouraged. As Hager (2011) notes, for a practice-based profession in particular, not all learning "… can be specified in advance or imparted in a formal course." (p. 17). Simulations offer greater occasions for informal, opportunistic and incidental learning, to complement theoretical knowledge and to help students move from 'knowing' towards 'knowing how'.

The scope of simulation activities outlined in Chapter 2 can align with aspects of several learning theories such as: *behaviourism* where observable actions such as skill development and refinement are the focus, to *constructivism* and *social constructivism* when activities are based on a patient case scenario and students build on their existing knowledge during interactions with the case material or with peers. The important distinction to make with these commonly used learning theories is to acknowledge that learning is not just a 'thing' nor limited to the individual, and to recognise that the social, cultural and material elements which assist in making sense of things occurs with how individuals interact with others and the world around them. Hence when attempting to measure learning, metrics of knowledge, skills and attitudes or attributes provide only a portion of the 'larger picture'. Attention needs to be directed towards conceptualising how learners engage and participate in meaningful activities and how they apply their knowledge within varied contexts.

Reflective practice as described by Schön (1995) brings into focus the cognitive psychology considerations of the unobservable actions that occur within learning – the thinking, reflecting and understanding elements. These elements align particularly well with the processes of observing a simulation, the debriefing of all participants and facilitated discussion post-simulation, and subsequent reflection in written or oral forms or actions. Further, the notion of *situated learning* and *legitimate peripheral participation*, within or separate to the concept of a *community of practice* (Lave & Wenger 1991), align well with how contemporary nursing simulations are constructed and delivered and have been reported by several groups when employed within studies (Berragan 2011; Dieckmann et

al. 2011; Paige & Daley 2009). Enhancing practice-related learning through a community of practice concept (expanded in a subsequent section) incorporates a number of simulation components. Components include: incorporating a patient case as context, the authenticity of the simulation environment, participants portraying Registered Nurses providing patient care, inclusion of observer roles peripheral to the simulation activities, guidance by an experienced nurse academic within or in close proximity to the simulation and facilitated debriefing and reflection processes. Exploration of these components and their contribution to clinical judgement will be reported within this research.

There has also been a focus by some authors on activity theory (or cultural-historical activity theory – CHAT) as they relate to simulation, with Vygotsky's (1978) developmental psychology ideas of higher mental functioning frequently cited (Berragan 2011; Kneebone et al. 2004; Sanders & Welk 2005). Activity theory in general acknowledges that the higher functions of humans are viewed as social activities mediated by cultural objects and social forms particularly language (Langemeyer & Nissen 2006, p. 188). Researchers appear to be attracted to Vygotsky's notion of a *Zone of Proximal Development* which essentially reflects what a person can do by themselves compared with how they perform following guidance and support, that is, scaffolding (Hopwood 2013).

Experiential learning as attributed to Kolb (1984) and Boud and Walker (1990) is equally applicable to simulation activities. Propositions within this theory are that learning is a process which includes feedback and draws out the participants' beliefs and ideas, is a holistic process involving the thinking, feeling, perceiving and behaving functions in addition to cognition, and results from synergistic interactions between the person and environment (Segers & Van den Haar 2012, p. 55). Boud and Walker extended the theory adding greater emphasis on the contribution of *reflection* to the learning processes and emphasised that learners' experiences were shaped by their presuppositions and assumptions, intent, and interactions "between the learner and the social, psychological and material environment or milieu" (1990, pp. 63-4). Key to this framework is that an

'event' is the situation as *observed* by a person *detached from it* but the 'experience' is the situation as it is *known and lived* by the learner (Segers & Van den Haar 2012, p. 59).

Elements from several of the highlighted learning theories can also be seen in each phase of Tanner's *Model of Clinical Judgment* (introduced in Chapter 2) particularly social constructivism and experiential learning (what the nurse brings to the situation; how they interpret and respond to patient data) and the noticing, seeing and feeling aspects related to reflective practice (Boud & Walker 1990; Kolb 1984; Schön 1987, 1995).

The resurgence of attention on the importance of *informal* learning opportunities, as described by Hager and Halliday (2006), brings into focus the contribution of, for example, internal goods (tacit knowledge, thinking) to the preparation of graduates for the workplace. Irrespective of profession or type of work, the key features of informal learning put forward by Hager and Halliday complement the experiences offered through simulations. In contrast to formal learning such as lectures, features of informal learning are that it is indeterminate, opportunistic, involves both internal and external goods (artifacts) and is an ongoing process (Hager & Halliday 2006, p. 236). Combining well known concepts of life-long learning, skill acquisition (Dreyfus 1979, 2001; Dreyfus & Dreyfus 1986) and a number of previously noted learning theories, Hager and Halliday (2006) put forward strong arguments for greater awareness of the benefits of informal learning in the higher education and vocational sectors.

A major part of this doctoral research is to investigate the learning that occurs during simulation encounters and how simulations might enhance clinical judgement of students to practice as Registered Nurses. As the focus of this research relates to team-based simulations to enhance clinical judgement in final year nursing students, discussion will concentrate on theoretical frameworks which relate to these contexts. Educational frameworks which appear to resonate with simulation in the context of this research are: legitimate peripheral participation within a community of practice (Lave & Wenger 1991; Wenger 1998; Wenger, McDermott & Snyder 2002); clinical judgement – thinking like a

nurse (Tanner 2006); and experiential learning (Kolb 1984; Boud & Walker 1990). As a collective view, the concept of informal learning – wisdom, judgement and community (Hager & Halliday 2006) appears to draw aspects of a number of learning theories together to refocus on the importance of occasions of learning beyond a didactic format. At a meta-perspective, simulations provide opportunity for informal learning to make more explicit the implicit elements of holistic practice. Discussion will centre on how frameworks link with the types of learning which may occur in simulations. Literature is drawn from educational as well as healthcare simulation domains to illustrate current thinking, synergies and areas where further inquiry is needed.

An early foray into characterising the pedagogy of simulation in medical domains was shaped by the types of learning activities and curricula at the time (Bradley & Postlethwaite 2003). Although initially focused on the developmental psychology perspectives of cognition, Bradley and Postlethwaite expanded their discussion to include the socio-cultural perspectives of learning. Aspects from this historical account of simulation pedagogy and subsequent writings are considered in the following sections.

4.1.1 Constructivism and social constructivism

The theoretical framework of constructivism, from the psychology domain, relates to learners building on existing knowledge (assimilation) through active processes and constructing mental schema to understand, or accommodate, new knowledge (Bradley & Postlethwaite 2003) rather than assuming that knowledge is a set of propositions that needs to be memorised (Somekh & Lewin 2006). This theoretical concept underpins the use of patient case scenarios, authentic practice experiences in university clinical laboratories, within observed structured clinical assessments (OSCAs) and during facilitated clinical experiences. The addition of interactions within social structures such as with ‘the patient’, academics and other students during patient care simulations where students actively engage with the learning activity and develop their own meaning reflects the theory of social constructivism (Bradley & Postlethwaite 2003; Somekh & Lewin 2006). In this situation, academics can scaffold and support student learning, then gradually

withdraw such support to enable independence (Sanders & Sugg Welk 2005). However gaining perspectives beyond an *individual* learner's mental schema to broader concepts of learning communities which incorporate both active and passive participants, represents the team-based formats used within contemporary simulations.

The more representative theories for practice-based learning can be drawn from the social and anthropological domains which extend conceptions of learning beyond the metaphors of the mind as a 'filing cabinet' or a 'vessel that substance is added to' to acknowledge the influences of the social, cultural and material elements. Learning should to be considered beyond the individual person to the contextual elements which shape the experiences. For healthcare students, enabling participation in work-related activities in an authentic learning environment interacting with a 'patient' and other team members and relatives can incorporate the social, cultural and organisational dimensions highlighted by Illeris (2002).

4.1.2 Situated learning, a community of practice and legitimate peripheral participation

For practice based professions learning is more meaningful if it is situated within authentic environments, is contextual and incorporates interactions with peers and experts. These concepts of *situated learning* are for the most part acknowledged and embraced to varying degrees within healthcare curricula. Formal learning, lectures and tutorials, remain a substantial component of nursing and medical degrees but exposure to clinical contexts is enabled through practical sessions at university and work based clinical experiences throughout the degree programs. For many years, university clinical practice laboratories have been created to reflect hospital ward settings, and on occasion, specialty areas such as intensive care and operating theatres. This type of environment contributes to situated learning if combined with contextual material (e.g. patient case scenarios), artefacts and rehearsal of practice which includes active co-construction of peoples' world views (Benzie et al. 2006).

Within the theory of situated learning, Lave and Wenger (1991) proffer that learning also occurs through legitimate peripheral participation in a *community of practice*. The overall concepts of a community of practice are: understanding; practice; meaning (negotiation, participation and reification); and community. Although communities are considered to come together, develop, evolve and disperse – with no clear commencement and ending – some of the overall concepts are useful for novice students in developing their professional identity and practices. For example, Lave and Wenger (1991) and later Wenger (1998) describe how such communities can create appreciation of practice boundaries and locations; a sense of identity, belonging, participation and negotiation; and a shared repertoire, (mutual) engagement and joint enterprise / accountability. At a meta level, some forms of simulation activities can enable learning through this theoretical framework particularly where the academics, as experienced nurse clinicians or 'masters', provide guidance and model practices within such a community.

Legitimate peripheral participation, within simulations, can be attributed to several roles for example the novice students within active roles learning alongside more experienced nurses, and those who are purely observing the simulation activities. For observers there is opportunity to reflect on their own practices or discuss unfolding sequences of patient care with other learners if observing from a distant room. The concept of experts modelling practice complements the notion of *legitimate peripheral participation* and is beginning to be reported in the literature as an important element of preparation for, performance during and reflection following simulation learning activities (Aronson, Glynn & Squires 2013; Brown 2008; Disler et al. 2013; Rochester et al. 2012; Sanders & Welk 2005).

Although there have been criticisms of Lave and Wenger's original work about community definitions, power differentials, existence of extrinsic as well as intrinsic motivations and what constitutes membership (Andrew, Tolson & Ferguson 2008; Fuller et al. 2005; Hodkinson & Hodkinson 2004), the applicability of the theoretical construct to this

research is reasonably valid. The study participants are predominantly novice learners of nursing, more experienced clinicians (academics) comprise the experts (or full members of the community) and the community in this research context is considered to be the *profession of nursing.* Although the community of practice focus has origins in workplace learning research, there is applicability in this context as nursing students need to be prepared for workplace cultures and the issues surrounding ongoing learning opportunities within practice. In addition, communities of practice abound across organisations, comprise any number of members and range of foci and as entry level practitioners, nursing graduates need to be prepared to integrate into workplace communities.

Students do gain a degree of insight into the social systems of the health workplace from exposure during clinical practica throughout their course, but consolidating the notion of professional identity particularly during the final stages of the degree through a *community of practice* would assist with the transition from student to registered nurse roles. Again, team-based simulations with students participating as Registered Nurses or as a team leader or observing others then contributing to discussions during facilitated debriefing, provides opportunity to think and learn about practice from several perspectives.

4.1.3 Experiential learning

The work of Kolb (1984) and Boud and Walker (1990) were previewed earlier in this Chapter emphasising the experience the learner realises through engaging with the milieu in *experiential learning*. Kolb's (1984) often cited learning cycle (reflective observation, abstract conceptualisation, active experimentation and concrete experience) provides the notion of four dominant learning styles: accommodating, diverging, converging and assimilating. Given that each of us develop a predominance in one of the four learning styles but possess attributes of all, it suffices to say that the manner in which simulations is delivered are likely to cater for all types of learners according to this framework. But what role does feedback and reflection have within this theory?

The work of Boud and Walker (1990) expands these original concepts to focus on two particular elements of experiential learning – what the learner notices within the milieu and how they intervene within and beyond the situation. Entering into the experience of a given situation the learner engages with the immediate players (the human elements) which may be influenced by gender, culture, and class as well as material aspects (such as artefacts) of the physical environment (Boud & Walker 1990). Elements which the learner notices within this milieu may then be changed or altered in some way as the learner attempts to intervene with the particular situation.

Key aspects of the experiential learning framework for this doctoral research are that learners' experiences are shaped by what they bring to the situation and how they reflect on action. Feedback and facilitation are instrumental to reflection particularly for novice learners, and recognition of prior life and practice experiences should be accounted for and incorporated into occasions of learning.

4.1.4 Informal learning

In the educational literature, there has been a resurgence or increasing focus on the contribution of informal learning opportunities to a broad range of situations and disciplines. Rather than learning being seen as the acquisition of propositional knowledge, the view of learning from participation in sociocultural experiences focuses on the processes and the inseparability of the individual and the social (Hager & Halliday 2006, p. 113). This view is not dissimilar to other theoretical concepts however the following notions highlight how informal learning is more about 'learning as becoming' (a health professional in this instance) rather than 'learning as preparing' for a particular job per se.

Propositional knowledge, tacit knowledge and 'knowing how'

The intent of undergraduate health programs is to adequately prepare graduates to undertake independent professional practice. Expertise develops following years of further experience as propositional knowledge is applied to clinical situations and

individuals' repertoires are established. The experienced clinician is able to discern which propositional knowledge is useful for a given situation particularly when there is more than one 'correct' way to proceed. Rather than keeping stock of vast amounts of memorised facts or information, the expert tends to draw on tacit knowledge and know-how which may not all be codifiable (Hager & Halliday 2006, pp. 623-4).

Much of the early learning activities in undergraduate health programs, related laboratory sessions and some forms of simulation, focus on the acquisition and refinement of 'technical' skills. However according to Hager and Hodkinson (2009) skilful practice is highly contextual and holistic rather than atomistic and context-free (p. 625). Hence when moving towards more representative patient scenarios operationalised through simulations, learning should be considered as participation in human practices, that is, active participation in complex social constructions (Hager & Hodkinson 2009, p. 626). Knowing how to succeed in a particular field is based on one's cultural capital which in addition to acquired skills and knowledge, accounts for understandings of how to fit in and do the job, acknowledging the social relations and hierarchies of the workplace (Hager & Hodkinson 2009, p. 632).

In addition to enabling insight into the social aspects of practice, simulations may also assist participants to experience personal and embodied reconstructions of nursing and of healthcare more generally. These reconstructions may be tacit rather than explicit, yet it is recognised that people *become* through learning and learn *through becoming* whether they are cognisant of these processes or not (Hager & Hodkinson 2009) p. 633). These understandings are highly applicable to the practices which play out during contemporary simulations and offer a different perspective on what is being learned during these activities. Given these opinions, the ways to examine such occurrences are best attempted through qualitative methods of inquiry rather than observations and / or surveys alone.

Within the nursing literature, there have been similar considerations about expert practice and how to instill wisdom and practical know-how in novices. Similarities are noted between Hager and Halliday's work and Tanner's model of clinical judgement.

4.1.5 A model of clinical judgement

A fundamental aspect of nursing practice is making judgements about a patient situation which enables nurses to provide appropriate care. In addition to educational theoretical frameworks, a model of clinical judgement drawn from nursing education literature is also applicable to this research.

A model that accommodates a number of the above learning theories into a framework for nursing practice is Tanner's *Model of Clinical Judgment* (2006). The foundations for the development of this model and how it can be applied to simulations experiences are now discussed in more detail.

Seminal work by Dreyfus and Dreyfus defining a model of skill acquisition (1979; 1986) has been a solid foundation for subsequent investigation across other disciplines. Benner applied the Dreyfus model to nursing to uncover the knowledge embedded in clinical practice and practitioners (1984). Using an interpretive approach to identify and describe nurses' clinical knowledge, Benner's numerous and diverse vignettes used to illustrate the domains of nursing practice significantly uncovered what many could not describe – the tacit knowledge of expert nurses and maxims used in providing patient care. Intuition plays an important role in nurses' judgement and decision making. This intuition is developed over time from professional and patient care experiences. It starts to develop in the advanced beginner stage (Dreyfus & Dreyfus 1986), where the nurse starts to intuitively recognise situational elements from practical experiences in concrete situations with meaningful elements (Benner, Tanner & Chesla 2009).

Tanner's *Model of Clinical Judgment* in nursing (2006) (Appendix A) arises from her own and colleague Benner's research and describes four key phases - *noticing, interpreting,*

responding and *reflecting* - which define how nurses use clinical judgement in caring for patients. Tanner (2006) describes this model as one of engaged moral reasoning (engaged with both the patient and family) which is useful in uncertain or undetermined clinical situations. Although the model reflects expert nurses' practice, it provides direction and guidance for educators, students and clinicians in developing and improving practice enabling novices to transition through to higher levels. According to Tanner (2006) when engaging in patient care, nurses have expectations of the situation based on knowledge and prior experiences of typical patient responses. They *notice* when patient parameters are atypical and demand further scrutiny. Following an initial grasp of the situation at hand, nurses then *interpret* and *respond* with an appropriate course of action based on a hypothetico-deductive reasoning pattern gathering further data to incorporate and form relevant hypotheses. In this phase, expert nurses may rapidly recognise, interpret and respond intuitively using tacit knowledge – which Tanner (2006) asserts both supports the notion of and results from clinical reasoning. The model is in a cyclical rather than linear form, representing the ebb and flow of situations, patient dynamics and clinical reasoning and decision making.

The final phase of this model which discerns clinical judgement from clinical reasoning is *reflection* in-action and on-action (Tanner 2006). Not only are patient responses to interventions assessed and compared with expected outcomes but both positive and negative care experiences can be incorporated into lessons learnt from judgements made, which consolidates learning. Further, the components within the model can help students identify individual clinical learning needs across the spectrum of patient situations within nursing practice. There are similar aspects of this model to Schön's (1987, 1995) writings about reflective practice in particular the seeing and feeling features of practitioners' work and behaviours and how changes are made to practice accordingly.

Lasater (2007a) applied Tanner's model to the simulation experience and one early research outcome was the development of a rubric. The *Lasater Clinical Judgment Rubric*

(*LCJR*) provides detailed developmental descriptors of expected levels of performance within 11 dimensions of the four phases of Tanner's model (*noticing, interpreting, responding* and *reflecting*). Students can be guided in practice development by knowing what is expected at the next level from detailed descriptors within the rubric matrix. Developed initially as an observer's tool, some groups have used the *LCJR* for students to self-rate their own performance citing examples from the simulations or clinical practice experiences to corroborate their ratings in each dimension (Cato, Lasater & Peeples 2009; Dillard et al. 2009). Although providing some indication of clinical judgement, inquiry about the contribution of simulations to clinical judgement within this research are sought via other methods.

There is scope for further research into the application of Tanner's model of clinical judgement to students' learning during simulation encounters. There has been no published literature of research using this model beyond the United States of America, although Australian academics Levett-Jones and colleagues (2013; 2010) have developed and tested a model of clinical reasoning with both similarities and differences to the clinical judgement model. The attraction of using Tanner's model in this doctoral research is that it accommodates and guides learners beyond the student or advanced beginner level, through the newly graduated and competent nurse phases towards the level of expert nurse. Phases within the model can be applied across practice and theoretical settings and the model is beneficial in simulation encounters as it can incorporate both theory and practice perspectives within learning.

4.2 Only one learning theory or framework for contemporary simulation activities?

As illustrated within the preceding short synopses of learning theories, there are notable commonalities across frameworks and a number of components from each which appear to fit well with simulation pedagogy and practices. It is believed that simulations can offer an array of learning opportunities related to psychomotor skills as well as occasions to

extend higher order thinking skills during unfolding scenarios, depending on the focus and learning objectives within the activity. What is clear to those involved in simulation delivery is that for the majority of participants, learning continues beyond the activity if reflection is piqued through facilitated engagement during the simulation session. Understanding more about the learning that occurs during simulation and how this can be productive for future practice are areas which need further illumination.

4.3 Unanswered research questions – learning theories, pedagogy and simulation

Healthcare simulation continues to evolve and mature in practices, evaluation and research. As noted on a number of occasions throughout this thesis and as reiterated by Schaefer et al (2011) and others (Arthur, Kable & Levett-Jones 2011; Gore et al. 2012), an important focus for those creating simulations is the incorporation of educational theoretical frameworks. However the question may be 'which educational framework'? The answer may well be 'whichever framework suits the intent of the learning activities' with the caveat that all three dimensions of learning - the emotional, social and cognitive – should be acknowledged (Illeris 2002). The research within this thesis may assist with clarifying the dimensions of learning within simulations as informed by undergraduate nursing students' experiences.

Information is emerging from the literature about how simulation experiences may impact on the development or improvement of clinical judgement (Ashcraft et al. 2013; Lindsey & Jenkins 2013; Lusk & Fater 2013; Mariani et al. 2013; Weatherspoon & Wyatt 2012). What is absent though is following this concept in a temporal or longitudinal manner - to determine the contribution of clinical judgement formed through simulations to the practices of newly graduated nurses.

These are important concepts to determine to provide insight into the educational benefits of the emerging use of simulation technologies and shed light on students'

practice requirements to both inform educational development and guide student learning experiences. Further, an enigmatic aspect that needs to be probed is whether participating and learning through simulations improves clinical practice performance, and as some aspire, improves patient outcomes (McGaghie et al. 2011a; 2011b). By investigating these questions and tracking final year nursing students across the last semester of their nursing degree and into clinical practice, our understanding of the impact of simulation on development of clinical judgement for practice may be greatly enhanced.

4.3.1 Revisiting my research questions – a deeper perspective of learning through simulation

Given the context of discussion in the last two Chapters in particular, it is time to revisit the research questions of this doctoral work.

These questions are:

- *What learning occurs through using simulation activities?*
- *What are the factors within the simulation that assist students to develop and apply professional judgement within the scenario context?*
- *How can simulations be productive in preparing for practice (within the context of student groups/ culture/s)?*
- *Has what was learnt on the course/ within the simulations helped within subsequent work as a newly graduated nurse?*

The approaches used in seeking information about these areas of inquiry are expanded in the next chapter, Chapter 5 which covers the research methodologies and processes employed in two temporal studies.

Chapter 5: Research Methodology and Process

The overall methodological approaches used within the research and a justification of the adoption of such approaches will be featured in this chapter. Further discussion will then focus on the specific data collection methods and activities used within each of the 3 phases in order to address the specific research questions. Details of the study participants, settings, data collection and analysis will also be outlined in this chapter.

5.1 Methodology

A mixed methods approach was used in this exploratory, longitudinal research. Adopting a mixed methods orientation enabled investigation using qualitative and quantitative data to provide different perspectives with regard to the research focus and questions. A mixed methods research approach adopts the pragmatist paradigm where the focus of investigation incorporates a view of 'the truth as what works' with regard to the research questions (Creswell & Plano Clark 2011, pp. 19-52; Teddlie & Tashakkori 2009, pp. 3-18). This perspective contrasts with the pure positivist or post positivist tradition of seeking an unquestionable 'truth' through quantitative inquiry; or the pure constructivist position of describing the 'reality' through solely qualitative methods (Teddlie & Tashakkori 2009, pp. 3-18). Rather than a singular perspective, mixed methods research enables the combination, triangulation and potential corroboration of data from both numeric and narrative sources (Creswell & Plano Clark 2011, pp. 19-52).

The emergence of mixed methods research, from the 1990's onwards, has resulted in reconstruction of traditional, philosophical orientations and approaches to research. As Teddlie and Tashakkori (2009) propose, the world view of a "continua of philosophical orientations, rather than dichotomous distinctions, more accurately represent[s] the positions of most investigators"(p. 94). Teddlie & Tashakkori (2009, pp. 93-6) illustrate this perceived continuum with a predominant orientation of either QUAN or QUAL labels (abbreviated and in uppercase text reflecting dominance) at either end of the continuum,

and varying combinations of both methods in between (represented in lowercase text). For example, within the continuum there may be equal focus on QUAN and QUAL orientations, in either order, or a predominance of one method such as QUAN-qual or quan-QUAL (upper case denoting the predominant approach). Further defining characteristics within and across the three research paradigms (qualitative; quantitative; and mixed methods) include the perspective and approach to logic; the researcher / participant relationship (epistemology); the role of values (axiology); and the nature of reality (ontology) (Teddlie & Tashakkori 2009, pp. 20-9). Adopting a mixed methods approach to investigating simulation related learning is required to capture the complex elements of these activities – the emotional, cognitive and social elements of learning.

The world view underpinning the research outlined in this thesis adopts a pragmatist perspective where the research questions are formulated early in the investigation and the best methods for answering the questions are subsequently determined (Creswell & Plano Clark 2011, pp. 38-47). A combination of inductive and hypothetical-deductive logic is used appropriate to the type of data and its analysis (Teddlie & Tashakkori 2009, pp. 87-91). Rather than a discrete objective or subjective point of view, both perspectives are considered as the researcher and participant co-construct 'reality' or the researcher objectively analyses quantitative information. Instead of a value-bound or value-free axiology, values are considered important in interpreting results per se in the approach selected for this research. An awareness of the impact of researcher values on research outcomes is always important to note and methods to address this issue will be outlined in subsequent pages and chapters. The ontological perspective of this research is one of diverse viewpoints regarding social realities, aligned more with the multiple, constructed realities of the constructivist paradigm rather than the critical realism of a post positivist perspective (Creswell & Plano Clark 2011, pp. 38-47).

