Radiography assessment for practice: A critical practice enquiry

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Certificate of Authorship

I hereby declare that this submission is my own work and to the best of my knowledge and belief, understand that it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Charles Sturt University or any other educational institution, except where due acknowledgement is made in the dissertation. Any contribution made to the research by colleagues with whom I have worked at Charles Sturt University or elsewhere during my candidature is fully acknowledged.

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Ethics Approval

As I was employed at two different institutions while this research was being conducted (initially the University of Sydney and subsequently Charles Sturt University), the issue of ethics approval needed to be considered for both universities. The data collection stage of the research was conducted while I was employed at the University of Sydney, so Charles Sturt University ethics approval was not required. Approval was gained from the University of Sydney Human Research Ethics Committee (HREC) (approval number 13568) (see Appendix A).

Ethics approval to include staff from New South Wales Health (NSW Health) institutions as participants can, by government regulation, be granted by one NSW Health institution. Therefore, ethics approval was sought and gained from Concord Repatriation General Hospital’s HREC (approval number HREC/11/CRGH/27—CH62/6/2011-022) (see Appendix A).

Ethics approval from each of the United Kingdom universities involved in the research was granted based on the University of Sydney HREC approval.
Publications Resulting from this Research


Abstract

Workplace learning (WPL) is integral to most professional entry degrees in healthcare. To be registered as healthcare professionals, graduates need to have proved their capability during WPL to achieve registration. Proving capability requires an assessment approach which considers the contextual variability of professional practice. The aim of this research was to develop an approach to assess undergraduate radiography students’ WPL capability. I chose radiography as this is the profession in which I am qualified and experienced, and in which I teach undergraduate students the skills and capabilities they practise during WPL.

As an assessor of radiography students’ WPL capability for over 20 years, and a radiography academic for over 10 years, I have first-hand experience of WPL assessment practices from workplace and university perspectives. This led to several observations. Firstly, unlike many other healthcare professions, undergraduate radiography degrees in Australia do not have uniform practices for assessing WPL capability. Secondly, current radiography WPL assessment practices assess competency, but largely neglect capability. Thirdly, current practices highlight that the radiography profession is having some difficulty breaking away from focusing purely on technical skills, and acknowledging that radiography professional practice shares commonalities with other healthcare professions.

This study is located in the interpretive paradigm, within which a deconstruction-reconstruction method was employed. The overarching research question was: What is an optimal method for assessing the clinical capability of radiography students? To answer this question three research sub-questions were posed:

A. What are the perceived challenges and issues in contemporary radiography WPL assessment?
B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?
C. What assessment approaches lend themselves for assessing the key capabilities in a meaningful way in the context of A and B?

Current radiography WPL capability assessment practices were deconstructed in the light of contemporary literature regarding assessment in higher education. Surveys, interviews and focus groups with stakeholders were undertaken. This empirical data was used to reconstruct a radiography WPL capability assessment approach, piloted with radiography clinical assessors working with students from two Australian universities. Their opinions were sought via survey.
The deconstruction process examined the nature of professional practice in the literature; it was deemed to be interactional, dynamic and contextual in nature. These aspects of professional practice were found to be integral to assessment of radiography WPL capability, but not to the neglect of the technical aspects of radiography practice currently assessed. Therefore, the assessment approach developed needed to adequately assess all these aspects of practice.

This study clearly pointed to different assessment strategies being necessary for assessing professional practice. Because professional practice does not occur in isolation, but rather forms part of a complex whole, it was determined that the different assessment strategies should occur in parallel, producing a multidimensional assessment approach. This approach assesses student capability in professional practice utilising professional judgement of workplace assessors, structured reflective journals assessed by university academics, and assessment of technical competence by workplace assessors.
CHAPTER 1
INTRODUCTION

This thesis explores the nature of assessment practices in radiography workplace learning (WPL) with a focus on assessing practice capabilities. It examines the nature of WPL in healthcare education in general, drawing on the pertinent literature to critically analyse current thought on assessment of WPL performance, and analysing current assessment practice in relation to radiography students’ performance during WPL. In later chapters I will increasingly interpret performance as capability. The findings from examining the literature, conducting interviews and focus groups with radiography students, academics, placement supervisors and experts in the field, and the analysis of current practice are synthesised to make recommendations for the future of WPL capability assessment in radiography. I will use the terms WPL performance assessment and WPL capability assessment to refer to the demonstrated performance or capabilities of students during their WPL placements. At times the literature mentions WPL assessment as a general term; when reporting this literature terminology, I am clearly referring to assessment of students’ performance not the educational program or teachers’ performances or programs during WPL. That is the topic of other research.

In this opening chapter I discuss the interest that led to this research, give an introduction to current practice, introduce the research phenomenon and research questions on which the research is based, give an overview of the research method and the structure of the thesis, and discuss the significance of the study.