5.2 Mixed methods research design

A range of mixed methods research designs are described in contemporary texts. Four basic designs include: a convergent parallel design; sequential explanatory design; sequential exploratory design; and an embedded design (Teddlie & Tashakkori 2009, pp. 137-67). Creswell & Plano Clark (2011, pp. 53-106) suggest two additional designs which support investigation of multiple elements – transformative and multiphase designs. While not strictly conforming to these suggested designs, this research adopts elements from at least two commonly used designs – the explanatory and multiphase approaches.

According to Creswell & Plano Clark (2011, pp. 81-5), in the explanatory design, initial quantitative data informs and directs subsequent qualitative inquiry to provide a broader perspective of the same research question or to further examine factors which emerged from significant or interesting results. Often a subgroup of the initial research participants is used in the second stage which expands perspectives and links existing data. By contrast, the typical multiphase design incorporates sequential studies each of which informs the next phase in an iterative process and is commonly undertaken by a team of researchers to address large scale problems or topics.

In this doctoral research, research inquiry was conducted within two studies – with detailed descriptions provided in subsequent sections. The first study comprised a quantitative approach in the form of a survey to a representative sample of final (3rd) year nursing students at one university. Rather than necessarily informing inquiry for the second study, as in an explanatory research method, the survey addressed a number of the research questions by different modes of inquiry and focus compared with the subsequent qualitative study. Further, the research participants in the latter study were not drawn from Study 1 participants, another variation to the traditional explanatory design. A qualitative approach was selected for Study 2 of the multiphase, longitudinal research. The focus of this latter study addressed differing research questions to Study 1

with specific intent to follow-up a subgroup of students in clinical practice following course completion. The selected approach and research design supported the specific aims and direction of the doctoral research with the intent of providing greater insight into the contribution of simulation learning encounters on participants' clinical judgement capabilities specifically in relation to clinical practice.

5.3 Methods

5.3.1 Design

The research comprised two studies:

Study 1 - a survey of third year nursing students

Study 2 - an interview study of a subgroup of nursing students at the end of their course and after commencing work as a Registered Nurse

A multi-phase mixed methods inquiry was conducted to investigate of a cohort of final year nursing students (Figure 4). Data gained from the survey in Study 1 (N=108) provided a landscape of the study group characteristics and academic level. Quantitative data provided students' self-perceptions of knowledge, learning, practical performance within the context of a specific team-based simulation encounter. Qualitative data were drawn from free text responses within the survey. Results from Study 1 also served as a reference point for comparison and triangulation of subsequent data (Study 2).

The second study was subsequently undertaken using qualitative methods. Nine students agreed to participate in one of two semi-structured group interviews at course completion, and to individual follow-up interviews in the early months of employment following graduation (Figure 4). The aim of this method was to seek a deeper understanding and personalised accounts of how simulation encounters experienced within the Bachelor of Nursing (BN) course impacted on individuals' knowledge and learning, and contributed to clinical judgement in relation to practice. Early follow-up within practice was deliberate so that participants' recall of course learning experiences

and the impact on, or application of, learning to practice situations could be explored. As time passes, influences of local workplace practices and the desire to assimilate into the professional community may diminish recall of factors from formal university courses that contribute to professional practice (Malouf & West 2011; Wangensteen, Johansson & Nordström 2008).

	Study, sample and timeframe	***Procedure***	***Product***
Quantitative and qualitative data collection	***Study 1*** 3rd year nursing students (N=108) 2009 and 2010	Pre- and post-simulation survey *Data screening* *Quantitative analysis (SPSS)* *Frequencies* *Correlations* Free text responses - *reduction of wording (removing plurals, definite and indefinite articles)*	Numeric and free text data Demographics Descriptive statistics Word Clouds
	Study 2 3rd year nursing students (N=9) November 2009	Two group interviews (n=4; n=5) *Semi-structured interview questions and demographics* *Conducted by independent researcher* *Audio recording and transcription* *Coding and thematic analysis* *Within-case and across-case theme development*	Demographics Audio and text data (audio recordings and transcripts) Codes and themes
Qualitative data collection	Newly registered nurses (N=9) May – June 2010	Individual follow-up interviews (n=9) *Semi-structured interview questions* *Audio recording and transcription* *Coding and thematic analysis* *Within-case and across-case theme development*	Audio and text data (audio recordings and transcripts) Codes and themes

Figure 4: Procedure, processes and products for Study 1 and Study 2

Choosing three time points to investigate the impact of simulation activities on learning and clinical judgement was purposeful. The intention was to use temporal investigation to create a richer picture of the contribution of simulation to students' learning and determine the impact of this approach to learning on varied aspects of clinical practice, specifically making judgements in contextual workplace situations as discussed in Chapters 2 and 3. Research from the healthcare simulation literature to date has focused more on the aspects of skill ability, time on task and skill retention over time rather than a more holistic view of how simulation can contribute to professional practice and in particular, decision making. This is an under researched area which is of great interest and importance to the healthcare simulation community worldwide, government health departments and professional groups as outlined in Chapters 2 and 3.

5.3.2 Setting and sample

Setting

Data collection took place on campus at the University of Technology, Sydney (UTS). UTS is a large urban university with over 23,000 students enrolled in undergraduate, enabling and non-award courses (University of Technology Sydney 2011). Approximately 34% of students are from a non-English speaking background, and 46% of students were born outside of Australia (University of Technology Sydney 2011). The largest language groups were Chinese, Cantonese, Vietnamese and Arabic (University of Technology Sydney 2011).

The Faculty of Health (UTS:Health) has a majority of female students (87%) with 48% of this group born outside of Australia. There is also a greater diversity of age ranges with 55% of undergraduate students in UTS:Health over 25 years of age (University of Technology Sydney 2011).

For Study 1, research data were collected at the university during the tutorial / simulation sessions conducted in the nursing laboratories, the usual scheduled venue for these types of student activities.

The group interviews and majority of the follow-up interviews (Study 2) were also conducted at the university. During follow-up, former students were invited back to the university setting for convenience. This arrangement allowed those being interviewed uninterrupted time away from the clinical practice setting which minimised distractions. This arrangement also facilitated the follow-up process from an ethics approval perspective, which may have necessitated up to nine additional applications to individual health service areas if interviews took place in the work setting. One interview took place in a café, the location convenient for both the participant and the researcher.

Sample

Study 1

A convenience sampling method was used to enroll students in Study 1. Participants would be considered a purposive sample in that students were from a designated program and year of study at one university. The researcher had access and permission to engage with nursing students at the university.

Final (3rd) year students from the BN were selected as potential study participants. They comprised three subgroups: recent school leavers who undertake a 3-year BN program; and two groups within a 2-year accelerated program. Accelerated program students were either Graduate Entry (GE) with an Australian or international degree in another discipline, or Enrolled Nurse (EN) students seeking to upgrade their qualifications from a Certificate IV TAFE qualification. During the 3rd year of the BN, all student groups come together for their final year studies, hence the study participants have a range of nursing and life experiences, knowledge and cultural backgrounds.

All students participated in the designated university simulation experience irrespective of the research study. Students from three tutorial groups in the 2009 cohort and another three tutorial groups from the 2010 cohort were invited to participate in the research and data collection. An information letter and consent form was provided and students who agreed to participate signed the written consent form and completed the pre- and post-

simulation questionnaires. Although known to some of the students, the researcher was not involved with teaching students in the selected subject tutorial groups. Reducing perceived coercion by the researcher-as-teacher was paramount for encouraging students to respond honestly and for reducing bias within student responses.

Data were collected for two consecutive years: One difference between the years was use of audio-visual playback in 2009 during the feedback/debriefing session which was not possible in 2010 due to time constraints and changes to the university scheduling format.

Demographic data from 2009 (61 students from a possible 75; 81% response rate) and 2010 (47 students from a possible 75; 62% response rate) comprised a total of 108 responses from 150 students (overall response rate of 72%) as shown in Table 2. The sample were predominantly female (82%), enrolled in the 3-year Bachelor of Nursing program (55.7%), aged 19-25 years (68.9%) and had two or less years of nursing experience (63%). Over 70% of respondents had either one or no previous encounters with high fidelity simulation.

Study 2

In response to recruitment strategies (emails through the online university portal; reminders during formal lecture sessions) nine final year nursing students from the 2009 cohort agreed to be interviewed at course completion and into practice during 2010.

The participants in Study 2 would be considered a purposive sample, in that students from a designated program and year of study at one university participated in the latter phases of the research. Although students self-selected to participate they may have felt compelled to contribute to the research due to the nature of their associations with the researcher as teacher. Discussion about potential influences of the researcher in relation to the data and quality aspects of the research outcomes will be addressed under Ethical Considerations (Section 5.4) and in subsequent chapters.

Table 2: Demographic data of the samples (Study 1 and Study 2)

Demographic		Study 1 N=108 n (%)	Study 2 N=9 n (%)
Sex	Male	9 (8.3)	5 (55)
	Female	93 (86.1)	4 (45)
	Not stated	6 (5.6)	0
Program	3-year	59 (54.6)	6 (67)
	2-year Enrolled Nurse	20 (18.5)	1 (11)
	2-year Graduate Entry	26 (24.1)	2 (22)
	Not stated	3 (2.8)	0
Age (years)	19-25	69 (64)	5 (55)
	26-32	27 (25)	1 (11)
	33-39	5 (4.6)	1 (11)
	40-46	5 (4.6)	0
	47-53	1 (0.9)	1 (11)
	54-60	0	1 (11)
Age	≤25	68 (63)	5 (55)
	≥ 26	39 (36.1)	4 (45)
Years nursing experience (excluding course)	0	34 (31.5)	0
	≤2	34 (31.5)	5 (55)
	3-5	33 (30.5)	3 (33)
	6+	7 (6.5)	1 (11)
Years nursing experience	0	34 (31.5)	0
	≤2	33 (30.6)	5 (55)
	≥ 3	40 (37)	4 (45)
Number of previous simulations	0	36 (33.3)	0
	1	43 (39.8)	0
	2	24 (22.2)	1 (11)
	3	4 (3.7)	6 (67)
	4	1 (0.9)	2 (22)
Highest educational qualification	Secondary school	46 (42.6)	4 (45)
	Technical College	26 (24.1)	1 (11)
	Diploma	5 (4.6)	1 (11)
	Bachelor	25 (23.1)	3 (33)
	Masters	1 (0.9)	0
	Post graduate certificate	1 (0.9)	0
	Post graduate diploma	1 (0.9)	0

As these students had not participated in Study 1 data collection, demographic data were also collected at this point. This group comprised representation from all ages, gender and study programs within the BN i.e. 3-year program, EN and GE accelerated programs in this

group. Demographic details of the follow-up group which differed substantially from the larger student cohort were: more males (55%); more years of nursing experience (all students had more than 2 years experience compared with 34% of the larger cohort who had no experience); and more previous simulations (89% of the follow-up group had experienced 3 or 4 simulations compared with 95% of the larger cohort who had experienced 2 or less simulations) (Table 2).

Participants in 'follow-up into practice' time-point in Study 2 were the same students from time-point 1. All nine participants were now employed in professional practice with most undertaking a structured new graduate nursing program.

5.3.2.1 The simulation encounter – preparation, delivery, debriefing

Leading up to the simulation encounter in the final weeks of a 3rd year nursing subject, students were familiarised during tutorial classes with Tanner's *Model of Clinical Judgment* (2006). In particular, the phases of noticing, interpreting, responding and reflecting were discussed in classes in relation to knowledge, understanding and clinical practice.

One week before the simulation students were able to access an outline of the patient case via the university's online learning management system. Prior to selecting roles and participating in the simulation, students were orientated to the simulation setup and equipment, were reminded of the manikin's capabilities and given directions of how to gain further clinical information or patient cues if required. Students self-selected for the simulation roles based on a broad verbal outline of the responsibilities of each position provided by the academic. Details of the deteriorating patient simulation case, roles and level of academic support are represented in Table 3.

Table 3: Details of the deteriorating patient simulation scenario

Subject **(combined theory/ clinical)**	Acute adult medical-surgical with existing integrated simulation
Simulation learning objectives	Focused patient assessment, effective communication and teamwork. Escalation of the situation as necessary.
Patient background	A 61 year old post-operative patient with a history of cardiovascular compromise; during phase 2 the patient experiences sudden acute alterations to fluid balance which precipitates pulmonary oedema. Vocal and physiological signs displayed – breathlessness, increased respiratory rate and heart rate, concurrent drop in oxygen saturations
Setup and moulage	SimMan - configured as an elderly female patient in a hospital bed. Bedside monitor with ECG and oxygen saturation readings Moulage - wound/s and dressing/s; wound drainage devices containing red coloured fluid; a urinary catheter and drainage bag containing yellow coloured fluid; intravenous cannula and fluid therapy; and 'oxygen' - delivered via facial mask / nasal prongs
Student roles: **Academic roles:**	- Primary nurse, 2 additional nurses, nursing Team Leader - 2 relatives - Observers within the same room but at a distance Patient's voice via SimMan from enclosed control room (with one way glass)
Getting into and out of role	Students donned blue gowns for the simulation and removed these prior to the debriefing session
Simulation commenced:	with senior nurse (academic) giving patient handover who then left the scene
Timings **(approximate)**	Pre-briefing: 5 minutes Simulation: 10 – 12 minutes Debriefing: 20 minutes
Guidance / Assistance	After giving handover, the academic remained within the lab but peripheral to the simulation action. If deemed necessary, the academic paused the simulation to provide some guidance to re-focus students' attention to key aspects of the unfolding scenario. Contact to either a senior nurse, doctor or rapid response team was possible using the wall phone.

Following the simulation and de-roling, the academic proceeded with a facilitated debriefing session. Open ended, semi-structured questions were used with active

participants invited to respond in the first instance, then observers contributed to a wider discussion. The debriefing session was structured according to recommended practices at the time (Cantrell 2008; Fanning & Gaba 2007; Jeffries 2007; Rudolph et al. 2006) and framed within Tanner's (2006) clinical judgement model specifically around the elements of noticing, interpreting, responding and reflecting.

5.3.3 Data collection

5.3.3.1 Study 1 – near course completion

This component of the research aimed to address two questions:

- *What learning occurs through using simulation activities?*
- *What are the factors within the simulation that assist students to develop and apply professional judgement within the scenario context?*

This phase of the research sought to provide an insight into students' perceptions of the contribution of simulation for learning in relation to clinical practice and to determine which components provided greatest support for making judgements in this context. In determining methods to address these two research questions and considering the time limits and constraints around academic schedules, multiple strategies were planned to gain students' perspectives of these areas of interest. One specific theoretical framework, Tanner's *Model of Clinical Judgment*, aligned closely with contemporary opinion about nursing practice and simulation, was used for this research.

Tanner's model, based on the notion of 'thinking like a nurse', was one theoretical framework which had been integrated into the new Bachelor of Nursing curricula at the study site concurrently with this doctoral research. Concepts from Tanner's model (such as context, background, what students bring to the encounter, knowledge, experiences, expectations and reasoning patterns) together with the four main aspects of *noticing, interpreting, responding and reflecting*, informed development of questions in both

studies of the research. A pre-existing survey was further developed to elicit multiple aspects and student opinion of simulation in light of the research questions.

Surveys

Surveys can provide benefit from creating a picture of the distribution of peoples' characteristics, attitudes or beliefs (De Vaus 2002). Although typically designed to gather quantitative data, surveys may also generate a richer picture from free text responses and analysis of qualitative data. Concepts of the area of interest are identified, and indicators, which offer some measure of these concepts are formulated into questions (De Vaus 2002). Evaluating and interpreting the indicators is the final step when using this research method.

Identifying and defining relevant concepts and indicators is an iterative process. Concepts which influence data sets incorporate socio-demographic, dependent, independent, intervening and grouping variables (De Vaus 2002). Relevant dimensions and sub-dimensions, aligned with a chosen theoretical model, need to be determined before testing the survey for reliability and validity.

The pre- and post-simulation survey

Central constructs that were explored or measured within the surveys focused on the learning that occurs during simulation activities and the specific components which promote students to develop and apply clinical judgement within the patient scenario context. The constructs emerged from gaps in the healthcare simulation literature where learning is primarily rated at one or two brief time points rather than described (Brown & Chronister 2009; Hatala et al. 2008; Schwartz et al. 2007). Further there is strong interest and little data about the contribution of simulation for the higher order and holistic aspects of clinical practice – clinical reasoning and making judgements (Levett-Jones 2013; McGaghie et al. 2011a; Tanner 2006).

The pre- and post-surveys were refined by the researcher and supervisor from pre-existing versions (Disler et al. 2013; Kelly et al. 2014). The pre-existing surveys were pilot tested

with groups of students, academics and experienced researchers over three years to determine face validity (Kelly et al. 2014). Additional questions were added to the survey used in this research to embed elements from the theoretical framework (Tanner 2006). These processes were undertaken due to a lack of developed surveys relevant to the context of Australian simulation and nursing practices, and the focus of this research. This course of action was informed by an understanding of existing surveys from the higher education and healthcare simulation literature at the time (Jeffries 2007; Kardong-Edgren, Adamson & Fitzgerald 2010).

Review of students' survey responses over previous years (Disler et al. 2013; Kelly et al. 2014; Rochester et al. 2012) provided direction for the scope and type of inquiry within this research and helped refine questions for the study surveys. Based on these research studies, there was interest in determining the contribution of varied simulation components to students learning experiences and clinical judgement. Feedback from students and other academics, as well as personal experiences of developing, implementing and evaluating simulation experiences locally and internationally contributed to determining the components for inclusion in the survey.

Informed by Tanner's (2006) *Model of Clinical Judgment* the pre-simulation survey comprised self-rating questions inquiring about what nurses (students in this case) bring to the patient care situation, which may impact on what they *notice* and how they *respond* within the scenario context (Appendix B). Factors which were predicted to influence these aspects were participants': level of theoretical and clinical knowledge and experience; other work experiences; and the number of previous simulations. Demographic information (in the form of ordinal or nominal data) were collected including: age; gender; highest education qualification; and, study stream within the BN. These latter aspects were believed to similarly impact on participants' values, beliefs and perceptions of performance (Freeth & Fry 2005; Tanner 2011; Whyte, Ward & Eccles 2009).

For questions requiring a rating, a horizontal four-point Likert scale was used. Answers were to be provided by choosing one selection of four semantic differential options. Likert scales enable collection of data about attitudes or beliefs, which can be quantified and analysed in the light of characteristics and other data relating to the research participants (De Vaus 2002). Further, smaller scales are likely to provide the data of interest as effectively as larger scales, which are often contracted into smaller categories during the data analysis process (De Vaus 2002).

The post-simulation survey inquired about the components of the simulation (briefing; orientation; guidance; debriefing and so on), the scenario context, and contribution of the simulation experience to learning and practice. Participants were asked to rate on a 5-point numerical scale the value or level of assistance (1 = little assistance, 5 = greatly assisted) of eleven components of the high fidelity, team-based simulation encounter from the preparation, participation or debriefing phases (Appendix C). Specific interest was on how either participating in, or observing, the team-based simulation might impact on participants' subsequent encountering of similar scenarios in the clinical setting and on practice when a Registered Nurse. Several open-ended questions at the end of the survey enabled free-form responses.

Simulation components that mattered most from the student's perspective had not been adequately investigated within the literature. Educators can pre-determine the relative worth of a range of components commonly used to support simulation encounters. It was therefore important to investigate the value and contribution of these various simulation components from a participant's perspective, particularly in the context of clinical judgement.

When paired with Tanner's *Model of Clinical Judgment*, it was anticipated that inquiry via the surveys based on the aspects of *noticing, interpreting, responding, and reflection*

might reveal more information and insight about students' learning and development of judgement through participating in simulation activities.

5.3.3.2 Study 2 data collection – at course completion and into practice

Study 2 of the research comprised interviews of nine participants at two time points. Group interviews were conducted at course completion (as 3rd year nursing students) and individual interviews of the same participants were conducted the following year (as newly practicing Registered Nurses). The group interviews (65 - 75 minutes in duration) occurred three months after the simulation and data collection described in Study 1. Individual interviews were conducted within the first four months of practice and were between 45 and 75 minutes in duration. All interviews were audio recorded and transcribed.

This component of the research aimed to address three questions:

- *what learning occurs through using simulation activities?*
- *how can simulations be productive in preparing for practice (within the context of student groups/ culture/s)?*
- *has what was learnt on the course/ within the simulations helped within subsequent work as a newly graduated nurse?*

The central constructs of Study 2 were to seek more detailed insights from students of the contribution of simulation activities to clinical judgement and subsequent clinical practice both within the BN and as a Registered Nurse. Group interviews were the chosen research method for the first time-point in Study 2 and were conducted by another researcher who was independent of the study. Semi-structured questions developed by the researcher and doctoral supervisor guided the group interviews (Appendix D). Questions were again informed by the theoretical framework of Tanner (2006) specifically the aspects of noticing, interpreting, responding and reflecting, and aimed to explore contributions of simulations to learning and practice.

Group interviews

Group interviews, like other data collection methods, confer benefits and disadvantages. The terms *group interviews* and *focus groups* are now used more interchangeably in educational research (Punch 2009, p. 146) and are claimed to provide a socially-oriented, more relaxed environment compared with one-on-one interviews. In listening to an individual member responding to questions, other members of the group have time to "listen to others' opinions and understandings to form their own" through reflection on the topic (Marshall & Rossman 2006, p. 114).

Group interviews allow flexibility to explore unanticipated points as they arise in the group discussion. However, potential power dynamics between the facilitator and participants can influence or impede responses yielding incomplete or truncated views or opinions (Krueger & Casey 2009). The researcher was mindful of these aspects in relation to the data collection, analysis and interpretation. One strategy to mitigate researcher influence was to source another experienced academic to facilitate the group interviews. The facilitator's role, on this occasion, was to moderate and monitor discussions to help participants make explicit their experiences within and subsequent to the simulations and how these experiences contributed to their practice.

At the second time-point in Study 2, the same nine nursing students were invited to be interviewed by the researcher, to discuss issues relating to their work as a Registered Nurse. Of interest was how the new graduates (NGs) were adjusting to their role within the healthcare workforce and to determine which aspects of their simulation experiences had contributed to their learning and perceived level of clinical judgement within practice experiences. A semi-structured interview approach was used incorporating open-ended questions (Appendix E). Impressions from group interview data shaped the interview questions to a degree.

Interviews

Interviews can be conducted in a number of formats, from highly structured through to completely unstructured (Punch 2009, pp. 144-50). Less structured interviews often result in richer data as participants are able to respond more freely to the questions without being constrained by pre-set response categories (Punch 2009, p. 146). However the interactions are only between the interviewer and interviewee rather than the group dynamics seen within group interviews. Planning for the interview process is key and in addition to choice of venue and range of trigger questions, the communication and listening skills of the interviewer are central to the flow of discussion and depth of probing. In addition to the prepared interview schedule (Appendix F) a quiet, informal setting and approach were adopted with general, opening questions used to commence discussion and establish rapport with the participants.

Although the ideal would have been to adopt a group interview approach for this second time-point in Study 2, participants' work commitments made this impossible. Competing shift work patterns and limited availability for follow-up interviews with two or more participants meant that individual interviews were the only viable approach for data collection at this time-point.

5.4 Ethics approval and considerations

The doctoral research was approved by the University's Human Research Ethics Committee (UTS HREC REF NO. 2009-268A). After reading the information sheet those who agreed to participate signed the consent forms (Appendix G and H). Codes were used to indirectly identify each participant and were separated from the surveys and other paperwork to ensure data were de-identified.

The researcher, although known to some students, was not a subject teacher of the tutorial groups selected in Study 1 of the research. By taking this course of action, the researcher aimed to reduce bias and coercion in relation to consent to participate in the

research. All students were expected to participate in the simulation activity as part of the subject requirements. If the students did not want to participate in an active role they were offered an observer role. The usual practice of all people reading and agreeing to a confidentiality agreement was adopted for simulation encounters (Appendix I). The confidentiality agreement raises awareness and seeks commitment from all those present that there will be no discussion of anyone's performance outside the classroom. Agreeing to confidentiality provides a degree of safety and license to perform particularly for those who play an active role in the simulation encounter. Where audiovisual recording was undertaken, students and staff provided written approval for this purpose.

The researcher approached the subject coordinator as well as the academic staff responsible for each of the identified tutorial groups who were selected to participate in the study. Approval was granted by all academic staff for the researcher to attend their tutorials and ask students to participate in the research. The academic staff overseeing the simulation activity were experienced in this type of learning including the facilitated debriefing component. As such staff were cognisant that some students may react to the unfolding patient scenario if they had had similar personal experiences, provision was made for additional Faculty or university support for students if such situations arose.

Although the researcher was present during the each tutorial group's simulations in Study 1, she deliberately took a passive role and did not engage in or influence the learning activities or student responses. Rather, the researcher only provided verbal and written information about the study to students; administered and collected the consent forms and surveys; and, observed the action.

The researcher was cognisant of the potential influence of her teaching and leadership roles on students and their decision to participate in Study 2. The teacher as researcher may have also increased the bias of students' responses to focus group questions. Further discussion of this point will be expanded elsewhere in the thesis. To mitigate the likely

influence, the researcher organised for an independent academic to lead the focus group interviews. This experienced researcher, who did not participate in any simulation learning experiences with students, guided discussions using semi-structured questions provided by the doctoral researcher (Appendix D).

5.5 Data management and analysis

5.5.1 Study 1

Data from pre- and post-simulation questionnaires of both years (2009 and 2010) were anonymised by using coded surveys and separating the consent forms after data collection. All data were stored in a secure office at the university accessed only by the researcher and supervisor. Both quantitative and qualitative data were entered into a statistical software database (SPSS® version 19) created specifically for the research. Each participant was assigned a research code within the database and data were aggregated for analysis.

The data were checked for errors and missing values. Missing variables were left blank as recommended to assist with the analytical process (Pallant 2007, pp. 43-9; 56). Data were summarised using frequencies and percentages for categorical variables and means and standard deviations, or medians and range for continuous variables. Case summaries were also generated as a further data screening process.

Distribution of continuous variables (simulation components) showed a degree of negative skewness, that is towards the higher end of the rating scales (-1.121 to -.285). Kurtosis of the same variables revealed ranges from -.860 to .841. Histograms were generated to visually examine distributions and detect outliers, but the data characteristics were deemed acceptable to proceed with statistical analysis (Pallant 2007, p. 56).

Analysis of variance (ANOVA) was used to determine whether study stream (3-year, 2-year enrolled nurse, 2-year graduate entry), age, years of nursing experience, and gender influenced students' ratings of the benefit of the different components. The significance level was set at $p \leq 0.05$. Post hoc analysis was performed using Tukey's Honestly Significant Different test (HSD) to guard against Type 1 errors (Pallant 2007, p. 207).

The free text responses (qualitative data) from three questions in the pre and post survey were copied into a Microsoft Word file then uploaded into a 'word cloud' (Wordle). Several iterations of word clouds were undertaken for each of the three questions to reduce redundant words (definite and indefinite articles; plurals) and provide a representative sample of students' descriptors in relative order of importance.

5.5.2 Study 2

Transcripts of all group and individual interviews were created in Microsoft Word from the audio recorded files. The researcher checked all audio recordings against the respective transcripts on numerous occasions for accuracy and made corrections to the word document where necessary. This process enabled the researcher to become immersed in the raw data to develop overall impressions of participants' responses.

Both forms of the raw data were further examined, concurrently and separately, for common issues, patterns of words or phrases to determine typologies, and eventually a hierarchy of themes. Both inductive and deductive approaches were used during analysis of the qualitative data sources. Deductive emic analysis was the first process adopted focusing on the terms used by participants to describe their world views and experiences (Patton 2002, p. 454). Researcher notes were added to a side column of the interview transcripts. As analysis continued, the process moved towards an inductive etic analysis as the researcher applied labels or aspects from Tanner's model of clinical judgement to the emerging patterns (Patton 2002, p. 456).

Typologies, rather than strict taxonomies, were formed from the data as recurring attributes and characteristics became clearer (convergence) (Patton 2002, p. 465). Themes were created and revised following a divergent classifying process to extend and bridge items (Patton 2002, p. 466). The researcher performed these analyses which were corroborated by the doctoral supervisor during iterative analysis of output at face-to-face meetings.

5.6 Summary

The methodological approach adopted for this multi-phase, longitudinal research has been outlined and justified in this chapter. Details have been provided of the mixed methods approaches used in Study 1 and 2, as well as the study setting, participants and processes of data collection and analysis. Reference was made about incorporation of Tanner's *Model of Clinical Judgment* as a framework for the research questions and respective data collection and analysis, providing further context in which the research is situated. The next chapter will focus on initial findings in light of current literature in the areas of simulation, learning, and practice.

Chapter 6: Main Findings

Findings from both studies of the doctoral research will be provided in this chapter. To summarise, Study 1 data comprised survey results from 108 third year undergraduate nursing students in the form of pre- and post-simulation self-rating questions. To characterise the learning which occurred, students provided free text responses to questions and ranked components within the simulation activity in the context of development of clinical judgement. Demographic data were also collected.

Study 2 data (first time-point) derived from two group interviews conducted by a research colleague during the final week of the Bachelor of Nursing program. In response to semi-structured questions, nine volunteer students provided thoughts and opinions about their experiences in the simulation learning activities and how this type of learning may contribute to enhancing clinical judgement, inform clinical practice and prepare the student for their new graduate year.

Data from the second time-point of Study 2 took the form of individual interviews conducted by the researcher. All nine students were now new graduate nurses employed in large metropolitan hospitals or private healthcare facilities. Again, semi-structured questions were used to elicit opinions from these graduates about which elements of simulation provided most benefit for them to practice as Registered Nurses.

Tanner's *Model of Clinical Judgment* was one framework for the research and data collection, in particular the phases of *noticing, interpreting, responding and reflecting* within the model (Appendix A). Further, the researcher incorporated components from the model, such as knowledge, prior exposure and experience, to frame interview questions for Study 2. Themes were drawn from group and follow-up interview data regarding simulation experiences and how these contributed to the development of

clinical judgement particularly in relation to clinical practice. Findings from each of the studies are presented in the following sections.

6.1 Study 1: pre- and post-simulation survey

6.1.1 Where do you feel least able or lacking in your current knowledge of nursing practice?

Students were given opportunity to provide free text responses at the end of the pre-simulation survey about the areas they felt least able or lacking with regards to their current level of knowledge for nursing practice. This question was designed to trigger students' individual thoughts and ideas across the spectrum of nursing practice competencies as a focus for the upcoming simulation learning activity. Responses varied widely from no response, to a small number of words, to more considered thoughts represented by two or more lines. As the representativeness of responses was not guaranteed through conventional data analysis, the collation of words were used to develop a 'word cloud' using the online application *Wordle*™ (Feinberg 2011). The result provided a visual representation with words used more frequently in the text equating with greater prominence reflected in the word cloud.

Figure 5 shows the 'word cloud' highlighting areas where students felt least able in their current practice. Of most prominence, and hence greater frequency within text responses, were: *patient, clinical, knowledge, and pathophysiology;* next level considerations evident as medium sized words were within the context of *nursing, practice, improve, data, need* and *skills.* As in any practice based profession or discipline, students completing their final year of study who are about to embark on their career identified typical areas which in their opinion are critical for competent nursing practice.

Figure 5: Word cloud (Wordle^{TM}) representing responses to areas where students perceived to feel least able or lacking in their current knowledge of nursing practice

Patient, knowledge and clinical feature prominently in the 'word cloud' responses followed closely by *pathophysiology, nursing* and *practice.* This focus is perhaps not surprising for students who are completing their final year of study and are on the threshold of practice compared with junior students who may be more intent on *skills*.

The next section posits findings from the post-simulation survey within the context of other data and reports on students' ratings of the components of simulations which facilitate the application of clinical judgement.

6.1.2 Post-simulation survey

Immediately following the feedback and debriefing session, students completed the post-simulation survey to provide immediate impressions of the contribution of the activity to learning and practice. There was opportunity for students to provide free text responses to questions about the simulation just encountered and to rate the usefulness of specified components of the learning experience in relation to applying clinical judgement. The connectedness of simulation to clinical practice was of great interest within the research.

6.1.2.1 How could the simulation experience help with subsequent clinical scenarios?

Based on the premise of the contribution of simulation, feedback and reflection to learning, students were asked "***What things might you do differently if you encounter this kind of situation again (in clinical)?***" As previously described, responses were entered into Wordle™ to determine the prominence of foci following the simulation learning encounter. Words with highest frequencies at this point in students' learning included: *patient, communication, assessment* and *care* followed by *information, plan, tasks, team and handover* (Figure 6).

The importance of the *patient* and *communication* are pronounced, as the most frequent responses and focus following the simulation. Taking all the aforementioned words of prominence from this 'word cloud' it appears students became much more aware of the essential components of registered nurse practice and of being a member of the healthcare team following the simulation. Focus appeared to move towards the *patient* and *assessment* particularly when clinical parameters changed (as in the simulation). Assessment (and reassessment) and *communication* are important aspects of practice and hallmarks of vigilance for ongoing monitoring to mitigate acute deterioration and to initiate medical review of the patient (Buykx et al. 2012; Cooper et al. 2010; Kelly et al. 2014)

Effective communication, planning patient care and working as part of the team are areas critical to the acceptance and success of new graduate nurses in their first year of practice (Wolff et al. 2010). It appears the simulation experience of caring for a deteriorating patient within a healthcare team context influenced students' perceptions of the focus required for clinical practice, specifically to focus on the patient and the importance of effective communication.

Figure 6: Word cloud (Wordle™) representing responses to what students would do differently if they encountered a similar situation again in clinical practice

6.1.2.2 How could simulations be used to help you practice as a Registered Nurse?

The second post survey question of interest, which sought to canvas students' opinions about how simulations could assist with registered nurse practice, resulted in a different array and prominence of words within a 'word cloud'. On this occasion, students' responses focused on words such as: *situations, practice, patient,* and *simulation* followed by *real, clinical, learn, emergency* and *improve* (Figure 7). Collectively, these words reflect how simulation appears to provide students with an opportunity to practice patient situations which are realistic, and authentic enough to mimic the need for an emergency response. The importance of new graduate nurses recognising situations which require higher levels of clinical judgement and additional resources beyond their scope of practice is a cornerstone of safe, responsible practice (Feng & Tsai 2012; Purling & King 2012). To this end, a simulated patient scenario such as the one provided for these final year nursing students appeared to provide insight about the role of nurses in managing patient 'situations' and the multi-faceted responsibilities of registered nurse practice.

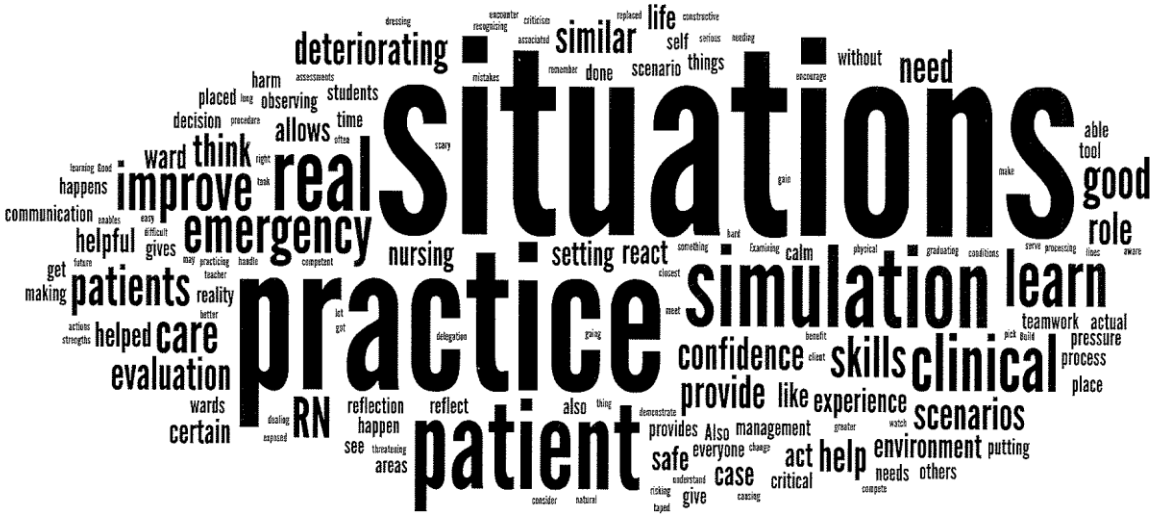

Figure 7: Word cloud (Wordle^{TM}) representing responses to the question 'how could simulations help you practice as a Registered Nurse?

The next area of inquiry following the simulation focused on the components which assisted students to apply clinical judgement.

6.1.2.3 What matters most? Rankings of simulation components which assist students to apply clinical judgement

Findings from this aspect of the research have been published (Kelly, Hager & Gallagher 2014 Appendix G). Students' ratings (n=102) on the assistance that the 11 simulation components provided to clinical judgement ranged from mean 3.23 to 4.02 (5-point rating scale) as illustrated in Table 4. The three simulation components which received the highest ratings for contributing to clinical judgement (with mean scores above 3.7) were: 1) *facilitated debriefing*, 2) *post-simulation reflection*, and 3) *guidance by the academic*.

Table 4: Ranking and mean ratings (scale of 1-5) of students' ratings of the benefit of simulation components to making clinical judgements (N=102)

Ranking	Simulation Component	Mean (SD)
1	Facilitated debriefing	4.02 (1.03)
2	Post-simulation reflection	3.98 (1.03)
3	Guidance by the academic	3.78 (1.1)
4	Observing others and making notes	3.65 (1.07)
5	Participation in the simulation	3.60 (1.04)
6	Asking questions of the patient, relatives and others	3.54 (1.04)
7	The patient case scenario topic	3.48 (1.15)
8	Briefing and orientation to the simulation area	3.48 (1.19)
9	Participation in a role	3.46 (1.14)
10	Viewing the simulation AV playback (n=58) *	3.33 (1.22)
11	Patient case notes	3.23 (1.27)

* Data collected in the first year only (n=58)

The third highest rated component however is not always incorporated into the delivery of simulation activities – that of *guidance by the academic*. Practices vary in the level and manner of support provided to students during simulations and range from: no academic support (neither physical presence within the simulation room nor communication by phone), to proxy guidance through the manikin's responses or by phone (via the academic), to an academic physically taking on a role and actively engaging in the simulation scenario. The level of guidance is generally determined by academics and gauged on the year level of the student cohort and their prior simulation experiences. In this research 73% of students had one or no previous experiences (Table 2 Section 5.3.2) which influenced the simulation delivery.

The remaining five components, ranked seven to eleven in Table 4, were ranked lower in relation to assisting students in applying clinical judgement. The components which the consolidated student group rated least beneficial for clinical judgement were the *patient case notes* (mean 3.23), and *participating in a role* (mean 3.46). The low rating of the *patient case notes* (ranked 11th) may have reflected the limited level of detail the notes provided or the greater importance of *engaging with the patient and others* in the simulation scenario.

A surprising finding is the lower ranking students allocated for *participating in a role* (ranked 9th). This may be attributed to the fact that not all students were able to actively participate in a role due to time constraints and large student numbers (Kelly et al. 2014; Rochester et al. 2012). However this is countered by the higher ranking of *participating in the simulation* (ranked 5th) which indicates students benefited in other ways from the overall learning activity.

Simulation Component Rankings per student group

Of particular interest with this student body was determining differences across the three student subgroups of the relative value of each simulation component for applying clinical judgement. Rating scores per student subgroup for each simulation component are represented in Table 5. The ranked order of components is the same as displayed in Table 5 with additional columns of the relative rankings and mean scores per component for each study stream (subgroup).

Table 5: Rankings of simulation components for each student subgroup: Mean (SD)

Simulation Component	Study stream within Bachelor of Nursing					
	3-year		2-year EN		2-year GE	
	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)
Facilitated debriefing	**1**	3.83 (1.08)	**1**	4.10 (0.93)	**2**	4.40 (0.91)
Post-simulation reflection	**2**	3.74 (1.05)	**2**	3.95 (1.03)	**1**	4.58 (0.78)*
Guidance from the academic	**3**	3.66 (1.10)	**5**	3.63 (1.26)	**4**	4.20 (0.91)
Participation in the simulation encounter	**4**	3.60 (0.99)	**7**	3.53 (1.02)	**8**	3.60 (1.23)
Participation in a role	**5**	3.46 (1.05)	**5**	3.58 (1.07)	**11**	3.28 (1.4)
Observing others and making notes	**6**	3.41 (1.09)	**2**	3.95 (0.84)	**5**	3.96 (1.06)
Asking questions of the patient, relatives and others	**6**	3.41 (1.06)	**4**	3.84 (0.83)	**8**	3.60 (1.16)
Patient case scenario topic	**8**	3.33 (1.01)	**11**	3.22 (1.26)	**5**	3.96 (1.14)
Briefing and orientation to the simulation area	**9**	3.26 (1.18)	**7**	3.53 (1.07)	**7**	3.88 (1.27)
Viewing the simulation AV playback	**10**	2.97 (1.19)	**10**	3.46 (1.20)	**3**	4.30 (0.95)*
Patient case notes	**11**	2.96 (1.30)	**7**	3.53 (1.26)	**10**	3.56 (1.26)
Total Mean (SD)		3.42 (0.28)		3.66 (0.26)		3.94 (0.4)
Range		(2.96 - 3.83)		(3.22 - 4.1)		(3.28 - 4.58)

* = p<.05
(potential score range 1-5)

The top two ratings were the same for all groups: *facilitated debriefing* and *post-simulation reflection*, but the lowest ratings varied. The lowest ratings for 3-year students was *patient case notes*, for 2-year Enrolled Nurse students the *patient case scenario topic* and for 2-year Graduate Entry students *participation in a role*.

Statistically significant differences in mean ratings occurred in two simulation component areas: in *post-simulation reflection* (F 6.16; p=.003) specifically the 3-year program mean score (3.74 SD 1.05) was lower than the 2-year GE (4.58 SD .78). It seems possible that the GE group who were generally older and had attained a higher education degree would have more developed skills in reflection and analysis. The second statistically significant difference was *viewing the simulation recording* (F 5.245; p=.008), with the 3-year program having a low mean (2.97 SD 1.19) compared with the 2-year GE students (4.3 SD .95). Similarly, is may be plausible that the GE group, having studied at university previously, had greater reflective skills and appreciated the opportunity to gain feedback on performance from multiple perspectives. No other variable tested (age, years of nursing experience, or gender) had a statistically significant effect on the mean scores of simulation components. Further discussion of these findings is incorporated into Chapter 7.

6.1.2.4 Summary of post-simulation survey findings

A summary of post survey questions revealed that simulations assisted students to appreciate that the patient is central to nursing work, and expanded their awareness of how to manage clinical situations. Benefit was conferred for students in many ways, not just through active participation in a simulation role but also in observing others work through the patient scenario. The simulations provided a visual and contextualised patient care situation for students, which 'previewed' how things proceed from recognition of a patient problem through to initiating medical review and how to deal with anxious relatives.

It appears from the simulation component rankings that students gained much benefit from *guidance by the academic* during the unfolding patient cases, in addition to the post-simulation debriefing and reflection which are often deemed the most useful components following simulation learning experiences. The ranking exercise provided insight from students of how eleven specific components assisted students to apply clinical judgement within the simulation scenario context which adds new information to the simulation literature.

6.1.3 Summary of Study 1 findings

Study 1 aimed to address two research questions:

- *What learning occurs through using simulation activities?*
- *What are the factors (components/ elements) within the simulation that assist students to develop and apply professional judgement within the scenario context?*

The pre-simulation survey questions revealed information about students' theoretical and clinical knowledge and self-perceived capabilities. Post survey data highlighted how what students learned in the simulation changed their focus from *knowledge* and *pathophysiology* more towards the *patient*, *communication* and in particular *assessment*, (providing) *care*, and *planning/tasks*. For subsequent practice, students considered the simulation made them aware of practice issues including how to manage situations and patients and the multifaceted responsibilities of registered nurse practice.

The top three overall components of the simulations which helped students apply clinical judgement were: *facilitated debriefing, post-simulation reflection* and *guidance by the academic*. Components ranked at mid-level reflected learning through legitimate peripheral participation i.e. *observing others and making notes, participating in the simulation*, and *asking questions of the patient and relatives*. Other components, often considered essential in simulation activities, were deemed least helpful in relation to clinical judgement i.e. *briefing and orientation to the environment, patient notes, viewing audio-visual playback* and *participation in a role.*

Findings from the more in-depth qualitative inquiry of how simulations contributed to learning, practice and judgement will be presented in the next two sections which provide an account of the results from Study 2.

6.2 Study 2: how simulations contributed to students' learning and practice at course completion

This component of the multiphase research aimed to gain detailed perspectives of students' opinions about their simulation experiences and how these may have contributed to learning and practice. Two time points were included in Study 2 - at course completion and early follow-up into the first year of practice. Demographic data of Study 2 participants are included in Table 2, Section 5.3.2).

Eight of the nine students in Study 2 had participated in three or more simulations. These included: a team-based trauma simulation for a critical care elective subject (in third year); a paediatric focused simulation (in second year); or an interdisciplinary hospital-based simulation pilot project where they interacted with final year medical students (in third year). Others recalled their experiences from a team-based deteriorating patient simulation (medical-surgical in Table 6), again provided in their final year of study. In all learning experiences, the patient scenarios focused on situations which required interaction with other team members, the patient and relative, analysis of information, a response to the situation and communication of the patients' clinical signs and symptoms of concern. Outlines of the simulation scenarios and contexts, student roles and level of academic support are included in Appendix J.

Five of the nine students had volunteered and participated in the interdisciplinary simulation with medical students at a Sydney based hospital, and all students had experienced at least two simulations within their nursing degree. Five students had

participated in the trauma simulation which the researcher had organised, with three of these students interacting with the researcher in the critical care scenario. Only two students (Debra and Mark) participated in both the critical care and interdisciplinary simulations. Consequently there was a diversity of simulation experiences across this student cohort which may have influenced interest and participation in the study. Hence responses to interview questions were recognised as a potential issue for data validity as the researcher had either facilitated or organised a number of simulation experiences.

Table 6: Study 2 participants: Study stream and simulation experiences. Each participant is identified by a pseudonym

Participant	Study stream	Year 2	Year 3		
		Paediatric	Medical surgical	Critical Care (elective)	Interdisciplinary (hospital/ voluntary)
Benita	3-year	✓	✓		✓
Mark	3-year	✓	✓	✓	✓
Debra	2-year EN	✓	✓	✓	✓
Alex	2-year GE	✓	✓	✓	
Mary	2-year GE	✓	✓		✓
Ting	3-year	✓	✓	✓	
Lilly	3-year	✓	✓		
Andy	3-year	✓	✓	✓	
Jason	3-year	✓	✓		✓

From analysis of the qualitative group interview data four major themes were identified. The agreed four major themes were:

1. ***ways of learning within simulations;***
2. ***the holism of practice;***
3. ***being a Registered Nurse – responsibilities and expectations***
4. ***the immediate impacts of simulation on practice.***

These themes are described and illustrated with representative vignettes over the following pages of this section. The themes are not separated by hard boundaries and there is a degree of overlap with some vignettes which illustrate more than one theme. An attempt has been made to deliberately keep the appearance of repetition to a minimum.

6.2.1 Ways of learning within simulations

Five sub-themes or categories arose within the major theme of ***Ways of learning within simulations.*** These five foci are previewed in more detail below and include:

a) affective elements of learning – emotions, attitudes and behavioural norms;
b) experiential, situated and contextual learning;
c) learning through participation– the active and observer roles;
d) the raw materials for reflection; and
e) knowledge and skills for practice.

Each sub-theme is examined in more detail below illustrated by student quotes or relevant vignettes.

6.2.1.1 Affective elements of learning – emotions, behavioural norms and attitudes

According to students, simulation triggered a range of emotions, behavioural norms and attitudes nested within the complete learning encounter. These affective elements were manifested when either participating in or observing others perform a patient care simulation.

A common feeling of *anxiety* was reported by the majority of students before the simulation but they stated this decreased when they actually engaged in the simulation activity and afterwards – when the action was complete. Anxiety was present irrespective of prior experiences with simulation learning or familiarity with the patient case scenario. For example, Alex had experienced other simulations prior to the trauma scenario in the critical care subject as well as others during his hospital clinical practicum yet he still initially felt anxious.

Alex was a young man in his twenties who had graduated as a doctor in the Ukraine but was unable to practice in Australia as his credentials were not recognised, hence he was undertaking the 2-year Graduate Entry nursing course.

> **Alex:** *In one way you feel **anxious** that your patient* (the manikin) *is going to die, but in the simulation you know if you make a mistake no one is going to die, if you make a mistake you're not going to be judged by it - what I did stayed in the room, if you make a mistake no one points the finger* (like some feelings in clinical practice)*.*

The ground rules of agreeing to confidentiality about peoples' performances and being able to make mistakes without consequence to the 'patient' were followed in all simulations conducted at the university and the hospital (personal knowledge). Although this performance 'safety barrier' was put in place, students still felt anxious about what might unfold, and the consequences of their actions within the simulation.

In addition to feeling anxious, other emotions described were *excitement* - having the opportunity to actively participate in a realistic patient situation then view their performance afterwards during a facilitated debriefing discussion incorporating playback of audiovisual footage.

> **Alex:** *The simulation was kind of **exciting** – you get involved and when you sit down and watch it on the screen* [AV playback] *that's when you actually have to think backwards. It was great you could pause it, talk about what happened and I picked up what I shouldn't have done or what I did well in...*

Jason, a male student undertaking the 3-year program part time with three to five years' experience as an assistant in nursing (AIN) had some expectation about what may unfold during the simulation – that something was about to happen which would test his skills.

> **Jason**: *It was kind of **exciting** because, you know, our simulation was that the patient was deteriorating and that was the whole point.*

Students frequently described the learning as **'safe'** or undertaken in a **safe environment** such that the conditions created reduced fear, that students could take risks in making decisions and so could learn from errors without consequence to the patient.

As a student from the 2-year Enrolled Nurse program, Debra had accumulated well over six years of experience both in the United Kingdom and in Australia. Debra was a mature-aged student with adult children and was upgrading her qualifications.

> ***Debra:*** *I also think it* [the simulation] *allows you to make mistakes (yes, cos it's a safe environment). You have a deteriorating dummy, not actually a patient, and you can learn how to manage that actual condition or situation without actually killing somebody.*

Other initial emotions reported by students included: being *awkward* or *feeling embarrassed* or *frustrated*. Portraying roles and performing in front of others is uncomfortable for the majority of people, irrespective of discipline or work training situation. Students with less practical experience in nursing roles and fear of others' perceptions (peers and academics) reported similar feelings. The following dialogue reveals the pressure Ting felt performing the role of nursing Team Leader, an experience few students gain during clinical practicum. Ting, a young man of Chinese heritage, was in his twenties and undertaking the 3-year program straight from high school.

In the simulation the duality of role uncertainty and inexperience of performing a physical assessment on a trauma patient led to the situation of not finding a set of keys which were planted under the 'patient's' bed linen. Adding to the embarrassment was watching himself on audio-visual playback in front of peers and the academic (the researcher). However, once the simulation and debriefing experience was completed, for Ting a greater perspective emerged of his capabilities and performance.

> ***Ting***: *It was a little bit **awkward** seeing myself on video. It's like you're looking in a mirror for the first time. But it was good in the sense that I could review myself having done it and how I **could** have done it. From that perspective I'm learning what I'd missed. But there was a bit of a sense of **embarrassment** that I'd missed it* [the keys] *but you've sort of got to feel that next time you can do this. And that's why the simulation is so great in that sense. Cos you **miss it** this time but it's a **safe** environment here and when it gets to reality, I could do it. For example in that simulation – the key was hidden underneath the patient and supposedly I was the one to find it … but I couldn't and I was so **frustrated**. I thought I'd gone through everything - but I didn't. And the teacher kept saying "keep looking for it …". Later on I found out there was a key hidden under the patient. It was a bit embarrassing in that sense but now I know how important it is to look - to make sure nothing is underneath the patient. I reckon it was very good when I look back on it. … Yes, I was **confused** as I didn't know what to do at that stage but **after** the debriefing I thought, well I do now. So in that sense I've learned something.*

In the trauma simulation Ting refers to, guidance was provided by the academic (the researcher) an experienced intensive care nurse playing the role of the doctor, who was working with students modeling how to assess patients and respond to sudden changes in the patient's condition. (The guidance aspect of learning is expanded later in this section). However Ting did not appear to be confronted by the academic playing a role alongside him. Rather, it appears that Ting experienced intensely emotional aspects of learning within this simulation, had a greater awareness of professional behavioural norms and was prepared to volunteer to be part of the research inquiry.

The simulation environment is a contributing factor to learners engaging in active patient care scenarios and to the emotional aspects of learning. To illustrate the point - the 'patient' in this scenario was positioned in a hospital bed, was surrounded by monitors and other equipment and was moulaged to reflect bruises, grazes, cuts, bone fractures and burn injuries. Such artifacts illustrated in Figure 8 aimed to replicate an authentic clinical setting to help students engage in the scenario.

Figure 8: Illustrations of moulage applied to the manikin for a trauma simulation

From Ting's account the situation provoked a range of emotions and indicated significant learning from this scenario. From initially being confused, frustrated, embarrassed and feeling awkward in this new leadership role (TL) and the novelty of dealing with events as they unfolded, Ting came to the realisation of the benefits in being challenged in that role and what he would focus on in future situations in the clinical setting.

A range of attitudes were revealed by students following a simulation experience - of **being focused** and **assertive**, taking the simulation scenario **seriously**. This reflected the engaging, affective nature of the learning experience and, for example, how Benita interacted in the authentic situation. Benita is a mature-aged female (47-53 year age group) of Lebanese heritage who had worked for 15 years as an assistant in nursing (AIN) in a nursing home, and had previously worked as a legal secretary and in the fashion business. Benita had experienced three simulations during her 3-year BN degree.

> ***Benita:*** *… it felt like we were looking after a* ***real*** *patient, to me he was the real thing. I didn't see a manikin I saw a real patient. …Well I felt* ***focused****. I was* ***assertive*** *... I felt I was heavily involved in the patient care.*

In this excerpt, Benita illustrates how participants can become immersed and engaged in the simulation learning strategy.

When asked '*What was the most memorable thing about the simulations?*' students collectively agreed it was a **fun** and **different way to learn** about nursing practice and patient care. On all occasions, simulation environments were created to mimic authentic acute hospital settings as described above and students were expected to respond to events as they unfolded.

The unique benefits of this type of activity for student learning are the ability to draw on knowledge and skills, and combine these within a reasonably realistic patient situation which requires students to make decisions and judgements similar to the clinical setting. Hence the learning is considered to be experiential, situated and highly contextual.

6.2.1.2 Experiential, situated and contextual learning

All students agreed that the simulation experiences were different from other learning strategies used across the degree program. Although generic group work and peer discussion about patient cases provide opportunity for contextual learning, the uncertainty about how the 'patient' will respond within a simulation scenario amplifies the experiential level.

As Alex recalls:

> **Alex:** *What's great about that simulation is the patient's changing condition, the monitors, the patient's voice, relatives - you need to switch your brain on and this is when you actually can't prepare for it. It's putting it all together - decision-making and problem solving.*

Andy was in his twenties, a student from the 3-year program straight from high school and had lived all his life in Australia. Andy's comments support Alex in that simulation tested how he would respond as a situation unfolds, something that one cannot fully prepare for:-

> **Andy:** *I just found it a **different** way of learning. It's not rote learning - you can't rote learn in simulation. I really enjoyed that aspect of it.*

The type of learning described here reflects realistic experiences - what students will likely encounter in nursing practice. The simulations and unfolding patient scenario, delivered in

an authentic setting provided situated and contextual learning experiences in which students responded and made decisions as they would be expected to do in practice.

6.2.1.3 Learning through participation – the active and observer roles

Benefit was conferred in both participation in AND observation of others during the simulation scenario. For active participants, the pressure of performing the nursing role, leading a team and responding appropriately to the patient situation in front of peers and the academic (teacher) was an initial issue. However once the action started, students were able to respond in meaningful ways to the 'patient's' vocal responses, changing physical parameters or direction from the experienced nurse (the academic) or doctor.

For those who observed the simulation, the pressure to perform was removed, there was time to pay attention to others' actions and benefit from a wider, more distant perspective of the team's performance. There appears to be additional benefit for 'international' students to observe simulations prior to actively engaging in them, as they acquire information about professional behaviours, specific ways of communicating in English compared with their native language, and team dynamics which assists their own performance in subsequent simulations.

Mark reflected on the benefit of experiencing the registered nurse role in simulation compared with the limited opportunities available during clinical placements. Mark was also a male student undertaking the 3-year program and in his early twenties.

> **Mark:** *Simulation opens it up to students to be more involved compared to when you're on clinical. With a real patient who's deteriorating don't always feel you should be involved - you're* ***slower*** *and* ***might miss something****. In the simulation everyone is at the same level -* ***you can get involved*** *a bit better. In essence, in the simulation students are put in a situation where they had to be involved. Participating in the simulation, you're the Registered Nurse* ***you're making the decisions*** *which is quite different to how most of your time is spent on clinical.* [It's] q*uite a* ***challenge*** *stepping from that student role to the qualified role. But very beneficial - you're getting that opportunity that you don't get when you're out* [on clinical]*.*

The benefits Mark described here, to **experience registered nurse practice**, can be offered safely through simulation activities compared with clinical settings. Being immersed in a situation where students have **responsibility to make patient care decisions under a degree of pressure** provides advantages for practice. Advantages may include: a) for students, as new Registered Nurses in their first year of practice, a range of experiences where they have made decisions; b) for employing institutions – having new graduates who have experienced a broad range of patient situations; and c) for patients, care received from practitioners who have more insight into how to respond in clinical situations.

For other students a sense of **professional responsibility** was gained from actively participating in the simulation, having **less doubt** afterwards about their abilities, and retrospectively feeling pleased with their performance. A heightened sense of responsibility is desirable for healthcare workers who function within independent professional roles which for nurses includes advocacy for patients under their care.
Benefit was conferred for one student who was able to actively participate in a critical event during a recent clinical practicum which provided experience to draw on during a subsequent simulation. Alex had an experience resuscitating a patient during one clinical placement and was then confident enough to take on a leadership role (Team Leader) in the critical care simulation at university. It appears Alex could apply what he had seen and done during clinical to the trauma simulation at university, and both experiences culminated is greater satisfaction during the next episode of clinical practice.

> **Alex:** *I had experience in emergency, then the simulation, then I was in the clinical environment again and I sort of felt more prepared. But I've never been able to be in my role that I was in the simulation* [team leader] *in the clinical environment.*

Further comment from Alex on the experience of being the Team Leader in the simulation highlighted the pressure and responsibility he felt enacting that role – a role usually filled by a Registered Nurse with several years of practical experience.

> **Alex:** *I was team leader, when you're in the actual simulation you don't have much time to think - you have to make the decision and you do make mistakes but it's okay.*

The added benefit of exposing students to the Team Leader role is that in reality, it is likely they may be required to step into this role in the latter stages of their first year in practice.

Of equal interest were the benefits provided for practice through observing others during the simulations. Were there distinct differences in what students learned when not 'under the microscope'?

Lilly, a mature-aged 'international' student in the 3-year program, commented on the benefits for her learning by initially observing the simulation rather than being an active participant. Lilly deliberately chose an observer role to begin with and gained from watching other students once, twice or three times.

> **Lilly***: I was an observer rather than an active participant. I'm quite confident in the role of observer because it allowed me time to think and to watch other people doing things. Because in a scenario I'm the sort of person who would get really nervous standing there, even though I know it's not real. For me, I observed others, heard their conversations about what they should and shouldn't do which* ***gave me a picture*** *like it's a real situation you're watching.*

For Lilly, the notion of a picture indicated the impact of these types of simulations on the senses conferring unique learning experiences. Other students also used the metaphor of the simulation providing a 'picture' for them or 'like watching TV' when viewing the AV footage of the scenario – as observers, not active participants. The following examples highlight the different type of learning which occurred for those observing the simulations. In these instances there was no pressure to perform and the opportunity to assimilate audio visual representations of practice within students' own understandings of what to notice and how to respond enabled reflection and peer learning through

discussion. The conversation between Mary and Ting who use social analogies to explain their experiences as observers provides a visual illustration. Mary was a female student in her late twenties undertaking the 2-year Graduate Entry program. She had an arts degree and had several years work experience but had always wanted to do nursing.

> **Mary:** *It's like TV game shows. When you're sitting there under the lights it's terrifying and you know, 1+1 = ... everybody at home is shouting, it's 2, its 2, its 2.*
>
> **Ting***: I was about to say the same thing. It's like one of those scary movies. Like you say, run, run, run but they just stay there. You've got this picture and you're objective cos you're not in it to begin with. You feel empathy and the adrenaline is rushing. To have a deteriorating patient is quite daunting.*

Learning appeared to be amplified during the interdisciplinary simulation when two nursing and two medical students were observing their compatriots undertaking a simulation in a separate room. The explanation provided by Debra and Mary about this experience reveals substantial learning through observing with concurrent discussion amongst peers.

> **Debra:** *Sitting back there we could actually see they were doing the wrong thing and checking things – and we're saying, why don't they check the drain, you know. It was quite good to actually sit there.*
>
> **Mary:** *And it was kind of good because we were all talking amongst ourselves with the medical students as well and we were saying, oh they should do this or they should do that. Somebody said something and I said, oh why would you do that and they explained it to me so I learnt without even being involved.*

These reflections confirm that learning through observing others in simulation provides additional perspective in a more objective manner. This provides evidence that students assimilated what they were seeing others do with their own opinions about clinical practice, particularly patient assessment (noticing).

6.2.1.4 The raw materials for reflection

The value of reflection on practice following the simulation was a common response by all students in the group interviews, with the aim of improving their awareness – or level of noticing - of patient signs and symptoms (cues) and the subtlety with which clinical situations can change, that is, learning from experience or practice.

To start, we return to Lilly the mature-aged 'international' student who benefited from observing other students before actively participating in a simulation. It appears that benefit was not only conferred at the time of the simulation within the designated subject, but across other subjects in the same semester of study.

> **Lilly:** *When observing the simulation I was not really thinking about interpreting the data. I had the opportunity to discuss this further in another subject* [Comprehensive Health Assessment] - *it related to the simulation but* [it gelled for me] *afterwards. It really made sense for me. Suddenly* [the concepts] *all link together - now I know why it is and why it is not - things are quite clear afterwards. The relationship between bits of information and the usefulness of the information, when we need it and how we use it start to become clearer. It really made sense to me.*

Subsequent reflection on the simulation enabled Lilly to not only link concepts across other theoretical domains, but to recall the simulation experiences weeks after the event.

> ***Lilly:*** *I reflected on their* [other students'] *behaviours and their actions and thought should I do that? … Is she right? During the debriefing you refresh what you've just seen. During the simulation I wasn't sure whether my judgement was right - … this is clarified during the debriefing. So I learnt during the simulation* [about myself] *and after.*

For Mary, learning continued particularly after the second year paediatric simulation which focused on assessment of a sick child while concurrently communicating with an anxious parent.

> ***Mary:*** *I guess I didn't really understand what that meant … academics saying that the issue was really important and they* [students] *would learn a lot …and probably on reflection, through different experiences with simulations, I've sort of learnt more from that* ***after the fact*** *than what I learnt on the day.*

These insights confirm the influence simulation experiences have on students' reflection on practice and contribution to subsequent learning experiences through recall. It could be said that simulation provides the raw materials for reflection. The notion of reflection in and on practice appears here (and in subsequent findings) and is key to learning according to Schön (1987, 1995) and Tanner (2006).

6.2.1.5 Knowledge and skills for practice

From a broad perspective students believed that simulations highlighted what they knew and what they didn't know and this encouraged students to review their knowledge and skills for some or all aspects of the patient scenario. The simulation essentially tested their skills within a practice situation and provided insight about the pragmatics of skills-based patient care activities, how to prioritise when circumstances changed and confirmed or extended their theory/practice capabilities.

Finally, another common response by students to what simulation provided was the notion of demonstrating knowledge and skills in an authentic patient care scenario. Frequently responses were in the form of 'knowing' and 'knowing and showing by doing' – or putting theory into practice – which highlighted their level of competence as well as gaps or deficits of practice. The impact on learning and practice for Benita following simulation was distinct and profound as featured in the following reflection.

> ***Benita:*** *The simulation draws out what you know and what you don't know. I read about things I don't know, work on and it prepares for the next simulation. Intuition and that 'gut feeling' - my experience working with aged care* [patients] *has helped developed this, but the simulation gives you a stepping stone to develop this. I wouldn't have* ***noticed*** *if I hadn't had that simulation no matter how much experience I'd had. The simulation* [at the

> hospital] *opened up what I did know and what I didn't know - it seems hidden at the back but I was able to bring it out.*
>
> *It was like the penny dropped - before that I was doing my job, I felt okay, I felt confident but that simulation was a whole new beginning for me.* ***It was like a turning point****.*

Whether it was the point where Benita was in her studies and nursing experience or that the simulation connected concepts allowing her tacit knowledge to be realised, it appears the simulation had a profound influence on her subsequent confidence, clinical judgement and overall practice.

For Ting, there was benefit in the planned progression of the total simulation encounter within the critical care subject – preparation, participation, facilitated debriefing viewing audio-visual footage, and reflection. In addition, the realisation that a certain level of knowledge and skills were required prior to participating in a complex simulation were evident in Ting's comment below.

> ***Ting:*** *In fact, the simulation would be useless if you don't have the* ***knowledge*** *behind it. Even though you did a debriefing or whatever, you still wouldn't get it because you don't have that* ***understanding*** *behind it. It was good in a sense when I did a critical care simulation, it was right at the end* [of the subject] *it was the last week that I did the simulation, so instead of what I learnt from critical care subject, it was sort of summarised in simulation so I could* ***put it into practice****, so that was really good. But I was thinking, if I had an extra week in that semester and repeated the simulation again, I probably would have learnt more.*

These examples illustrate how simulations can marry together the knowledge and skills for practice and confer benefit during subsequent clinical experiences. If time permitted, repeating the simulation following debriefing would likely further amplify the benefits for learning and practice. However time constraints and large student numbers prohibit this with current resources.

In summary, the simulations stimulated diverse affective responses, specifically emotions, attitudes and behaviours norms. All students enjoyed at least one of their simulation encounters (most had experienced between 2-4); they felt excited; much more focused – they took it seriously ("saw the manikin as a patient") and found it motivating and engaging. All students indicated that simulation provided a safe and realistic (clinical) learning environment and that they could make decisions independently – "on their own" - and there would be no consequence for the patient from their mistakes in clinical judgements. Further, during the debriefing discussions students indicated they would learn from their own and others' errors and, as evident in the research group discussion responses, have learnt more from ongoing personal reflections subsequent to the simulation activities. The findings confirm that simulation contributes in meaningful ways to enhancing students' capacity for clinical judgement.

Of keen interest in the healthcare simulation community is research to determine the anticipated benefits of rehearsing practice in simulation scenarios to performance in actual clinical situations. In addition to improving insight and confidence more concrete examples are sought of how simulation influences subsequent clinical practice and by extension how it might improve patient outcomes. The second theme explores how simulation provides opportunity for holistic contextual practice for students in preparation for entering their professional roles.

6.2.2 The holism of practice

The second theme, the holism of practice, confirms the unique characteristic of healthcare simulations in 'bringing things together' particularly for students and novice clinicians. From the group interviews, students described their simulation experiences as **the complete experience**, that it glued things together and allowed them to make independent decisions without fear of harming patients. In essence, these learning opportunities allowed students to move **beyond noticing** towards **anticipating** what may happen next in patient scenarios. In-depth discussion of these aspects follows.

6.2.2.1 The complete experience

All nine students provided varied descriptions of how the simulation experience "glued things together" for them. It was described as a complete experience, being able to draw on (tacit) knowledge and previous clinical experiences within a simulated patient care scenario. During the scenario students had to use their initiative, but could confer with other students as a team – or the academic - on the best course of action for the patient's clinical issue. Simulation was described as a different type of learning experience, in that students perceived a consolidation of knowledge and skills and a perspective of how theory intersects with and influences practice. The authentic situations reflecting the chaotic nature of nursing practice created within the simulation also challenged students to respond to events as they arose. As Mary describes:

> ***Mary:*** *I mean a simulation is not just, you do this task, it's a whole thing and you get thrown things as well.*

In a similar way, Jason described how the simulation had 'glued things together' for him.

> ***Jason:*** *You can kind of pinpoint like, oh maybe that patient … is going into pulmonary oedema because the* [intravenous] *fluids have come a bit too fast. Or in the one at* [the hospital], *oh he's breathing out or he's having respiratory arrest or distress. It's kind of exciting because everything sort of* ***glues in together****.*

Jason, who had three to five years' experience in nursing at the time of the research, reveals how the types of patient cases presented in the simulations provided meaningful practical learning experiences. This complete experience of the patient situation assisted him to form opinions of clinical problems (interpret) and also anticipate what lay ahead.

In summarising the three components which Mary believed provided 'the whole picture' to understand nursing practice; knowledge, simulation and reflection combined were considered essential for 'success'.

> **Mary:** *… all that education we had, even at University, all the classes we had before … then you go and do it in simulation. Those two things separately would be a bit useless but when you put them together and say, oh that's good. Then you do a debrief as well and say, remember how we talked about this, and then you did it? You kind of need those three things.*

These beliefs align well with elements of Tanner's *Model of Clinical Judgment* (2006) in relation to: the knowledge which nurses bring to the patient care situation; noticing and responding (in the simulation) and reflecting on practice.

Simulations allow replication of unanticipated events or patient responses. Further, simulation brought all aspects into focus such that the 'things that mattered' could be identified. The experiences provided students opportunity to become more targeted in what they noticed and from recalling previous simulations, their thinking was triggered in subsequent clinical situations. For many students, the simulation experience provided a more prominent context to work from. This impressionable, contextual nature of the learning experience triggered students to think of things from a theoretical perspective or from previous occasions of clinical practice. Debra stated that concepts or ideas came to her subconsciously; she just started responding within the situation and was aware of recall or **drawing on tacit knowledge** and actioning this in the simulation.

> ***Debra:*** *For me I found that unconsciously I was being prompted to do this, to do this and to do this.* ***It was all coming back*** *so it was everything that you've sort of learnt, and you actually had the reality of the patient deteriorating in front of your eyes so you're going, right now I need to do this and I need to do that. It was all coming back. It was like prompting you so unconsciously you're doing it. So what you've learnt, the knowledge that you've retained, it all comes flooding back.*
>
> ***Interviewer:*** *Can I just clarify that that comes flooding back in the simulated learning or in clinical?*
>
> ***Debra:*** *Well both probably. But if we're talking about simulation and even perhaps in the clinical you could then start if something like that has actually happened to you in the clinical then obviously you're going to remember that and it's all going to come back to you.*

In this final comment Debra predicts that her reactions to the unfolding patient simulation during simulation would have a similar effect in the clinical setting. This very aspect will be explored in the follow-up interviews at the second time-point in Study 2.

6.2.2.2 Beyond noticing – anticipating

Within this sub-theme, comments emerged from students indicating a higher level of thinking and judgement. Examples presented in this section illustrate that following the simulations students were thinking ahead - they had an idea of where the patient situation might lead to and they were preparing for further action. Excerpts demonstrate how these students were moving beyond an advanced beginner status towards a more competent level of practice.

To start, Debra describes her simulation experience as understanding the patient's journey through the clinical scenario. Being able to see the whole situation from the beginning and how the case unfolds, enabled Debra to anticipate what may happen and to prepare for action in subsequent exposures.

> ***Debra:*** *Having a simulation which can actually take you through a* ***journey*** *so you can pick up on the cues before it becomes acute. You can* ***anticipate*** *something that's possibly going to happen and you are prepared for that. Maybe making sure that the arrest trolley is near you and that the suction's close by because you suspect that this patient is going that way. So in a way* [it's good] *being able to have a simulation where you can see the patient start to deteriorate slowly and* ***you are prepared*** *for an event.*

In this conversation Debra brings to light the benefits for students in controlling the timing of patient events within the simulation. Unlike actual clinical practice, where some events occur unexpectedly, simulations enable for example demonstration of patient deterioration in a temporal and focused manner. Further, students can be provided with a complete synopsis of a patient case where data relevant to an imminent adverse event can be revealed as a key element to be aware of and anticipate in real situations.

Simulating a patient case also provides students with wider perspective - the bigger picture - compared with short and often decontextualised experiences during clinical practicum.

The small group interdisciplinary simulation at the hospital was raised frequently by students as a memorable learning experience. In the context of 'working things out' Debra offered her opinion of learning and clinical judgement provided through this small group simulation.

> ***Debra:*** *We were actually working out for ourselves what the patient was doing. I just found it was so much better doing it that way than probably having a whole class full of students.*

Perhaps the ability to focus on the action with less distraction from a larger class of students contributed to Debra's thoughts, which were also corroborated by Andy and Jason. However, responses in this research need to be considered in the context of the level of experience these final year nursing students possessed in that they were about to graduate from their program of study. For less experienced students the outcomes from such simulations might be different. This is an important aspect to consider when planning simulation learning experiences, to align students' level of theoretical knowledge with the type and complexity of the simulation patient scenario.

In summary, student opinions about simulations as part of learning at University confirmed it offered greater insight into the contexts of nursing practice, which enabled understanding and experience of the expectations of the nurse's role in providing patient care. In simulation, students could 'put it all together' and experience the holism of practice. There was opportunity to draw on and assimilate tacit knowledge and experience in a controlled 'patient care' situation which contrasts with the often interrupted episodes in clinical practicum where connections may not be made or evident. Most often during clinical practicum students perform tasks under the supervision and

direction of the Registered Nurse or clinical facilitator and may not be exposed to the full responsibilities of making decisions about patient care.

Simulations allowed students to link aspects and anticipate patients' needs according to the context. It is important for students to make these connections because as Registered Nurses, making accurate judgements and decisions is fundamental for safe patient care and practice. The third theme expands on students' views of how simulation provided real experiences of being a Registered Nurse with the accompanying pressures, responsibilities and workplace expectations.

6.2.3 Being a Registered Nurse – responsibilities and expectations

In this theme students spoke about learnings from simulations which relate to **being a Registered Nurse** specifically understanding the **responsibilities and expectations** of this role for practice. In the majority of the simulations described in this research, students assumed the role of a Registered Nurse enabling opportunity to think, plan and provide patient care. Within this theme three particular aspects will be discussed:

- guidance to help students 'think like a nurse'
- confidence to respond in clinical situations and
- a wider perspective of practice.

All nine students reported that the experiences from one of more simulations in the degree program raised their awareness and confidence in areas of patient assessment, skills and abilities for clinical practice. As such they felt the timing of simulation prior to clinical practice would better prepare students for these valuable components of the nursing degree. Further, as graduating nurses, they believed their involvement in at least one simulation learning activity (as the Faculty was gradually integrating it across years of the Bachelor of Nursing at the time) was beneficial for the reasons outlined below.

Due to the authentic nature of the simulation learning activities – patient voice through the manikin, moulage such as dressings, catheters, intravenous lines, 'bloody' sheets – students engaged in the learning activity either in active or passive observer roles. In almost all occasions, students played the role of the Registered Nurse or otherwise a relative of the patient. In rare instances, they played the role of the student nurse. By participating as the Registered Nurse within the simulations students reported they had a greater understanding of the role and the associated responsibilities of decision making and actions that would be expected in professional practice. On some occasions however, guidance by the academic was more integral to the simulation activity and provided benefit.

6.2.3.1 Guidance during the simulation experience

For the more complex simulations or scenarios that students had not previously experienced, guidance by the academic is important to scaffold learning and model nursing practice. Recollect from Study 1 findings that students rated the 'guidance from the academic' component third from 11 options. For the critical care trauma simulation, half the class had not yet been on clinical, which provides students with experiences in the Emergency Department (ED) or Intensive Care Unit (ICU). Higher order skills and knowledge are required to manage critical patient events and novice nurses require guidance by experienced clinicians in these situations. The strategy used to guide students in the trauma simulation over the last four years is for the academic to play the doctor role, and hence provide direction during the unfolding simulation scenario to manage the 'patient's' deterioration. Five of the nine students in the research group interview had participated in this trauma simulation which featured in the discussions. The level of prompting and guidance offered by the academic in the simulation remained within the confines of the 'doctor' role to represent realistic team-like interactions. Students acknowledged the importance of guidance from more experienced practitioners and described benefits for their own knowledge, skills and practice.

We return to Ting who engaged in the team leader role of the trauma simulation and was prompted more than once to find the set of keys planted under the 'patient'. Although the trauma simulation occurred during the final week of the subject, Ting had little clinical experience specific to this simulation scenario to draw on. In such situations guidance by more experienced clinicians contributes to the action and pace of the simulation as well as students' ability to contribute to team work and respond in meaningful ways.

> ***Interviewer:*** *So Ting it sounds like that the skill of the tutor* [academic] *is an important part of the simulation experience.*
>
> ***Ting:*** *Yes, if there's guidance, it's good for us. For the students to follow. But as I've mentioned before, it's more the guidance in that simulation setting. It also* ***helps the students know what to do****. You can't stand there doing nothing, it's totally a waste of time.*

Ting had fewer simulation experiences compared with other students so the degree of guidance is important in such circumstances to keep the scenario moving so students can engage and respond.

Simulation activities put more onus on the student to focus and think thus providing opportunity to respond to patient cues, as Mary describes:

> **Mary:** *But if they say maybe you should look at the* [observations] *or something, in a clinical situation it's like someone is going to say … so we have to do this and I'm going to do it. And I'll just watch. But in a simulation you just don't know what to do. Someone says maybe you should look at his drainage bag and then you look at his drainage bag and you go, oh OK well there's something there.*

The time pressures on clinical are not such a factor in simulation so students are less constrained in making connections between key clinical data. Prompting or guidance is seen as a temporary measure, to direct students on a pathway of independent thinking and responding. Debra reflects on this point:

> **Debra:** *In reality there may not necessarily be someone there to prompt for you* [on clinical] *and that's why it's good to have that because you need to be able to* ***focus*** *and* ***use your own initiatives*** *about what needs to be done.*

Although Debra has well over 6 years experience as an Enrolled Nurse, in becoming a Registered Nurse she will move from a supervised to an autonomous level of practice. The benefit of the simulation for Debra reflects her transition role. For others however, the notion of moving towards 'thinking like a nurse' is summarised by Mary. Although she is repeating what another student reported she appears to connect with this concept herself.

> **Mary:** *Well going back to what Ting was saying with the critical care scenario - didn't really know what to do, got some guidance, figured it out, did some stuff and that was great. Then if you got to do it again he would* ***know*** *what to do and be able to just do that. So fine, you need the guidance first time, but the second time & in real practice, you get that situation, well I didn't really know what to do first time, but I know this is where to start and where I go from.*

As a 2-year Graduate Entry student, Mary brings well developed academic skills to the simulation situation but less clinical experience. In this situation guidance is equally important but in different ways in that connections are quickly established following demonstration but guidance scaffolds the practice experience. It also appears that for students who have only experienced a small number of simulations, an important factor for triggering engagement, thinking and action in the simulation was guidance by the academic.

6.2.3.2 Confidence to respond in clinical situations

As previewed earlier in this section (6.2.1.3), Lilly's concept of simulation being a picture is expanded to her recollection of the simulation scenario in clinical practice as "a movie playing in my mind". The effect of the recollection was a positive and calming one akin to an actual experience of caring for a patient - one that she could visualise. A common concern for students is not appearing uncertain in front of patients which Lilly acknowledged.

> **Lilly:** *When I'm facing a real patient in a ward it's sometimes like a **movie in my mind** is and I know that situation, because we've learnt somewhere in the lab* [thinking of a similar situation that happened in the simulation]. *Helps to **calm me down** because of that knowledge is in your mind and **I don't panic** - you don't want to appear anxious in front of the patient, that would make it worse. I think it* [simulation] *really helps".*

This insight, that simulations and learning in the practice laboratories at university confers a lasting visual image that can be recalled in subsequent clinical episodes, is strong evidence of how experiential learning can be transformed into practice.

When asked if simulation prepared them for particular situations in the clinical area, Mary gave an example of her perceived level of competence as well as anticipating what might transpire with a very ill elderly patient. Following simulations and rehearsal of resuscitation skills at university, Mary felt confident in her ability to respond in clinical situations.

> **Mary:** *Yes, I know what to do. I could tick all the boxes and get it done. On my last clinical placement there was a woman who was possibly going to arrest at some point and the other Registered Nurses were saying … I'll do her respirations* [provide airway and breathing support] *but I don't want to do her chest* [heart compressions] *because she's so frail* [concern for cracking ribs] *and I could really relate to that* [having performed this in a simulation]*. Like I sort of **knew what the situation would be like** anyway and it wasn't like, oh my god it's scary or whatever. The main thing I thought was I hate doing CPR as it makes my face all red. If it came to a situation where I had to do CPR, of course I'd do it and I'd do it to the best of my ability but the one thing I think about is that it … makes my face all red. That's my main concern about CPR and not that I'd be able to perform it correctly.*

From this account, Mary responded to the question from a confident and knowledgeable position. Having performed CPR in the university simulations coupled with anticipating potential complications based on the patient's frail condition, Mary acknowledged she

would be able to effectively contribute to resuscitating and provide safe care for this patient. Such examples would provide good evidence of how training can improve students' sense of knowing and willingness to respond in clinical situations.

Despite initial doubt by many students of their abilities prior to the simulation, Alex's experience of enacting the team leader role in the trauma simulation extended his insight beyond the registered nurse role to the responsibilities of more experienced nurses who lead a team.

> **Alex:** *I felt that for a lot of us there was a lot of doubt going into the simulation but it really* ***raised the confidence****. For myself, I know that I can, not particularly well, but in an emergency situation that* ***I can lead the team****, even as a 3rd year student. Not the best job but we still did it – the patient survived. So, and with my colleagues, just a quick hook up before this* [the group interview]*, and myself our confidence rose a lot, post-simulation, even in the clinical environment.*

General concerns about capability and performance in the new graduate year are common amongst final year nursing students. The trauma simulation appeared to have provided confirmation for students in their ability to care for more than one or two patients as occurs during clinical placements within the nursing degree. In preparation for the group interview, Alex sourced other students' opinions about the impact of the simulation. Prior to the simulation, students commonly expressed concern about how they would provide care for up to five patients as expected of a new graduate nurse. After the simulation they felt more at ease with their clinical capabilities – except if someone dies. Novice healthcare practitioners are generally concerned about causing harm to patients through their inexperienced actions. With more experience comes the realisation that death is a natural and plausible patient outcome for very ill hospitalised patients and that a cure is not always possible. This concept in fact provides opportunity to incorporate other simulations into the curriculum which focus on 'unsuccessful' resuscitations and end of life scenarios, reflecting the realities and spectrum of practice.

6.2.3.3 A wider perspective of practice

Early clinical benefit from learning through simulation was described in-depth by Benita who as mentioned earlier had a profound experience - an epiphany - from the hospital simulation in particular. When asked if there was a change, subsequent to the simulation, in how she noticed things about patients in her practice Benita demonstrates a more mature perspective beyond that of an advanced beginner (Benner 1984; Dreyfus & Dreyfus 1986).

> **Benita:** *There are a couple of things I've **noticed** on the ward, the* [intravenous] *cannulas. I know what I've been taught* [maximum duration] *and I notice, in passing by, the tape* [covering the cannula] *is not nice and clean and secured. Along the edges of the tape it was dry and dirty and peeling off. I thought, **I don't think that looks right**, so I checked the site for bleeding, swelling and pain. I asked the patient if he was in pain but he said no, so I thought, everything's fine. I went and checked the documentation and it was in for 6 days so I went and alerted the RN and said, could you remove it? So we removed it* [the intravenous cannula].
>
> **Interviewer:** *Could I suggest that perhaps previously you may not have thought of the significance of something like (I won't say as simple as) that and following it through?*
>
> **Benita:** *I would not have noticed that unless he was **my** patient. I would not have noticed that in passing. I probably would have been blasé about the whole thing and I would have been **focused just on my patients** because in the past that's all I did, just focus on **my** patients. I was scared that if I focused on something else, I might miss something about **my** patient but now I can sort of branch out and I can just **see the whole picture**.*

In this vignette, Benita demonstrates a **wider perspective** in her practice beyond her allocated patient responsibilities. Usually novices are focused on completing tasks and skills in their own sphere of responsibility (Benner 1984); however Benita demonstrated more situational awareness than most nurses at this stage in their career. It is likely that the simulation learning experiences which were so profound for Benita contributed in a substantial way to her confidence, level of noticing (wider perspective) and ability to respond.

Beyond a widening perspective in clinical practice situations following simulation, the key focus for many researchers is to determine if simulation **improves** clinical practice. The final theme in this phase of the research previews evidence of the immediate impact of simulation on practice for this group of students.

6.2.4 The immediate impacts of simulation on practice

A desirable outcome of simulation learning experiences for entry level health professionals is that benefit is conferred in clinical practice. Findings in this section reveal immediate benefits from a variety of simulation experiences which students recount in the practice settings.

Several examples were given during the group interviews of how learning from the simulations impacted and influenced students' practice in their subsequent and final clinical week of their degree. In general, most students felt they could respond in more meaningful ways and manage 'the situation' and believed their actions to be 'better' than before.

In the following dialogue, Mary provided a clear example of recall from a university simulation experience during a subsequent patient care event. Although not an exact 'reproduction' of events, Mary drew connections between what was unfolding with the patient at hand and the simulation experience where concern about intravenous fluid administration was a learning objective.

> **Mary:** *We had a patient who came back post-op and her blood pressure was ridiculously low and they just kept pushing* [intravenous] *fluids and pushing fluids. It* [the sim scenario] *was in the back of my mind and I did ask, how fast do you want to run it* [the fluids]*, like how much do you want to give her? Her blood pressure was really low so it was fine I guess but I was thinking, how fast do you want to give it before she's overloaded? She might still be dry* [lacking fluids] *but she might be wet in the wrong places* [e.g. the lungs] *if you just do it too fast. So the simulation did kind of make me - it wasn't necessarily the same situation - but I did still ask questions in the clinical scenario from the simulation.*

> **Interviewer:** *There were some aspects that took place in the simulation that actually you picked up but they weren't necessarily relevant for your post-op patient as it turned out. You did have that in mind.*
>
> **Mary:** *Yes. It* ***triggered me to think*** *of things.*

This commentary reveals strong associations between the simulation and a subsequent clinical event of similar nature. Because Mary had prior exposure to a potential patient outcome during aggressive fluid resuscitation, she was able to connect the simulation with the unfolding clinical event. Perhaps given more time, Mary may have even been empowered enough to overtly question that specific patient management strategy.

On a more tangential note, the critical care simulation experience provided unexpected benefit during Alex's subsequent interview for a new graduate nursing position in a hospital Emergency Department (ED). Alex was able to answer the interview questions with greater depth and context because:

> **Alex:** *I'd done the things in the simulation – rather than default response like "I'd refer it to the senior nurse".*

What emerges here is Alex's ability to respond to interview questions drawing on practice-based insight from experiencing a common patient scenario which hospital managers would like to feel new graduate nurses could manage.

And finally we again return to Benita whose participation in the interdisciplinary simulation at the hospital became a life changing experience. Benita recalls the impact of her simulation experience during the following week of clinical practice, the last week as a student in the nursing program.

> **Benita:** *Everything that I did last week on the ward has been as a result of the simulation because it gave me strength and it put everything into* ***perspective*** *for me. It made me take* ***notice*** *of my patients, e.g. I've been looking in other directions. And I notice this patient* [Benita was not allocated to care for him] *he looks very pale to me so I just go to the patient and ask if he's OK and what is he feeling? He tells me he feels dizzy.*
>
> *I asked, do you have any headaches or any other pain? I just kept* ***gathering*** *as much* ***data*** *as I could in such a short space of time as I had to get to* ***my*** *patient* [who she was actually allocated to provide care for] *but I don't know anything about this patient. But given the fact that we're on the cardiovascular ward and a number of our patients are diabetics, I took his blood pressure which could indicate low blood pressure (which was low by the way), I took his BSL* [blood sugar level] *and it was low so I put him into bed straight away and I went and alerted the RN* [Registered Nurse].

This example of Benita intervening and acting on her concerns about this patient in the clinical setting illustrates a **higher level** of noticing, interpreting and responding to what a student would reasonably be expected to do. Based on these insights Benita is displaying some characteristics **beyond an advanced beginner** of which the catalyst was her recent simulation experience. This example of Benita's thinking and responses illustrates the immediate contribution of simulation to clinical practice.

Although not notable in the group interviews, Andy and Jason experienced similar benefits from the simulations which were raised more so in the follow-up interviews which were conducted after commencement of RN practice.

There is clear evidence from these recollections about the benefits conferred for practice by experiencing and rehearsing patient care scenarios through simulations. Benefit appears to be attributable to actively participating in the scenario and by observing others and reflecting on the audio-visual footage during a facilitated debriefing session. Further still, what type and level of academic guidance is best to prepare students for professional practice?

When planning and delivering simulations, like other learning strategies, the spectrum of students' knowledge skills and background needs to be considered so that learning is enabled for all. Because simulations mimic situations of clinical practice there is the reliance on realistic scenarios, active participation and interactions amongst team members and with the 'patient' and relatives. Depending on the number or type of simulations students have experienced, they may require more academic guidance initially which can be tailored to how they engage and respond. As the patient case and events unfold, students may require less scaffolding - as they become more aware of the circumstances and develop a greater understanding of what is about to happen and how to respond to the situation. The scenario can be halted to get students 'back on track', or when the planned learning objectives have been achieved. What simulation provides in this context is opportunity for students to learn about becoming a Registered Nurse within a community of practice. The community in this case is nursing as a profession and members of the community are students who are peripheral to participation (in varying degrees) and academics as central participants in the community.

6.2.5 Summary of Study 2 findings – at course completion

Group interview discussions with students on the threshold of practice provided detailed insight about the contribution of simulation to learning and as preparation for RN practice. The four major themes from data analysis were:

1. *ways of learning within simulations;*
2. *the holism of practice;*
3. *being an RN – responsibilities and expectations; and*
4. *the immediate impacts of simulation on practice.*

Learning through simulation evoked emotions, attitudes and a greater awareness of behavioural norms which contributed to self-reflection of knowledge and skill capabilities. The emotional aspects, which were a dominant feature of the learning from simulations, are not generally elicited through other learning activities such as lectures or tutorial classes. Of particular importance to students was the opportunity to experience the role

of the Registered Nurse and on occasion the Team Leader. Appreciation of responsibilities and pressures of providing accurate and timely patient care were more pronounced for students.

For some, increased confidence and awareness led to immediate benefit in clinical practice situations in particular noticing across a wider perspective, seeking further information, anticipating actions and a willingness to respond. Benefit was conferred in active participation **or** observing others in the simulation and from guidance by experienced nurses to know how to *respond* in the patient scenario. Simulation experiences also reflected the holism of practice and ***'glued things together'*** connecting theory and practice.

Simulation appeared to contribute to students anticipating what would happen next in a given clinical situation whether in active or observer roles. They had insight into what actions would be required and sought to take steps to initiate these actions. Students also reported being more involved and engaged with *responding* to changes in patients' conditions. Communication was prominent in students' minds, and a heightened awareness of how important effective communication is within healthcare settings was also raised. Students revealed several subsequent clinical situations which were similar to the simulation case scenarios explored during the university degree. In these circumstances, the benefit claimed from their simulation encounters, was that they "had an idea of what may happen next", they would know what to expect and "wouldn't freak out when things happened". Overall students felt more prepared to respond and to better manage the clinical situation at hand as exposure to similar patient scenarios provided a context to draw from during subsequent patient care events.

The resultant visual images – the movie playing in the mind - which remained with Lilly beyond the simulation is a novel concept and outcome of the learning experiences which has not been reported in the simulation literature to date. In addition to the contribution

of the simulation experiences to students' confidence for their approaching first year in practice, an added benefit, a capstone experience if you will, was the ability of simulation to trigger tacit knowledge and to embody theory within a practice context.

The next phase of Study 2 explored the impact of simulation experiences on practice and judgement further – on new graduate nurses' performance in the clinical setting.

6.3 Study 2: how simulations contributed to New Graduate nurses' clinical judgement and practice

This second phase of Study 2 comprised follow-up interviews of the nine participants and took place during the first half of 2010 during the New Graduate (NG) year. Participants were employed as Registered Nurses in a range of clinical areas within major metropolitan hospitals or private healthcare facilities in the Sydney area. Detailed information about the interview schedules and participant's length of time in employment are included in Appendix F.

This phase of Study 2 aimed to answer the following research questions:

- *how can simulations be most productive in preparing for practice (within the context of student groups/ culture/s)?*
- *has what was learnt on the course/ within the simulations helped within subsequent work as a newly graduated nurse?*

The three main themes drawn from the data analysis were:

1. ***performing as a Registered Nurse;***
2. ***simulation experiences and recollections which influence new graduate practice;***
3. ***different contexts but similar processes – how simulations enabled clinical judgements in other patient situations.***

6.3.1 Performing as a Registered Nurse

All nine students appeared to be happy practicing as Registered Nurses. None were desperately concerned or felt ill-prepared to perform their roles and take on responsibilities. The sociocultural elements of practice were raised in the interviews as much as the predominant focus on skill requirements for providing holistic nursing care. Most students spoke about: 'fitting in'; being accepted; practising autonomously, yet still raised concerns about knowledge deficits and making decisions which were incorrect or that could harm patients. Being concerned, yet not overconfident, about knowledge levels is good for practising in a safe manner. Knowledge was also identified as an important factor for being able to discuss patient issues with doctors and peers. Several students expressed frustration with not being able to achieve all of the planned interventions for their patients during their shift at work – as such, managing time and workload.

A marked difference between practice experiences as a student and the practice landscape now as a Registered Nurse were raised as contrasting points. Even during the early stages of the interviews, some new graduate nurses raised how the simulations assisted with elements of practice. These points are illustrated in the following discussion and interview excerpts.

6.3.1.1 Fitting in and being accepted

Being part of "the team" was a prominent response during opening interview questions. Having a formal qualification provided licence for being accepted; there was equity in information sharing and responsibility was perceived as equal amongst team members. Ting, who now worked in the operating theatre of a public hospital, shares his views of being a Registered Nurse.

> **Ting:** *Right now I am working with them at the same level and we share the same responsibility - we share all the information. Because I'm an RN I'm at the same level and that sort of gives us a more united feeling of being a team member rather than when I was a student.*

Another element of new found professionalism was the ability to officially practice autonomously.

6.3.1.2 Practicing autonomously

The ability to practice autonomously was a common response from the new graduate nurses, in positive *and* concerned ways. For Jason who had more clinical experience than others by the end of his part-time degree, the sense of control over his own practice provided freedom. He could initiate actions of his own accord rather than having to check with another Registered Nurse every step of the way (as when a student).

> **Jason:** *I think it's good that you **have control** of what you're going to do to your patient as opposed to running to your RN who may take a while to get around to fixing the problem. Now, if a patient complains of pain, I can assess and see what interventions need to be done and I can therefore implement that and reassess later on so that's one of the good things.*

Andy concurred with this aspect of *having control* of his own practice and was enjoying the autonomy of 'branching out' – making decisions of his own accord if he felt capable of doing so. By contrast, Mark felt the burden of decision making processes due to his perceived limited breadth of knowledge.

> **Mark:** *The decision-making is sometimes challenging. There have been times when I've felt that I didn't know enough about a certain condition or certain subject to make the decisions.*
>
> **Interviewer:** *So what's your plan of action in those circumstances?*
>
> **Mark:** *Well, to look through the notes and see what other people have said and what the medical plan is and that sort of thing and consult senior staff which is normally my first port of call.*

Even though Mark felt lacking in knowledge in certain circumstances he adopted appropriate strategies to ensure safe delivery of care. Safe practice and recognition of appropriate strategies to confirm clinical judgements is a positive outcome in preparing students for the professional role. The Bachelor of Nursing provides a generalist training

experience and curricula for all scopes of practice, however many workplaces in tertiary urban hospitals have specialty wards. During clinical placements, the types of patients students may encounter to provide care for do not necessarily represent 'typical' cases. Hence there may be a lack of exposure in how to manage 'typical' situations e.g. patients with asthma, chest pain and congestive heart failure to name a few.

6.3.1.3 Managing time and workload

A common issue in the transition from student to new graduate nurse is in managing time and workload (Parker et al. 2014; Purling & King 2012) which was no different for these graduates. Although they generally enjoyed the work after studying for several years there was still a considerable adjustment from the student to the professional role.

> **Andy:** *I guess actually that's the thing I've found most challenging and most frustrating, having to rush things when you've got so much to do in a day. You feel like you can't comprehensively do a task.*
>
> *Planning's not really the trouble, it's just when things happen on top of your plans that you don't expect.*

What Andy describes here is the unpredictable nature of nurses' work in the light of patient care requirements on an oncology and haematology ward. Despite feeling comfortable with planning his patient care schedule, reprioritising the plan is what Andy is still coming to terms with.

Overall it appeared these former students were enjoying their new found autonomy and transitioning well into the registered nurse role within their first year in practice. Interview questions then focussed on the contribution of university simulations to new graduate practice.

6.3.2 Simulation experiences and recollections which influenced practice

A number of the nurses provided examples of clinical situations they had experienced which were similar to university simulations and how they recalled the learning and were

able to respond in the real situation. Prior exposure in the simulation laboratories provided graduates with an idea of 'how things would unfold' and the likely actions that would be required in such scenarios. Responses ranged from an awareness of how anxious the parents of hospitalised children can be - and how to recognise and deal with this; to anticipating the progress through an event where a patient was being resuscitated. Sub-themes within this section were: **similar clinical contexts and situational awareness**; **anticipating options and actions;** and **confidence and knowledge to respond independently.**

6.3.2.1 Similar clinical contexts and situational awareness

To start, Mary clearly recalled the university paediatric simulation (described in Section 6.2.1.4) more than 18 months later and how the experience linked with reality and provided insight for her new graduate practice.

> **Interviewer:** *Did the simulations help prepare you for RN practice?*
>
> **Mary:** *Yes, yes. In the one for Children's Nursing because I was really bad at finding the baby's heart beat. One of the other students was pretending to be the baby's mother and I had to deal with her concerns. The baby was actually fine, it was just that I had difficulty finding the heartbeat, there was a heartbeat. It was the mother that was more of the problem. Now that I've experienced it, in the real world, you do see the families sometimes as more of a concern than the patient.*

On this occasion, the focus of the simulation was replicated in the clinical setting and the more 'abstract' concepts such as parental concerns and how to recognise and manage these actually eventuated. The context of this scenario reiterates the holism of nursing practice – beyond completing set tasks to being aware of the entire situation. Advanced practitioners would then pre-empt parental concerns and use inclusive patient care strategies. Mary shows beginning insight into this aspect of paediatric nursing practice facilitated through the university simulation.

Beyond improved situational awareness, the intention of rehearsing clinical events within simulation scenarios is to improve the ability to pre-empt actions and patient care requirements particularly in acute situations where time is a critical factor.

6.3.2.2 Anticipating options and actions

We return to Lilly, a mature-aged 'international' student, who described the visual concepts from the university simulations which have remained with her and influenced practice. Of particular impact was the deteriorating patient scenario in the final year of studies. Lilly was an observer first in this learning experience but the contribution to learning about what to notice and how to respond appear to have had substantial impact. Lilly recalls the post-simulation debriefing in particular and how different responses to a patient situation could equally be justified. From her conversation below, Lilly now thinks this way in practice.

> ***Interviewer:*** *Has that* [simulation experience] *stayed with you? Has that helped you at all?*
>
> ***Lilly:*** *Oh* ***definitely****. It's in my mind. It's like a film, I talked about.*
>
> ***Interviewer:*** *You talked about the movie playing in your head.*
>
> ***Lilly:*** *Yeah. I'm not putting the real patient into that situation but when you're processing the way you do things for the patient, you might think there are several possible ways to do it but which is the best one? If I'm confused I might take the priority options to my educator. And I say, oh I think this way or this way, what do you think? So I get second or third opinions – say someone's opinion matches mine? So I might select one particular option just to make sure I'm doing the right things. So it helped me*
>
> ***Interviewer:*** *… That sounds to me a bit like the debriefing process?*
>
> ***Lilly:*** *It's kind of like in my mind. Like if this patient is short of breath, what do you do? Do you give him oxygen straight away or do you have to find out why first? Or change his position first? There are lots of possible ways to do things but which way is the best? If it's quite urgent, in that minute, you need to make a decision because maybe there's no-one around. So you might try two options at the one time, like sit him up and put the oxygen on and see how he goes.*

In this dialogue, Lilly displays a higher level of thinking and reasoning at this new graduate nurse stage. However Lilly had prior life and educational experiences to draw from in her decision making processes. She continued to provide further insight about the lasting

impact of viewing other students enacting a simulation scenario and the debriefing discussions around the response options for particular clinical situations.

It appears that for an 'international' student there is immense benefit in observing others first in simulations and the discussion about practice options which follow during debriefings. The lasting impression of these simulation components for Lilly in her practice were pronounced – and visual. As a woman with a young family and previous experience as a child care worker in China, Lilly's life experiences also contributed to her mature, measured approach to analysing patient management options for the given situation. However the visual recollection of the simulations and discussions about practice options during debriefing have contributed to Lilly's domains of nursing practice.

In another example, Mary reveals how she is now able to anticipate likely actions or further data that would be required during emergency events in the clinical setting, influenced by her participation in the deteriorating patient simulation at university.

> ***Mary:*** *I still haven't actually ever had to call an emergency arrest or anything but I've been involved in a couple.*
>
> *So that* [deteriorating patient] *simulation was really good for putting me into that situation in a safe environment. Because now, every time I do go to an arrest or an acute event, you just do what needs to be done and it's not all a big drama.*
>
> *So I guess my reaction to the simulation made me think about what I was capable of doing and what I wasn't capable of doing yet. Because when we do have an acute situation at work sometimes I do think back to that simulation about how everybody was handing me stuff and I'd just do it. Now I do kind of get in there and* ***I'm*** *the one who's taking the blood pressure and the one who's* ***checking*** *the sugar and running off to get the* [ECG] *machine instead of just waiting for somebody to tell me what do to,* ***I just do it****. Coming from a student role to a registered nurse role is a good progression.*

From the simulation experience, Mary now feels capable enough to assume more active roles in clinical situations similar to what she experienced in university simulations, to the point of anticipating relevant, appropriate responses. These behaviours reflect practice at a more advanced level of a new graduate nurse.

A more pronounced example of how university simulations influenced one new graduate nurse's decisions and actions during an acute event in the clinical setting is described below.

6.3.2.3 Confidence and knowledge to respond independently

Mark gave a detailed account of a clinical event where he made a rapid and decisive judgement based on a patient's condition – one which was questioned by the senior RN on the shift. However, Mark felt comfortable with the decision he made and was supported by the Nurse Unit Manager (NUM) and educator at the shift change.

During a night duty shift, Mark was caring for a patient admitted several days prior who was bleeding from his rectum. The patient was being monitored for further changes rather than specific interventions at this time. Mark noted the patient had complained about being sweaty and when he used the pan, the patient had another bleed. Although the senior nurse on the shift appeared not to be concerned, Mark investigated further and took the patient's blood pressure which was low (60/30 mmHg). (For context, normal blood pressure is approximately 120/70).

As the patient's observations warranted urgent medical review Mark immediately initiated the newly deployed 'track and trigger' system ["Between the Flags"] (New South Wales Health 2009). The senior nurse did not agree with Mark's actions however the rapid response team had now arrived and commenced active fluid resuscitation for the patient. One hour later the patient was transferred to the intensive care unit which confirmed for Mark that he had acted appropriately in the given circumstances despite conflicting opinion of the senior nurse. Come the morning as Mark gave handover to the next shift,

the Nurse Unit Manager and Nurse Educator were very pleased with and supported his choice of actions during the night shift.

When pressed about which elements of the BN may have assisted Mark's initiative, the simulation experiences - particularly rehearsing communication strategies - were highlighted.

> **Mark:** *I think simulation probably was helpful for that in terms of I guess the sort of thinking...what you know, interpreting an event and deciding what further information you need, like the blood pressure. But I think the big thing was being able to communicate the important handover to the staff as they came up.*
>
> ***Interviewer*:** *So where do you think you got that experience? From which simulation encounter?*
>
> **Mark:** *I think possibly the interdisciplinary simulation would have been the most influential one for that. I think most of the other simulations I wasn't involved as one of the nurses. In one of them I was a team leader so I think it probably would have been that interdisciplinary one because there was quite a focus on communication with medical staff as well.*

From Mark's account there appears to have been substantial contribution of the experiences gained in simulations for *noticing, interpreting* and *responding* in this subsequent acute clinical event. The initiative and confidence demonstrated in commencing an urgent patient review highlights how justified and comfortable Mark was with his decision. This example particularly illustrates the benefits of interdisciplinary simulations prior to entering practice to address concerns nurses may have in communicating and working with doctors.

But what of clinical situations which are significantly different in context from the simulation scenarios? Does learning within one context assist with making clinical judgements in other contexts? The final theme reveals examples where new graduate nurses applied learning through simulations across different clinical contexts.

6.3.3 Different contexts but similar processes – how simulations enabled clinical judgements in other patient situations

Examples of sentinel experiences within practice were raised by several students in response to the semi-structured interview questions. Of particular interest were clinical events where recollections of simulations from the university degree provided context and understanding which supported participants in knowing how to *respond*. A selection of excerpts from interviews is included in this section to illustrate how the processes learnt from university simulation experiences supported clinical judgements within contrasting contexts. Sub-themes within this area of interest include: from deteriorating patient to other acute situations; and generalisation of the effects of simulation.

6.3.3.1 From deteriorating patient simulation to other acute situations

To start, Andy recalled how the deteriorating patient simulation experience at university helped with numerous subsequent acute clinical practice situations – having the confidence to initiate appropriate patient assessment and how to *respond*.

> ***Interviewer*****:** *So remembering back to those sims then, has anything similar happened in clinical that you feel that doing the sim might have helped with or a connection?*
>
> **Andy:** *Yeah, I've had a lot of deteriorating patients. So it's just being confident in those situations. I guess it just helped prepare me for those scenarios where you know there's a call for help and then you start acting on everything you need to do.*

With regard to *noticing*, Andy's reflection revealed how he could capably care for a diabetic patient despite not having experienced the situation before. (For context, a normal blood sugar level is 3.0 – 7.7 mmol/Litre and for a diabetic patient is often consistently raised above 11 mmol/Litre (Craft & Gordon 2011, p. 1083)).

> ***Interviewer*****:** *Do you think you're using this noticing element?*
>
> **Andy:** *Yeah, definitely. I guess my example for that would be that the other day I had a patient who was diabetic and I knew that overnight he'd had*

> *labile blood sugars. So I go into the room and I say, hello and he just doesn't respond quite properly. So I say hello again and I go to him and he's very sweaty and a bit drowsy. Straight away I think, I need to know his blood sugar, I take it and its 1.6 so straight away I get some glucose into this fellow.*
>
> ***Interviewer*****:** *What do you think helped with that analysis and then doing* [something]*?*
>
> ***Andy:*** *I guess you've got your theoretical knowledge you have to know what diabetes will do.*
>
> ***Interviewer:*** *Had you been in that situation before?*
>
> ***Andy:*** *No, that was number one. I'd never had anyone with low blood sugar. He was alert enough to have plenty of glucose and things orally and he didn't have a cannula so we couldn't give him anything IV. It was just, I just felt I knew what to do and actioned that very quickly and got other people involved and he was fine in the next half an hour.*

Andy demonstrates acting on initial cues from *noticing* how the patient appeared; and took this further in gaining a blood glucose measurement knowing the patient's background. He made a decision to pursue oral glucose replacement quickly and noted the absence of an intravenous (IV) cannula which would have been the next option for glucose replacement. Despite the different context, the basics of patient assessment which are embedded within all simulation exercises appeared to provide benefit for Andy in this situation.

We return to Benita whose experience in the interdisciplinary simulation at the hospital had a profound impact on her and her nursing practice. The simulation provided Benita with clarity and focus in contextualising theory and practice situations. However Benita recalled other university simulations on how to *respond* to deteriorating patients and gave an example of how she recalled this simulation for a slightly different patient situation in practice. A key element of the simulation was the importance of initiating actions without delay prior to the doctor being present; and clarity in nurses communicating concerns

about the patient including clear recommendations and a timeframe for the doctor to review the patient.

> **Benita:** *And now when I have a* [patient with] *chest pain on the Ward, I do all those things and everything else far beyond the call of duty before I call the doctor. And it's usually 99.9% of the time that it's usually resolved by itself. Cos my patient's got a history of reflux. But I called the doctor just to come and review my patient. But the doctor that time at the simulation she was telling us what we should have been doing whereas we should have known what to do.*
>
> ***Interviewer:*** *Right, right. So do you think from that experience - do you* ***recall that*** *when you now say "I'll do this before you call the doctor"?*
>
> ***Benita:*** *yes, now that experience itself also taught me something. To find out what needs to be done, do it, and call the doctor. And even when I go on the Ward and I get my four patients or whatever, I do a little sort of research … a little literature searching. What do I do, if someone's developing withdrawal symptoms of detox or chest pains, whatever? I've got these little lists that I written them down - I refer to them.*
>
> ***Interviewer:*** *so it sounds like it's a combination of many things. Do you feel it was more in the third year that things were starting to connect?*
>
> ***Benita:*** *actually, things started to connect after I did that sim at the hospital. That's how I put the connection. Because I went home that day and I started reading on what we did. I thought - oh of course! That's what I say - that simulation was the highlight of my career. It was a turning point for me. It was then that everything started to connect. That I started linking things, signs and symptoms linking to the condition, to the nursing diagnosis.*

What is described here is the ongoing effects of simulation and how these learning experiences can provide frameworks for the processes which assist in clinical practice and planning patient care. Benita also reveals how she can now anticipate nursing actions relevant to what she has *noticed* and *interpreted* about patients' conditions.

6.3.3.2 Generalisation of the effects of simulation

Perhaps the most profound example of how simulations can provide benefit irrespective of subsequent clinical situations is the recollection provided by Alex. Now working in a private mental health clinic, Alex made connections between the critical care trauma simulation and a clinic patient who was becoming very agitated and required immediate sedation.

In addition to the curriculum content and clinical practice experiences, Alex believed the processes acted out in the trauma simulation conferred benefit for him in managing this mental health patient – as the only Registered Nurse working the shift with medical support only available off-site. Although there were two other nurses (an Enrolled Nurse [EN] and an Assistant in Nursing [AIN]) on site, they did not have the same level of qualifications, decision making or autonomy and required supervision and direction from the Registered Nurse in their practice.

> **Alex:** *Last Sunday, I worked on the drug and alcohol detox* [detoxification] *and had a patient who was a benzo* [benzodiazepine] *addict, a polysubstance abuser coming in for a detox from benzo, ketamine and midazolam. Basically he was on a weekly binge and the benzo detox. It's one of the nastiest because it gives the worst psychosis. So he comes in getting more and more agitated and obviously he probably didn't say the right amounts of drugs that he used. The* [medical] *consultant didn't prescribe the adequate sedation for him, he's getting increasingly agitated, hostile towards the staff, you know pacing around and he was a big young bloke. This is a situation which was about to blow out because either he would have gotten into a fight with someone or assaulted the staff or needed to be physically restrained and then sedated. No doctors on site and I was in charge of the ward with another EN (Enrolled Nurse) and there was a floating AIN (Assistant in Nursing) between the two floors.*

Alex continues to describe the critical time pressures of getting to an endpoint of adequately sedating this client for the safety of all involved. Important actions and decisions to initiate were: gaining a medical phone order for appropriate sedation for this client with a complex drug and alcohol history; preparing and checking the intramuscular

(IM) medication according to legal requirements; and getting the restless patient prepared for the injection to be administered.

For mental health clients an added aspect in this scenario is discussing the plan of action and gaining approval to give the sedation, not an easy task when someone is not able to think rationally. The scenario continues with Alex describing concurrent challenges at the time which included:

- Taking time to document the issues in the client's notes in case he had to be quickly transferred to hospital
- Answering the consultant's frequent phone calls and providing updates and opinion about the need for further action
- Thinking about the needs of the other 22 clients in the facility at the same time.

As it transpired, the client refused the injection first time around so Alex had to consider other options in this pressured situation. However he eventually achieved the client's consent and administered the medication. Subsequent monitoring of clinical parameters was required, similar to patients in non-mental health situations. Throughout this event Alex drew connections with the pressured situation he experienced in the university trauma simulation which helped him to organise and manage this clinical scenario. The conversation continues:

> ***Interviewer:*** *So even though the context of the patient simulation in critical care is very, very different to what you're experiencing in your work, you felt the tension and the pressure and responsibility and the pace and what you had to do, helped with you managing the situation that you described?*
>
> ***Alex:*** *Absolutely. Cos we did the trauma patient in the critical care and it was absolutely different. I had two examples; there was the patient who was deteriorating - the psychotic patient who was escalating and a patient in drug withdrawal who was escalating as well. Different – you know the person who's medically unwell, person who's mentally unwell basically the presentation is the same and the outcomes can possibly be the same. Acute*

> *withdrawal, seizure, obstructed airway. On the other hand trauma patients can have pnuemothorax or something, and same - obstructed airway or inability to breathe. Even though there are different settings and different environments, you're not in the resuscitation bay, you haven't got all the monitoring equipment but I found that you work on a model - you see the patient you quickly assess him straight away. Check the pulse, check the limbs, check the injury site, check this, then you look at the pupils, look at the tremors, check the heartbeat, you see if the person is sweating, any symptoms of withdrawal, see if the person is psychotic, do they speak, what's the presentation, what's the affect is like. So it's different but it's very similar.*
>
> *So you need to plan. So you decide, yes we need to act now, so what do we do? Same story. Now call the doctor. In the simulation that person had a cardiac arrest and we've shocked him and he regained the pulse. Here I've jabbed the patient and sedated him intramuscularly and* ***that*** *was the intervention. And then what do you do afterwards? You monitor. Was the dose appropriate? How sedated is he - is he over-sedated? Is he haemodynamically* [blood pressure and pulse] *stable? Do you need to monitor him? Depending on the outcome, you think, should I act further or do I just keep monitoring him.*
>
> *Same story with our patient in our* [simulation] *scenario. At the end of the day he regained consciousness and we transferred him to the ward with his wife.*

What is clear from this recollection is that Alex made parallel connections in the assessment and care processes required within the trauma simulation and applied these to the acutely unwell mental health client. Although management was different, patient assessment and *noticing* are evident in addition to *interpreting* and *responding* as the situation warranted. Benefit is seen in Alex's ability to appraise the situation and make decisions and clinical judgements in a measured way. The conversation heads towards a conclusion:

> ***Interviewer:*** *Yes. So you think that rehearsing that and practising* [the trauma simulation], *to some degree, even as a different context, do you think that helped when you came across this situation?*
>
> ***Alex:*** *Absolutely. Because when we've been in the sim you identified that the patient is deteriorating, you know what to do. Keep an eye on him but get the doctor here* ***now****. You need someone involved* ***now*** *because if we*

> *didn't do it in sim lab, potentially if we didn't call the doctor in time or early enough when the patient still had a pulse … the outcome would potentially be absolutely different.*
>
> ***Interviewer:*** *I'm going to ask you a "what if" question. If you hadn't have done that simulation experience, the critical care, or the other one in third year, do you think you would have been able to manage the clinical situation the way you did?*
>
> ***Alex:*** *Um. Look I think I would have managed it but not as effectively because I think we did really well with him* [the mental health client] *and I reckon that it would have been much more stressful, for sure. I think in the end (cos I wasn't the only person involved) that someone would have come up with the right decisions and the right actions but it was stress-less.*
>
> *So obviously it gives you that extra confidence and the time management and planning skills on top of what you learn anyway, but it helps to just to get a hold of a situation like this.*

The detailed personal recollection provided by Alex clearly illustrates the impact of the university simulations to subsequent clinical practice, irrespective of the clinical context. What Alex demonstrates here is the direct benefit of how he was able to acknowledge the immediate actions required for the mental health clinical scenario. Advantage was also conferred by participating in the team leader (TL) role in the simulation – to how Alex was able to think, plan and delegate roles and responsibilities in the acute clinical situation. The simulation experience appeared to provide exposure to the processes for managing patient situations which were able to be applied in contrasting clinical contexts.

6.3.4 Summary of Study 2 findings

In their transition to the new graduate role during their first year of practice, the nine nurses appeared to be all coping well despite experiencing common challenges of time management and prioritising patient care in changing situations. The nurses were enjoying their autonomy and independence, and contrasted the differences from the student role to being accepted as part of "the team" – or the community of (nursing) practice.

Students provided insights through group and individual interviews that engaging in simulations elicited various affective elements of learning such as amplified emotions, attitudes and behavioural norms. Specific emotions of anxiety and excitement were pronounced for some; others reported attitudinal characteristics of being more focused and serious about the patient care tasks at hand; and having a heightened awareness of behavioural norms through observing or working with others in the simulation/s. Tacit knowledge was brought to the fore as many of the students felt the simulations 'glued everything together' and were surprised with how they were able to recall theoretical knowledge, specific to the patient care scenario, and realised they 'knew what to do'.

All students provided examples of how they recollected university simulation experiences to situations of **similar** or **different** contexts in their clinical practice. Benefit was conferred in a familiarity of how situations might progress; anticipating appropriate actions in response to unfolding events; and in having a wider understanding or improved situational awareness beyond the patient's needs. Focus was centred on specific examples of how the simulation experiences provided direct benefit in clinical situations particularly in the process aspects of clinical judgement and decision making. Process elements evident in the nurses' clinical stories were: patient assessment, prioritisation, delegation, review of the situation, and reflection on practice. When aligning the process elements with Tanner's model of clinical judgement, there is evidence of these new graduate nurses demonstrating *noticing, interpreting, responding* and *reflecting.*

Chapter 7: Discussion

In this chapter the findings from Study 1 and Study 2 are drawn together into a consolidated discussion about the contribution of simulation to final year students' learning and preparation for registered nurse practice, specifically within the context of clinical judgement.

The structure of Chapter 7 focuses on the predominant research findings related to how learning through simulation: *makes more explicit the social aspects of learning AND practice*; *elicits both positive and negative emotions which relate to the social*; and *triggers reflection in- and on-action before, during and after the experience*. Students *processed* and used the simulation experiences in varied ways. Participants' personal accounts, provided in the interviews, of **how they subsequently managed patients and situations** showed the *complexity of the impact* and *ongoing influences* of the simulations experienced at university on their practice.

Particular components of the simulations conferred benefit for developing and applying professional judgement. In addition to *facilitated debriefing* and *post-simulation reflection*, *guidance by the academic* added context and insight about professional behaviours and norms. These elements were rated highest in the survey rankings, irrespective of student study stream, and were confirmed through the group and individual interviews.

Discussion in this chapter will link the study findings to literature raised in Chapters 2, 3 and 4 and conclude with comments about the strengths as well as the limitations of the research. Areas recommended for further investigation and inquiry will also be raised.

7.1 Overall perspectives

The research findings provide both confirmation of existing evidence about the benefits of simulation as preparation for clinical practice and add substantial new information to the field. As reported in a large number of studies on simulation for nursing students, participants in this research agreed that the simulation experiences improved confidence in their abilities (Liaw et al. 2012; Thomas & Mackey 2012), provided insight into knowing how patient care situations might unfold (Disler et al. 2013; Kelly et al. 2014) and helped students identify areas where they could undertake further work (Rochester et al. 2012).

New perspectives from the research provide information about simulation learning from *three student sub-groups* who came together within the final year of the Bachelor of Nursing program. This eclectic mix of *student types* conferred variety in what students brought to the simulations and the difference experiences each group may have encountered or gained. However the findings from survey and interview data reveal more points in common across the three sub-groups than are varied. Common concerns for students, irrespective of study stream, were about *adequate knowledge* and *skills for practice*, *not harming the patient* and a degree of anxiety about *how they would perform and be perceived* with regard to the scenario that was about to unfold.

As accounted for by a number of the study participants, the simulations helped *give meaning* to what they had learned, enabling them to connect or consolidate theory with clinical practice. The pressures and responsibilities of registered nurse practice became more explicit through undertaking (mostly) active roles in the simulation. In active roles, students stated they had to react to the changing conditions – of the patient and the situation. Being in this position helped them to weigh up alternatives, make contextually sensitive judgments, and respond in what they felt were the most appropriate ways. Essential to engaging and making judgements in the simulations described in this research

were requisite knowledge, and experience in clinical settings – in essence, what students themselves 'brought to' the simulation encounters.

Following the simulations students became more aware of the *centrality of the patient* in relation to the care they provided and the *importance of team-work and communication* – with the patient and family, and amongst team members. The holistic nature of the simulation learning experience, supported in a variety of ways by experienced academic clinicians, assisted students to *embody practice* and progress from *'knowing'* to *'knowing how'*.

A number of learning theories have been aligned with healthcare simulations but the focus and range of activities associated with contemporary simulations are such that they should be informed by practice-related frameworks (Boud 2012). The learnings in simulation are complex and this research has raised the prospect that more than one learning theory can inform simulation pedagogy. In fact, elements of several learning theories are applicable to this type of activity but in general terms this study suggests that simulation is powerful because it facilitates informal learning (Hager 2011). For practice-based disciplines activities which enable learners to draw on their tacit knowledge and learn *how to* do things in a contextual, socio-cultural framework, outcomes are invariably richer. Understanding practice through engaging with others and reflecting consolidates practice in its holistic form in ways that cannot necessarily be achieved through formal learning strategies such as lectures and didactic tutorials.

7.2 Simulation facilitates the social elements of learning and practice

A distinct feature of simulation for students is the interaction with others – peers and academics. Students assumed specific roles for the simulation scenarios and interacted with each other as team members, relatives or the patient (via the manikin's voice) and with experienced academic clinicians who also took on a variety of roles. For students this

level of complexity was close to reality. As such the learning was socially constructed and reflects the social elements of interacting with colleagues, patients and relatives in clinical practice. An equally important feature of simulations is representing how students, as new graduate nurses, would mesh within the healthcare team, particularly the interplay between various roles and the delegation processes. In the earlier years of contemporary healthcare simulation Dieckmann, Gaba and Rall (2007) raised the perspective of simulation as social practice based on concepts from psychology - the physical, semantical and phenomenal. The focus within this research extends this concept and frames simulation as socio-cultural practices encompassing the holism of nursing practice.

7.2.1 'Realistic' experiential learning

In assuming different roles and gaining insight from others about approaches to patient care, students interacted within the leaning milieu that resulted in specific, internalised learning experiences (Boud & Walker 1990; Kolb 1984). Although the environment and artefacts were simulated, the authenticity of the clinical situation appeared to be representative enough for students to commence providing care during the simulation. Students engaged in talking with the 'patient' and 'relatives', asking questions to gain further patient data for given contexts and concurred with others about how to respond. Some students proceeded to delegate (for example Alex as the TL), acted upon decisions of their own accord (Debra), and communicated with the team and team leader (Benita). Hence the simulation scenarios, as accounted for by students, provided occasions of experiential learning.

7.2.2 Support and guidance from the 'master'

Guidance from the experienced academic clinician during the simulations was rated the third highest component in the survey for assisting students to apply clinical judgement and was a point frequently raised in the interviews. Providing guidance was deemed important particularly in more complex simulations (as in this research) and helped students to focus attention on the *salient features and relevance of patients' cues* and diagnostic data as well as the *illness experiences* of the patient and family (Tanner 2006, p.

205). Irrespective of prior experience and study stream, all students valued academic guidance within the simulations. Mary's comment about being prompted to look at the drainage bag led her to realise this was important information in the patient case context. This prompt then triggered her to think and make a judgement about the relevance within the situation and what to do. Similar comments were forthcoming from Debra – that guidance from experienced nurses helped to focus on more pressing issues and so trigger thinking as well as drawing on one's own initiative.

In situations where the scenarios were more advanced (the trauma simulation), an added benefit was the experienced academic clinician demonstrating to students how experienced healthcare professionals might react and respond to heightened challenges. Modeling practice in this way, in being focused and calm, objectively assessing and reassessing the patient and prioritising management strategies was deemed beneficial by students. This experience added to students' collective understandings of patient management and enabled them to reflect on and develop their own style of practice. Understanding these nuances of practice appeared to help students as new graduate nurses to 'fit in' and assimilate with the social culture of their workplaces as none of the study participants raised these concerns, which were prominent features in the studies by Parker et al (2014) Malouf and West (2011) and also Newton and McKenna (2007).

Simulations delivered in the manner described in this research, which includes guidance from the experienced academic clinician, represents a community of practice as Lave and Wenger (1991) have described where members of the community have varying degrees of experience and the 'master' models healthcare practice. The concerns about the legitimacy, power and motivation of individual members within a community of practice raised by Benzie et al (2006) can be somewhat more controlled within simulations for students at university. As the intent of the learning activity is formative, students can be provided with examples of ideal professional practice through engaging with and performing alongside the 'master'.

Working alongside experienced academic clinicians in the simulations conferred benefits for improving how and what students *noticed* or paid attention to, which according to Tanner (2006) is the key initial element for developing clinical judgement. When noticing was triggered, students were able to commence interpreting and responding. However another aspect of the simulations that became evident from the data was the range of powerful emotions elicited from engaging in the socially constructed learning activities. Discussion will now focus on this aspect which plays an integral role in healthcare simulations.

7.3 Emotionally charged yet safe learning experiences

As a learning activity, the simulations enabled experiences which were multi-faceted and encompassed the *social, emotional* and *cognitive* elements of learning as described by Illeris (2002) in Chapter 4 and corroborated by Boud and Walker (1990) and Hager and Halliday (2006). Many POSITIVE emotions (*excitement, assertiveness, being focused, engaging, fun*) were generated before, during and after the simulations, as well as more NEGATIVE emotions (*anxiety, embarrassment, confusion, frustration*). These emotions rarely occurred singly and were related to performing in front of others or to uncertainty. This is a *unique* feature of simulation as a learning strategy as few other activities would draw out such affective and emotional elements as stated by all students in the interviews. Although the traditional forms of role play encompass performing in front of others or peers, enacting within simulations can incorporate multiple elements of practice and replicate the complexity of care rather than a single interaction. Emotions similar to those reported here are elicited when practicing in front of others in the clinical setting (Parker et al. 2014), irrespective of level of experience, which can override performance (Neill 2012).

Rehearsing patient care situations in the simulations exposed students to these practice-related emotions but provided safety in the learning. As the confidentiality aspect of the learning had been made explicit, students felt they would *not be judged* because of their

incorrect or naïve reactions and judgements. Students felt *able to ask questions*, and came to understand what to say and how to respond in particular situations. Students knew they would not harm the patient if the intended actions were not correct or not implemented rapidly enough, and came to understand the consequences of such actions. Having insight about how such situations may unfold and understanding the importance of *noticing* changes to patient parameters, *speaking up* and *responding* when patients' conditions change are fundamental elements towards improving quality of care and patient outcomes (Garling 2008; Institute of Medicine 1999), as outlined in Chapters 1 and 3. Speaking up and asking questions are particularly difficult for students whose native language is not English and create angst due to the power differentials and cultural behaviours of international students (Edgecombe, Jennings & Bowden 2013; San Miguel & Rogan 2009). Simulations can portray the expected behaviours within the Australian healthcare setting through the social elements of the learning and hence provide great benefit in this regard.

7.3.1 Emotional learning is shaped by students' characteristics and roles

The collective emotions were also embedded in what students brought to the simulations, that is their level of knowledge, practical experience, cultural beliefs and attitudes. All of these factors influence students' understandings of 'doing and saying' within the simulations and were further shaped through interacting with peers and academics. Interactions occurred during 'active' participation such as when taking part in a role or while observing others in the simulation – both equally argued to be an 'active' role from the research findings.

For example, Alex (the GE student) with his advanced medical knowledge chose the TL role in the trauma simulation where the team commenced the simulation initially unaided by the academic. Alex, although lacking in the practical aspects of patient management (limited exposure in his medical degree) felt a *sense of relief* and *accomplishment* after the scenario – that he could 'do this' in real practice. However Ting as a younger student from the 3-year program had less knowledge and experience to draw from but still volunteered

to undertake the TL role. Although feeling *embarrassed* and *frustrated* with not finding a set of keys under the patients' bed sheets, the impact of this emotional event was such that Ting raised this during both interviews. Collectively this event was a memorable one for Ting for his future practice as it highlighted the importance of appropriate knowledge and skills, and areas in which he could improve.

For Mary and Debra who watched a simulation from an adjacent room, they felt a sense of *frustration* in what others did not notice about the patient (for example a full drainage bag indicating blood loss). The analogy of watching the simulation to that of viewing a television game show, raised by Ting and Mary, showed that *frustration* and *concern* about what was happening was also felt by those observing the simulation. Because there was no pressure to perform, the observers noticed patient cues ahead of the participants in the simulation, and were willing them to 'look at this or that', concerned about the patient's pending demise. Hence those who observe the simulations are 'actively' participating, and this needs to be acknowledged and drawn out during the debriefing session.

As can be seen, the learning milieu within simulation is complex and, because simulations elicit such emotional responses, students need to be supported and debriefed adequately as negative emotions can have equally lasting effects and substantially override performance or delay advancement. Facilitated debriefing was noted by students as a substantial component of the simulations in learning about, and for, practice. Reflection was enabled through the debriefing process.

7.4 Reflection on and about practice

Many scholars over time have featured the importance of reflection for practice, the most recognised being Schön (1987, 1995). But reflection also features within other learning theories namely experiential learning (Boud & Walker 1990; Kolb 1984) and in nursing, within Benner's (1984) *Novice to Expert* and Tanner's (2006) model of clinical judgement.

Experienced educators recognise the importance and value of developing reflective habits in novice nurses; and within simulation strategies the debriefing session is a designated time for facilitating reflection about the recent scenario activities (Dieckmann, Molin Friis & Lippert 2009; Dreifuerst 2012). Yet reflection is really an ongoing process without boundaries.

Within this research, reflection appeared to commence for students at different times, either before, during or following the simulation and into practice, with no definitive start or end point. For Debra, reflection commenced during the simulation when playing a role, while for Lilly it was prominent when she was observing others in the simulation and continued into practice. It was triggered in other subjects the following semester. Prior to the trauma simulation Alex had talked with other students about what they might encounter in this type of learning activity and Jason was anticipating what might happen to the 'patient' and how he would react.

Participating as a Registered Nurse (rather than a student) within the simulation allowed students to learn and reflect on the responsibilities of that role which helped with identity formation (Wenger 1998). Playing a specific role was a feature in the interviews but less so in the survey data. Rather there was benefit in observing others, and for students to reflect about their own and others' practice.

In addition to the interactions within the scenario, reflection following the simulation was apparent and key to ongoing learning. Reflection on simulation events was at times not immediately evident to students until recollection and extension of the experience was subsequently brought to the fore during clinical practice or university tutorials.

7.4.1 Understanding the roles and responsibilities of registered nurse practice

There were numerous accounts from the interviews of students' heightened awareness of the scope of registered nurse practice through participating in the simulations. Vignettes illustrated how students came to appreciate the importance of *teamwork* and

communication and how central the *patient* was to nursing work. This aspect was corroborated by the changing emphasis or dominance of words across the three wordclouds from the surveys (Section 6.1).

Insights about the registered nurse role which featured most prominently in the interviews were: the *breadth* of the nursing role and associated *responsibilities*; *knowledge* and *skills* required for decision making and safe patient care; and the *delegation* and *prioritisation* required particularly in time pressured situations. Playing the RN in the simulation provided a *greater understanding* about the role for Debra, Mark and Ting; while for Mary and Lilly, observing how others responded to challenges in the scenario was a dominant feature for their learning.

Through undertaking the registered nurse roles in the simulations students were able to 'walk in those shoes' and *embody practice*. Allocating students to the registered nurse role in simulations, not always adopted with more novice students, appeared most beneficial for experienced students. Despite having a medical degree, Alex had limited clinical experience to draw from but was able to '*switch his brain on*' and '*put it all together*' within the simulation scenario. Refocusing on patient assessment following administration of treatments and in response to the patient's verbal cues or responses helped contextualise the trauma scenario experience for Alex and Ting, and brought attention to the patient as the central concern. Students were able to think about and choose a course of action, which if incorrect did not have consequences for the 'patient'. In this way, students learnt the most appropriate course of action which conferred benefit in subsequent practice in similar AND different contexts.

Another experienced student, Debra (an EN) realised that the conditions in the simulation drew out her *tacit knowledge* about how to respond in meaningful ways to the situation at hand. She reflected "it was all coming back" [theoretical knowledge] and felt she was being prompted unconsciously to "do this, and this and this …". Seeking assistance from

the 'doctor' either by telephone or at the bedside helped with developing a concise handover repertoire comprising specific, relevant information for brief yet vital conversations. From these reflections, the simulations appeared to assist students with application of knowledge into practice situations. Through exposure to select clinical situations within the simulations, enacting, observing and reflecting uncovered meaning for the students that wasn't there before; in essence the simulations assisted students to make connections between propositional knowledge and practical know-how (Manidis & Scheeres 2013).

The process of becoming a Registered Nurse incorporates assuming total responsibility for patient care which is not a guaranteed experience for students during their final clinical placements. Mark particularly stated his own concerns about safety in this regard – that patients' needs may require quicker responses than he may be able to provide. Yet taking responsibility for patient care and demonstrating competent, flexible practice are the very qualities expected by employers and managers when graduates commence work (Wolff, Pesut & Regan 2010; Wolff et al. 2010). In mastering the professional role as new graduate nurses, Pennbrant et al (2013) highlight the importance, and expectations, of *autonomy* and *'knowing'* about practice in addition to competence with skills. These attributes are equally important for the 2-year EN students in coming to terms with the differences between their supervised practice and adjusting to the RN role (Kilstoff & Rochester 2004) which carries greater autonomy and responsibility (Hutchinson, Mitchell & St John 2011).

Regular opportunities for students to 'walk in the RNs shoes' should be a goal across all years of undergraduate nursing programs, where simulations can offer pre-figured learning experiences to provide shape and predictable patterns of practice to help students become encultured into the profession. With scenarios based on national health priorities and exposing students to situations commonly experienced by hospitalised

patients, simulation can provide guaranteed experiences for all students during the degree program.

The facilitated post-simulation debriefing also helped to shape students' understanding of the RN role, through discussions about what occurred in the scenario which triggered reflection and questions about practice.

7.4.2 Facilitated debriefing and post-simulation reflection

From the survey results ALL student groups indicated that facilitated debriefing and post-simulation reflection (the *top two components*) helped them apply clinical judgement in the patient scenario. These results reflect similar findings in the literature such that debriefing is considered to be the simulation component which contributes most to learning (Dreifuerst 2012; Lusk & Fater 2013; Neill & Wotton 2011; Shinnick et al. 2011) and similarly here for applying clinical judgement.

For nursing students who are still shaping their understandings of professional practice and judgement, a debriefing discussion facilitated by a person who can add professional wisdom to the dialogue is considered the better approach (Shinnick et al. 2011). When used with practicing clinicians, who have more clinical experience, peer-led debriefing has been found to generate insight and frame debates about practice (Boet et al. 2011). But as Lasater (2011) points out, students' reflective capabilities vary widely so guidance is the key to help them appreciate what is important to notice and hence develop their clinical judgement (p89).

For students, unpacking and analysing the events which played out in the simulation enabled the entire patient situation to be discussed, however requisite knowledge and understanding were deemed key to making sense of the debriefing discussions. Ting (from the 3-year program) specifically emphasised this point and Mary's (GE student) comments also support this view - that three things were essential to bring things together;

knowledge, the *simulation*, but above all the *debrief*, which made it a complete experience.

That reflection was triggered within the simulation, shaped during the debriefing and continued beyond the learning activity, are points acknowledged by other researchers (Arthur, Levett-Jones & Kable 2013; Dreifuerst 2012). Although students' opinions were surveyed soon after the simulation, reflection on practice had already commenced. As Lilly recounts, the debriefing refreshed what she had just observed, and the discussions about patient management options were valuable and useful in confirming alternative care actions when faced with similar issues in subsequent practice. Referring to the paediatric simulation, Mary reflected that she "learnt more after the fact than on the day" of how to interact with parents while concurrently assessing their child. Reflections beyond the university simulation activities were evident from students' accounts and assisted with clinical judgements in other scenarios and contexts.

The significance of *reflection* following the simulation is a prominent finding of the research and an important professional attribute for students to develop (Benner 1984; Schön 1987, 1995) and according to Tanner (2006) is also a significant contributor to nurses' clinical judgement capabilities. Reflective practice was particularly enabled through guidance by the experienced academic clinician either during the simulation or in the subsequent debriefing session. The simulations not only triggered reflection during and immediately following the learning experience, but had lasting effects on practice during the following year. For instance, Mary's recollection about a patient receiving intravenous fluid resuscitation in the clinical setting prompted her to recall the same university simulation scenario and question the rate of fluid being administered as it might precipitate pulmonary oedema - as occurred in the simulation. Further examples and discussion about the benefits of simulation in subsequent practice is provided in Sections 7.5 and 7.6.

7.4.3 Feeling prepared for the NG role

Following the simulations students reported a sense of accomplishment, that they 'could do this now' (care for patients independently) having realised that their own capabilities and capacity for safe practice were affirmed through the simulation. Because the scenarios were focussed on common patient events, which typically occur after-hours and necessitate responses by junior staff, students were satisfied that they would know which patient cues to look for and how to proceed in such situations. Having a new awareness of the salient features within a specific scenario, how to interpret the patient data within the context and being able to determine the appropriate actions, students came to know how to respond either within their scope of practice or when and how to seek assistance. Such decision making, accountability and responsibility were noted by Kelly and Ahern (2009) as lacking or underdeveloped in new graduate nurses but instances to the contrary were revealed by the participants in this research.

Having an understanding of how patient events might unfold, students reported a willingness to respond rather than waiting for direction from others, for instance 'start CPR now'. These intentions reflect, to use Tanner's (2006) descriptions, emerging *patterns of knowing* and coming to understand the patient's trajectory; but also the "embodied capacities for action that involve both motor and intellectual components" (Hager & Halliday 2006, p. 222).

All students, as NG nurses in the workforce, offered examples of situations where they were able to recognise and make judgements about patient 'events' which necessitated rapid intervention. Where interventions could be managed by these NGs, they proceeded to either gather more focussed data or questioned the patient and initiated actions to mitigate negative patient situations. Expanded discussion and examples are provided in Section 7.5 and 7.6 with descriptions of how students *processed* and *used* the simulations in their practice. Suffice to say that the simulation experiences provided these students with greater insight and wider perspectives about how to detect and manage common

patient situations, what would be expected of them in practice and armed them with a *balance of knowing, doing and thinking* which Wolff et al (2010) noted are expectations of service sector employers.

It appears that simulations at university go some way in assisting experienced students to develop the desired new graduate capabilities of social intelligence, organisational acumen and work competence as described by Walker et al. (2013b). The new graduates in this research indicated they were better prepared for and able to cope with the more autonomous registered nurse role in practice. If new graduate nurses feel more satisfied with their ability to provide safe patient care and understand the expectations of the registered nurse role, they may be better prepared to deal with the tensions and social interactions that often feature during the initial periods of employment (Parker et al. 2014, p. 6). Feeling capable, in control and knowing what to do would contribute to greater job satisfaction or higher retention rates in the healthcare workforce. These factors are worthy of consideration in relation to the predicted shortfall in the workforce and impact on health services delivery (Duffield et al. 2011) raised in Chapter 2. However these aspects require further investigation as they are beyond the scope of this research.

7.5 How students processed and used simulation experiences

During and beyond the simulation activities, students processed the learning experiences in a number of ways. For Lilly it was the concept of a '*movie playing in my mind*'; for Debra, it was *a journey* and for a number of students it was *feeling and gaining a sense of control*. And for Benita it was being prepared by *researching* the general health issues of patients on the ward where she worked and *creating checklists* for anticipating and responding to common situations which might arise. The outcomes of processing the learning experiences from the simulations were seen in students' subsequent clinical practice – from the day following a simulation (Benita) and in the early months of the new graduate year.

7.5.1 A journey

Irrespective of previous experience in healthcare practice, the simulations appeared to be equally valuable for the 2-year accelerated EN students. For Debra, who had years of experience as an EN in the United Kingdom and Australia, the simulations offered time to explore and come to understand the RN role because the scenarios unfolded at a *slower pace* than occurs in the clinical setting. Because extra time was afforded to *process* and *reflect-on-action*, Debra felt better prepared to 'step up' in subsequent patient care situations. The metaphor of *a journey* was used to describe how meaning about practice was amplified through simulation. Debra came to realise she was working things out for herself (as in Tanner's (2006) 'interpreting') when either participating in or observing simulations.

This transition, or journey, towards the role of Registered Nurse is as important for EN students as for other student groups, to meet the expectations of future employers. As Cubit and Leeson (2009) highlighted, the transition from EN to RN is expected almost immediately following completion of the nursing degree. However graduates require time to adjust to their new professional role irrespective of their previous experiences in healthcare. Nayda and Cheri (2008) stressed that this was particularly important when graduates returned to the same workplace as RNs having previously worked there as ENs. Although not returning to the same workplace, for Debra, the simulations appeared to accelerate this role transition.

Boud, Keogh & Walker (1985) used the journey metaphor to describe how people come to terms with professional practice, reiterating that it is "not necessarily linear, prescriptive or always progressive, but … evolutionary and ultimately transformative" (p. 444). It appears that simulations for final year nursing students are productive in moving students along their journey such that they emerge towards independent practice.

7.5.2 A 'movie in my mind' and feeling in control

For Lilly the notion of a 'movie playing in her mind' represents processing the learning as a visual metaphor which she recalled in other (theoretical) subjects and as a NG nurse in subsequent practice situations. Recollection of the visual representation, in addition to discussions about practice options during the debriefings, appeared to deepen Lilly's understanding of nursing and assisted with application of knowledge for practice. Appreciating there were a number of ways in which to respond to a patient who was breathless, Lilly recalled the visual image of the simulation and subsequently appraised the situation in the clinical setting, asking questions of the patient, and decided that providing oxygen therapy OR sitting the patient in an upright position were both valid and equally beneficial responses.

A number of learning situations within the BN contribute to the development of students' clinical judgements, but primarily Lilly believed that observing how others responded in the simulations, and recalling debriefing discussions about intervention options assisted her to choose a course of action and correspondingly monitor the patient's response. Important aspects for Lilly were to *feel and look calm* particularly in front of patients and to *have a sense of control*.

For Mary (a GE student) her *sense of control* related to anticipating and selecting a preferred role in providing CPR for a patient predicted to go into cardiac arrest at any moment. Recalling how she performed in the simulations and knowing the role options, Mary stated her preferences to other team members (to manage the patients airway and breathing rather than perform compressions) should the patient require resuscitation.

Weighing up or discerning treatment options and feeling in control are arguably important considerations for all new graduate nurses, and it appears that exposure to common patient situations through simulation, such as patients who require respiratory assessment and support, provides a sense of knowing how to proceed, to reason and to

form decisions within practice. This balance of *knowing that you know* and *daring to act* were areas highlighted by Skår (2009) and Duchscher (2008) for the development of autonomy in nursing practice and are expected capabilities of new graduate nurses by the service sector (Walker et al. 2013a; Wolff, Pesut & Regan 2010; Wolff et al. 2010).

7.5.3 Systematic approaches to care, doing research and making checklists

Participating in the interdisciplinary simulation was an epiphany for Benita, as in subsequent practice she was now "*noticing everything*". The simulation was a turning point - "the penny had dropped" - and Benita was now applying her theoretical knowledge to practice in more meaningful ways. Two accounts where Benita noticed issues with patients she was not assigned to and independently initiated care illustrate the contribution of the simulation to Benita's confidence and self-belief. Noticing a patient in passing who appeared unwell, Benita commenced a systematic assessment gathering targeted physical data, immediately initiated appropriate responses and alerted the nurse caring for the patient. Similarly, Benita noticed another patient's intravenous cannula which appeared unkempt. After determining the cannula had been in place much longer than recommended (72 hours to minimise infection and complications), Benita suggested to the respective nurse that it be removed, which was then carried out. These examples reflect increased knowing and willingness to act which in essence were catalysed by Benita's simulation experiences.

The benefits flowed on into Benita's new graduate practice where she now researches likely clinical issues of patients on the hospital ward where she works. Creating checklists, Benita prepares herself, for example, to be able to discern the range of patients' chest pain or stroke symptoms and how to immediately respond for best outcomes.

7.5.4 Beyond the patient

Although the centrality of the patient emerged as a key aspect for students from the simulations, noting and engaging with family and relatives was an important outcome realised through a paediatric simulation. Mary (a GE student) described *becoming more*

attuned to parents' concerns in clinical settings following this type of simulation. During the learning scenario Mary had difficulty locating the 'child's' heartbeat. Another student who was in the 'mother' role became somewhat concerned, asking if everything was alright? After initially relegating this as a secondary concern and focussing on hearing the heartbeat, in subsequent practice situations Mary became more aware of parents' concerns and now encompasses them in conversations when providing care for their children. This is not often recognised in the literature as a practice attribute influenced by simulation; rather, more has been written about interactions and communication with team members and patients (Aebersold, Tschannen & Sculli 2013; Miller et al. 2012; Siassakos et al. 2011) rather than parents and relatives. Hence this appears to be a constructive focus for paediatric simulations and equally beneficial for adult scenarios as it promotes the patient-centred and family-centred care paradigm of best practice (Keating, McDermott & Montgomery 2013).

7.5.5 Meaningful responses in a job interview

An unanticipated advantage from the simulations was recounted by Alex during a job interview for a new graduate position. Drawing from his experiences from the trauma simulation, Alex was able to provide greater depth and specificity in his responses to the interview questions. Having played the role of TL in the simulation, Alex listed the types of responses he would initiate for a patient who was deteriorating, including how he would seek further assistance. From the 250 applicants Alex secured one of the two NG positions and believed the simulation experiences conferred positive benefits in his interview performance and subsequent job offer.

7.6 Replicating simulation experiences in practice - improved patient outcomes?

A number of study participants provided specific examples of how the simulation experiences at university influenced how they intervened in clinical situations in the workplace. Three specific examples of patient situations and resultant actions initiated by

these new graduate nurses illustrate how their practice was influenced by or linked to previous simulations.

The situation Mark recounted was initiating a rapid response review for a patient he believed was unwell and on the verge of deteriorating further (see Section 6.3.2.3). In noting that the combined clinical parameters indicated further internal bleeding, Mark determined this situation warranted urgent action and initiated a rapid review call. Having rehearsed the strategies for succinct patient handover in similar simulated situations proved beneficial as the team were able to quickly appraise and deal with the situation due to Mark's targeted effective communication techniques. Although questioned by the senior RN about initiating the rapid response, Mark's decision was completely justified, acknowledged by the brisk treatments and transfer of the patient to the intensive care unit, and as praised by the Nurse Manager and Educator the following morning.

What Mark demonstrates in this vignette is the self-belief in actioning his own judgement of the clinical situation. Endacott et al.(2010) believe the key skills for students to develop in situations where patients rapidly deteriorate are accumulation and discrimination of relevant patient cues. Honing such skills is possible in simulations where Kelly et al. (2014) found that students were more cognisant of patient cues and empowered to seek help quickly after the learning activity. The question remains, would the patient's outcome have been different had Mark not felt prepared to act on what he discerned about the situation, initiated a rapid review call and effectively communicated information to the team? It appeared that exposure to such clinical scenarios in the simulations contributed to Mark's *sense of knowing* and *assertiveness to act* on his appraisal of the patient's status within the cited clinical situation.

Andy provided a less dramatic example where he systematically assessed the patient and acted on the findings after noticing that a diabetic patient was uncharacteristically drowsy and not responding appropriately (see Section 6.3.3.1). Although he had not been in this

situation before, Andy demonstrated more advanced noticing and clinical reasoning skills than may be expected of a new graduate in the early months of practice, and determined the patient's blood glucose level, blood pressure and initiated glucose therapy. Gaining insight through the simulations of how patient situations may unfold and the imperative for rapid responses, Andy felt confident to act - that he just 'knew what to do'.

The most compelling illustration of strong links between a simulation experience and the contribution to subsequent practice was revealed in Alex's account of managing an agitated mental health client. In this lengthy story (see Section 6.3.3.2) Alex drew on the processes used during the university trauma simulation to determine priorities and options in assessing and managing this acutely unwell patient. Although the context was *completely different*, Alex negotiated with the client, liaised with offsite medical staff and organised the other nurses, considering the safety and well-being of all. Enacting the TL role in the simulation conferred direct benefit for Alex in how he appraised and managed this contrasting situation in the clinical setting. Having a *sense of knowing* and predicting the consequences for a number of treatment options, Alex orchestrated care for the best possible outcome.

These examples provide evidence of how the students' university simulations directly contributed to these new graduate nurses' *thinking, judgements* and *responses* in similar AND contrasting clinical contexts.

7.7 Beyond advanced beginners on entry to practice?

The new graduates within this research appeared to have understood the reasons and connections of their actions rather than 'just doing something' as Newton and McKenna (2007) found with the new nurses they interviewed. The question is again posed - what would have been the outcome for the patients in the above vignettes if the new graduate nurses had not been empowered to intervene and respond early?

Returning to Kirkpatrick's four levels of evaluating training programs (Section 3.1) the findings of the follow-up study in this research aligns with attainment of level 3 (impact on job behaviours) and potentially on patient outcomes. However, of equal interest is that simulation appears to enable students to embody practice and move towards a higher level of inquiry and situational awareness in their practice similar to the *advanced beginner* or *competent* stage of skill acquisition as Benner (1984, 2004) and Dreyfus and Dreyfus (1986) describe. Evidence of students' increased *noticing* and appropriate *responding* (Tanner 2006) in practice situations were illustrated on numerous occasions throughout the research findings.

7.8 Strengths and Limitations of the research

Strengths

The use of a mixed methods approach in the research, to examine the impact of simulation on the 'thinking aspects' of clinical practice, provided quantitative information as well as rich descriptions about students' subsequent practice. The contributions of simulation for three student groups were reported. This kind of data is *seldom found in existing literature*; and greater similarities were found across groups in their learning and judgements than were differences. Greater insights about the influence of simulations on the holistic elements of practice were drawn from the conversations with the small student group at two time points - the end of the degree program and in the early months of practice. Early follow-up into practice was deliberate, to ensure that recall of the university simulations was still fresh in their minds and connections could be explored. This research approach has *rarely* been used in studies about healthcare simulation and is applicable for other health disciplines.

To capture the contribution of simulation for practice requires *temporal* or *longitudinal* tracking of the same study participants over time rather than 'snapshots in time' as afforded by pre- post- surveys alone. The explanatory, mixed methods approach used in

this research provides an example of how to undertake temporal investigation and offers beginning insights about the multiple perspectives and effects of simulation on clinical judgement and practice. In focusing the research on the contribution of simulation for clinical judgement, the *socio-cultural ways of learning* and the benefits of simulation in preparing students for practice were further elucidated, framed within concepts drawn from a range of educational learning theories. The study approaches and findings address gaps in the 'translational science' area of simulation research where occurrences in the laboratory translate to evidence of use at the bedside (McGaghie et al. 2011a). However, investigation of the behavioural aspects of learning and practice align better with the socio-cultural research orientations which reflect what occurs in practice (Hager 2011; van der Zwet et al. 2010; White 2010).

Caveats

The findings of the research undertaken need to be considered within the study context. In this context, the simulations students experienced were well planned and organised, and delivered by experienced nurse academics who understood and applied the 'best practices' in simulation methods (Arthur, Levett-Jones & Kable 2013; Jeffries 2007). These aspects of planning and delivery have likely influenced the research findings. If the simulation learning experiences were provided in a less structured manner, with little account for recommended approaches, more negative findings might have been reported.

Given that the recruitment processes followed ethical principles, the findings reported from these participants who were willing to share their simulation experiences provide legitimate accounts to inform the body of evidence attributed to, and ongoing practices within, simulation. Some participants had 3-4 simulation experiences over the preceding two years, which suggested that occasions for repeated and diverse simulation experiences potentially provided a cumulative effect on their learning.

Limitations

The research was undertaken at a single site so the findings may not be generalisable for other sites and cultures. Overall, the follow-up student group had more and different simulation experiences than the larger student group (Study 1), so their particular interest in the learning strategy and their positive experiences may have biased them to participate in the research and the research data. Additionally there were more males in Study 2 (5/9; 55%) compared with Study 1 (9/108; 8.3%) however the impact of this difference on study findings is unclear. Validity of the pre and post simulation surveys also needs to formally be established.

Rather than experiencing the same roles within simulations, participants took on a variety of active and passive roles across the study period which would account for different perspectives. The influence of audio-visual playback on study findings, available for the 2009 cohort but not for the 2010 cohort, is unknown and difficult to determine at this point. However, the doctoral research findings offer important impressions of what simulation can offer particularly in the area of clinical judgement and influence of simulation on subsequent clinical practice.

Relationships between the researcher as teacher and the students were acknowledged as also having potential impact on the data, but steps were taken to mitigate this issue as described earlier (see Section 5.4).

Some may consider the size of the student group who were interviewed to be small. However richly descriptive data were sourced from this small group of participants to provide a good sense of the impact of simulation for their learning, thinking and practice.

7.9 Contribution of the research to ongoing simulation practices and research

Healthcare simulation practices and research are maturing. Ways of evaluating 'the impact' of simulation are moving beyond measuring or quantifying technical modes of skills to examining the influences on subsequent holistic practices and patient outcomes. This research contributes to this endeavour and offers perspectives gained through a mixed methods research approach using temporal or longitudinal follow up. As interest and investment in simulation continues worldwide, qualifying the breadth of benefits conferred with this different learning modality will inform and influence future directions of simulation practices.

In relation to increasing the learner's focus, and so augment clinical judgement, attention to two facets within simulations are recommended from this research: inclusion of some degree of guidance by the academic or tutor; and use of a rubric or observation guide for those watching the action. The former is evident from students' post-survey rankings of *What matters most?* in simulations (Kelly et al., 2014), and the latter is an area of current investigation as a consequence of the doctoral research.

Additional areas for investigation arising from this research include ascertaining if entry level practitioners who have experienced a program of simulation in their degree: achieve their required practice competencies quicker; cope better with the issues around socialising into practice and; progress more rapidly towards 'expert' practice. Further, the influence of the predominant roles experienced in simulation, be that mostly active or observer roles, on the *noticing* abilities of new graduates would be an interesting tangent to explore.

As the new graduates in this research appeared to manage and cope with the registered nurse role without considerable difficulty and were at ease within the healthcare team,

increased use of simulation in preparing students for practice could be advocated or mandated. However the quality of simulation delivery and facilitator expertise is critical to positive experiences and meaningful learning.

Chapter 8: Conclusions and Implications

Within this thesis, multiple aspects of the contribution of healthcare simulations for nursing students' learning and the influence of these experiences for subsequent clinical practice have been explored. The focus of the research has been how simulations have assisted students' to develop and apply clinical judgement for the all-encompassing registered nurse role. The research has provided a number of unique perspectives which address gaps in the healthcare simulation literature and provide new insights for simulation practices.

8.1 New insights from the research

The longitudinal research method used in this study enabled investigation about the longer term impact of simulation beyond the immediate learning experiences. The research findings have contributed to understanding how 'simulation works' in subsequent clinical practice and how clinicians' performance has been influenced by the simulation learning. Exemplars have illustrated how students' processed the learning through simulation in a number of diverse ways and how they recalled the learning experiences in similar AND different patient care contexts. In some instances, these new graduate nurses immediately responded to patient parameters they were concerned about which favourably influenced patient management. The question was posed – what would have been the patient outcomes if these new graduate nurses had not intervened? Such examples provide insight about the contribution of simulation to improved patient outcomes.

8.1.1 Providing meaningful simulation learning experiences – for all student groups

Within this study, participants were drawn from three types of student groups – the 3-year, 2-year accelerated EN and 2-year accelerated GE students, who come together in the final year of the Bachelor of Nursing program. Although the students had different backgrounds, cultural beliefs and life experiences, the findings of this research

demonstrate equitable benefit of simulation learning for all students irrespective of the study stream. Rather, the diversity provided by the eclectic mix of 'what students brought to the simulation' conferred variety and depth on the learning experiences. Yet, the ways in which students processed the simulations for their learning and practice demonstrate individual and unique benefits of simulation, benefits which are difficult to pre-determine. Reflection played a key role in what students learned, and when and how they realised such benefits.

8.1.2 The contribution of simulation for clinical judgement and nursing practice

Participants in this research demonstrated application of clinical judgement in the workplace which was influenced significantly by their simulation experiences. For some, the simulations had a profound effect on the 'thinking' and 'doing' aspects of their practice because they were able to embody practice and gain a deeper appreciation of the registered nurse role. There are implications here for greater job satisfaction from the new graduate's perspective and for workforce retention from the employer's viewpoint. Investigation of these areas would further elucidate the wider benefits of simulation in undergraduate programs to the healthcare workforce.

8.1.3 Simulation learning – the central pedagogies

Aligning simulation activities with contemporary learning theories confers benefit for the delivery and resultant impact. This research has highlighted that concepts from several learning theories are relevant and applicable to healthcare simulation, hence it is not necessary to subscribe to just ONE learning theory. With the intent to develop the holism of practice, simulations which enable students to 'walk in the shoes' of the registered nurse – or relevant health professional – create opportunities for informal learning, drawing on the internal goods (thinking; reasoning) as well as incorporating the technical skills and artefacts (external goods) available within the learning spaces. For novices, working alongside a 'master' within a community of practice was highly rated. This is a timely reminder of the powerful impact that modelling expert practice has on nurses who are still developing their repertoire of practice.

Overall, this research has provided strong evidence that well-prepared and professionally delivered simulations should play a vital role in nursing and other healthcare education well into the foreseeable future.

List of Appendices

Appendix A: Tanner's Model of Clinical Judgment

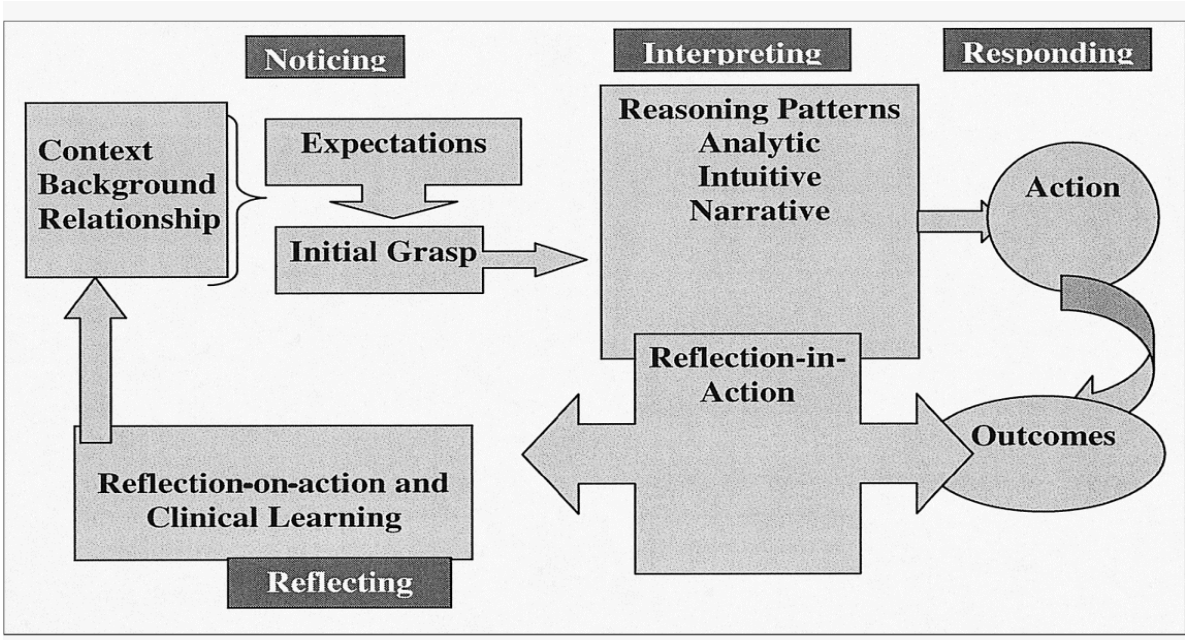

Figure. Clinical Judgment Model.

Source: Journal of Nursing Education Thinking Like a Nurse: June 2006, Vol. 45, No. 6, A Research-Based Model of Clinical Judgment in Nursing Copyright: Christine A. Tanner, PhD, RN

There are 4 phases to the model listed below, with some descriptors:

Noticing	focused observation; recognising deviations from expected patterns; information seeking
Interpreting	prioritising data; making sense of data
Responding	calm, confident manner; clear communication; well-planned intervention/flexibility; being skillful
Reflecting	evaluation/self-analysis; commitment to improvement

Appendix B: Pre simulation survey

As a 3rd year nursing student, how would you rate your current level of ability / knowledge of the following? **(Circle most appropriate answer)**

1. Theory

a. Pathophysiology

Need to improve a lot	Need to improve a little	Sound	Above average

b. Analysing diagnostic and laboratory data for patient care

Need to improve a lot	Need to improve a little	Sound	Above average

2. Clinical

a. Applying pathophysiology concepts/ diagnostic and laboratory data to patients' signs and symptoms

Need to improve a lot	Need to improve a little	Sound	Above average

b. Communicating with other RNs or doctors regarding patient management

Need to improve a lot	Need to improve a little	Sound	Above average

Overall, how would you rate your current level of:

Theoretical knowledge (1 a & b)	beginning /	developing /	accomplished /	exemplary
Clinical knowledge (2 a & b)	beginning /	developing /	accomplished /	exemplary

Where do you feel least able or lacking in your current knowledge of nursing practice?

Demographic information (circle the closest response/s unless indicated)

Indicate the grouping / campus which best describes your program:

3 YEAR PROGRAM: (*City OR Kgai)* ACCELERATED PROGRAM: (*EN OR Graduate Entry)*

I am: male / female

Age _____ years

Highest educational qualification:

HSC Cert IV Bachelor Degree PG cert PG diploma Masters PhD

Years experience in nursing (EXCLUDING BN CLINICAL PRACTICUM): _____ years

Where have you worked in nursing? (please list):

Other occupations and work – please provide brief details:

Within course clinical and patient care simulations:

	No. of previous simulations	Subject Name
My 1st year of BN		
My 2nd year of BN		
My 3rd year of BN (3 year program)		

Appendix C: Post-simulation survey

Have you cared for a patient with this or similar medical condition? If yes, provide brief details.

Following this simulation experience, what are the areas you most want to learn more about?

What things might you do differently if you encounter this kind of situation again (in clinical)?

How could simulations be used to help you practice as a Registered Nurse?

What was your role today?

Recall the 4 elements of the Clinical Judgment Model – noticing, interpreting, responding and reflection.

Rate the following elements of the patient care simulation which assisted with applying clinical judgment.

(1= little assistance and 5 = greatly assisted)

Patient case notes	1	2	3	4	5
Patient care scenario topic	1	2	3	4	5
Briefing and orientation to the simulation area	1	2	3	4	5
Participation in the simulation encounter	1	2	3	4	5
Participation in a role	1	2	3	4	5
Asking questions of the patient and others	1	2	3	4	5
Observing others and making notes	1	2	3	4	5
Guidance by the academic	1	2	3	4	5
Facilitated debriefing	1	2	3	4	5
Viewing the simulation recording	1	2	3	4	5
Post-simulation reflection	1	2	3	4	5

Appendix D: Group interview questions

What was it like participating in the simulation/s?

What was most memorable & / or helpful for you?

You've been on clinical since the simulation – was anything different for you this time?

The 4 phases of the clinical judgment model are: NOTICING, INTERPRETING, RESPONDING & REFLECTING.

What aspects of simulation might help address these phases?

What experiences in simulation might help prepare you for RN practice?

Notes from:

Dawson, S., Manderson, L., & Tallo, V.L. (1993) *A manual for the use of focus groups*. Boston; International Nutrition Foundation for Developing Countries.

Sampling – purposive / convenience; To investigate attitudes, opinions, beliefs of understand a new area (p28)

Set up & running

1-2 hours, 2-3 topics; Trial questions & reword. Pre-test if time.

Audio record -> transcripts (p36); 8 ideal, minimum 4 (p73)

Pauses/ eye contact to encourage shy people (p80)

If some are too talkative, lose eye contact & be ready with another question during a pause.

Clarifying / reinforcing questions (p79)

e.g. "tell me more ..." "I don't understand ..." "Give an example of what you mean ..."

Rephrasing / hypothetical questions

Reminder questions "X you told us ..., Y does anything ... for you?"

Appendix E: Follow-up interview questions

When did you start your NG program and work? (Same?)

How have things been since you started work as an RN?

Did you work in between finishing uni & starting the NG program?

What has been the most enjoyable part/s of working as a NG?

What has been the most challenging part/s of working as a NG?

Thinking back to the BN, what do you think has helped most in preparing you to be an RN?

You may remember the model of clinical judgement, I'd like to ask about the 4 elements in particular noticing. Do you feel you "notice" things in your work? What helped developed this?

Anything else you would like to add?

Appendix F: Schedule for follow-up interviews (2010)

Name	Date & Time	Venue	Confirmed	Critical care sim	Hospital sim	New Graduate since
Mark	29th April 3pm	Kgai campus cafeteria	Y	Y	Y	1st February (3 months)
Jason	29th June 9.30am	City lab 124		N	Y	27th April (2 months)
Debra	12th June, 1pm	Cafe	Y	Y	Y	8th February (4 months)
TIng	23rd April 10am	City – sim lab	Y	Y	N	8th February (2 ½ months)
Mary	17th June 3.30pm	City lab 124	Y	N	Y	15th February (4 months)
Benita	5th May 1pm	Kgai campus cafeteria/ classroom	Y	N	Y	1st March (2 months)
Andy	24th May 5pm	Kgai cafeteria	Y	Y	N	22nd February (3 months)
Alex	11th May 3.30pm	City – meeting room L6	Y	Y	N	1st January (4 ½ months)
Lilly	1st June 1pm	City lab 7.124	Y	N	N	8th March (3 months)

Appendix G: Information letter and consent (Phase/Study 1)

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INFORMATION LETTER AND CONSENT FORM (Phase 1)

Doctoral research: Investigating the use of simulation in enhancing clinical judgement of nursing students to practice as Registered Nurses

Phase 1 - Within class questionnaires

The aim of this study is to seek feedback from a sample of 3rd year Bachelor of Nursing students regarding learning and clinical judgment in simulation scenarios and how this may assist with practicing as a registered nurse. Your tutorial group has been selected to participate in phase 1 of this research.

I understand that the purpose of Phase 1 of this study is to investigate what types of learning occur within simulations, if simulation enhances clinical judgment and to determine which factors within the simulation assist participants' to apply clinical judgment.

I understand that my participation in this research will involve completing 2 questionnaires within class time (before and after the simulation activity) and agree to allow the researcher access to my responses to the "rating of clinical judgment" form completed before the simulation. The usual audiovisual recording of the simulation will be securely and confidentially kept for the purposes of this research and only the doctoral student and 2 supervisors will have access to these materials. These materials will be destroyed in 2017 in accordance with UTS policy.

I am aware that I can contact Michelle Kelly or her supervisor Professor Paul Hager (Tel 02 95143826 or email Paul.Hager@uts.edu.au) if I have any concerns about the research. I understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason. I also understand that if I withdraw from this research is will not prejudice my academic progress or relationship with the researcher/ academic.

I agree that Michelle Kelly (doctoral student) has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

I _____ *(participant's name)* agree to participate in the research project "Investigating the use of simulation in enhancing clinical judgment of nursing students to practice as Registered Nurses" (UTS HREC approval reference number 2009-268) being conducted by Michelle Kelly (PO Box 123, Broadway 2007, Tel: 02 95144815 or email Michelle.Kelly@uts.edu.au) of the University of Technology, Sydney for her degree: Doctor of Philosophy.

_____ ____/____/____
Signature (participant)

_____ ____/____/____
Signature (researcher or delegate)

NOTE:
This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: 02 9514 9615, Research.Ethics@uts.edu.au) and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Coded number _____

Appendix H: Information letter and consent (Phases 2 & 3; Study 2)

Coded number _____

UNIVERSITY OF TECHNOLOGY SYDNEY

INFORMATION LETTER AND CONSENT FORM

Doctoral research: Investigating the use of simulation in enhancing clinical judgment of nursing students to practice as Registered Nurses (RNs)

Phases 2 and 3 – Focus group discussions and follow-up in practice (2010)

The aim of this study is to seek feedback from 3rd year Bachelor of Nursing students regarding learning and clinical judgment in simulation scenarios and how this may assist with practicing as a registered nurse.

Phase 2 of this research will involve participating in a focus group session and answering questions from the facilitator or researcher. I understand the focus group discussions will be recorded (audiovisual). The facilitator is an experienced researcher and agrees to keep content of discussions confidential.

The purpose of Phase 3 of this study is to investigate what aspects of the course and the simulations helped me to practice as a RN. Participation in this phase will involve meeting with the researcher in my own time (no greater than 1 hour in an agreed neutral location), completing the "rating of clinical judgment" table and answering questions about how the course and simulations has assisted with my work as a RN. I understand this interview will be audiotaped.

In addition, the researcher would like to contact and interview a work supervisor/ educator (recommended by you) to ask questions regarding your performance as a new graduate Registered Nurse. Informal and confidential audiorecorded interviews will take place in an agreed off site location, and discussions will only focus on your performance relative to the research aims.

All materials produced in Phase 2 and 3 will be securely and confidentially kept for the purposes of this research and only accessed by the doctoral student and 2 supervisors. These materials will be destroyed in 2017 in accordance with UTS policy.

I am aware that I can contact Michelle Kelly or her supervisor Professor Paul Hager (Tel 02 95143826 or email Paul.Hager@uts.edu.au) if I have any concerns about the research. I understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason. I also understand that if I withdraw from this research is will not prejudice my academic progress or relationship with the researcher/ academic.

I agree that Michelle Kelly (doctoral student) has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

I _____ *(participant's name)* agree to participate in (tick relevant box/s)

Phase 2 ☐ and Phase 3 ☐ of the research project "Investigating the use of simulation in enhancing clinical judgment of nursing students to practice as Registered Nurses" (UTS HREC approval reference number 2009-268) being conducted by Michelle Kelly (PO Box 123, Broadway 2007, Tel: 02 95144815 or email Michelle.Kelly@uts.edu.au) of the University of Technology, Sydney for her degree: Doctor of Philosophy.

_____ ____/____/____
Signature (participant)

_____ ____/____/____
Signature (researcher or delegate)

My best contact methods for 2010 are:

Email: **Phone:** **Mobile:**

NOTE:
This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: 02 9514 9615, Research.Ethics@uts.edu.au) and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Appendix I: Standard confidentiality and recording agreement

Faculty of Nursing, Midwifery and Health

University of Technology, Sydney

Simulation confidentiality and recording agreement

As a participant in the simulation I understand that the content of this simulation is to be kept confidential to maintain the integrity of the learning experience for me and my fellow students. I also understand that in working side by side with my fellow students, I will be witnessing their performance. It would be unethical for me to share information regarding student performance with persons outside the clinical practice laboratory.

I therefore agree to uphold this request to maintain confidentiality about participant's performance and details of this activity.

The simulation may be audio-visually recorded to enable review of team performance and debriefing on the day of the simulation. I consent to the use of such material for the purposes of the research.

Student name _____

Student signature _____

Witness name _____

Witness signature _____

Date _____

Appendix J: Types of simulated patient cases, students' roles and level of academic guidance

Simulation type	Patient context	Student Roles	Level of academic guidance
Paediatric (Year 2)	Assessment of a hospitalised 'well' child (manikin) in the presence of a mother.	RN1: determine heart rate and respiratory rate while responding to questions from the mother. Mother: interrupt the nurse with questions during the assessment.	Was available in the lab to troubleshoot questions about manikin assessment, and ensure realistic responses from the 'mother'. Facilitated the debriefing session.
Critical Care (Year 3 / elective)	Trauma patient in the emergency department setting (phase 1) and intensive care setting (phase 2). A set of car keys was hidden under a bed sheet, underneath the patient. Students were expected to find the keys during secondary physical assessment when log rolling the patient onto his side. Patient reacts to medications and other treatments requiring DC shock; intubation.	Triage Nurse – provided handover to commence the simulation RN 1 – primary nurse caring for the patient; oversees the secondary physical assessment; delegates tasks. RN 2 – to assist RN1 Team Leader – in charge of the shift; able to provide assistance if required; communicate with other services/ relatives. Relative/s – when prompted, entered the simulation asking questions about their relative; concerned and anxious.	Played the role of the Medical Officer. Entered the simulation when called by the nurses (via telephone or pager); or when momentum in the action was waning. Initiated and supported the nurses during advanced clinical procedures (intubation, defibrillation). Facilitated the debriefing session.

Simulation type	Patient context	Student Roles	Level of academic guidance
Interdisciplinary (hospital/ voluntary)	2 cases which commonly occur during after hours or on weekends – when junior staff are working. Insidious alteration to respiratory function (atelectasis); insidious alteration to cardiovascular function (hypovolaemia).	In pairs, the nurses assess the patient and alert the 'medical officers'; in pairs, the medical students examine the patient and determine relevant actions, including a phone call to a senior medical officer or initiating a rapid review response.	Preparatory session about assessing and responding to a deteriorating patient. Guiding the simulation through the manikin's vocal responses. Facilitated the debriefing session.

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