1.1 WHY I AM INTERESTED IN THIS RESEARCH

Whilst working as a WPL supervisor, I found it concerning that I was expected to assess students’ performance using quite different assessment tools to help ensure that graduates achieved consistency and equivalence in performance, knowledge, skills and attributes regardless of which university they graduated from. As a workplace assessor, I found it challenging to move from one university’s form of WPL capability assessment to another, trying to grade student performances so that they were comparable. More worryingly, many of the university assessment forms that I was expected to fill out did not have any standards or rubrics incorporated in them. As a workplace assessor, I was expected to allocate a numerical grade, with no explanation as to what each numerical value meant. When performance descriptors were provided, they were often vague and wide open to interpretation. I began to reflect on what was actually being assessed in regard to students’ current practice capabilities. I asked what defines a capable medical imaging professional, and whether there might be a better way
to assess students’ workplace performance and capabilities during WPL. The radiography profession has not engaged with capability and its assessment in WPL, but rather has restricted itself to assessment of specific competencies. However, a health practitioner should demonstrate capability to be considered ready to practice (Watson, 1999), meaning that radiography practitioners need to be assessed in terms of capability, not just competence. This will be further clearly defined in Chapter 3.

I found these inherent challenges of assessing student performance fascinating and as a result commenced a path of research to compare current practice with what the literature described as best practice. I began to experiment with different ways of undertaking the assessments within the frameworks provided by the universities. One particular method I experimented with was getting students to fill out their own assessment forms as a first step prior to reviewing and amending their ratings as needed. I found this assessment method forced students to reflect on their own performance, and that they were invariably honest with their self-appraisals.

In 2007, I moved from the clinical to the academic environment, commencing as Clinical Education Coordinator for the radiography course at the University of Sydney. It was immediately apparent that there were a number of issues with the assessments that were used in students’ WPL placements. These included:

- the requirement for numerical scores in each assessment category, with no description of what each numerical ranking actually meant, or what behaviour, skill or attribute the category actually described;
- assessment categories for the professional behaviour of students were not provided, with the exception of broad descriptions such as “Interpersonal Skills”;
- students attending the same placement sites receiving the same score across all assessment categories, regardless of students having widely disparate skill sets;
- scores and comments on students’ assessment forms lacking consistency and evidence;
- students receiving a passing grade on the WPL capability assessment form when WPL supervisors had personally told me that they deserved a fail;
- the vast majority of students receiving scores that led to “High Distinction” or “Distinction” grades, when some of them quite clearly did not perform at that level as defined by the WPL subject outlines; and
- the performance of students at every stage of study in the course measured against the same criteria, instead of workplace educators adjusting expectations according to progression across the course in students’ experience and knowledge.
To understand the state of assessment of WPL performance in radiography at the time my research commenced in 2010—and how it remains in some places today in Australian undergraduate degrees—it is important to understand the background to the profession in Australia. My approach to this topic is influenced by my experience in this area. I will now describe both the history of the profession in Australia, and my experience in the profession.

Radiography, or medical imaging as it is sometimes called, is a profession that I have been involved in within Australia since 1983 when I started the Associate Diploma of Medical Radiography at the Sydney College of Technical and Further Education (TAFE). Since graduating in 1985, I have worked in a number of private and public settings, in both metropolitan and regional centres in New South Wales, Australia.

After graduation and until I ceased full-time clinical practice in 2007, I worked as a clinician responsible for the workplace supervision of students. Since then, while employed in academia at the University of Sydney and Charles Sturt University, I have been responsible for managing the WPL component of undergraduate and postgraduate courses in radiography.

For the entirety of my employment in academia, I have maintained a part-time clinical job, first at Concord Repatriation General Hospital, and then at Wagga Wagga Base Hospital. I have used this part-time role to mentor students who are struggling with clinical practice—inviting them to work with me one-on-one. Because of this experience in both the clinical and academic realms of the profession, I understand from a practical perspective what the assessor role is like for WPL supervisors. Most WPL supervisors have not worked in academia, so have limited understanding of its requirements. The majority of radiography academics have not worked clinically for many years, so have limited understanding or hold somewhat outdated concepts of contemporary good workplace supervision. I am in the unique position of having currency and experience in both domains, so am ideally placed to carry out this research.

I have supervised and assessed students from Charles Sturt University, the University of Sydney, the University of Newcastle, Monash University, RMIT University and the University of South Australia. All of these universities have different methods of assessing students’ performance during WPL, which WPL supervisors must interpret and adapt to. With the added complexity of some WPL performance assessments being graded on a continuum and others as pass/fail, WPL supervisors must somehow assess students who are training for the same profession and learning the same skills using a plethora of different methods. I reasoned that this must have serious negative effects on the transferability and dependability of WPL assessments and add an unnecessary burden on WPL supervisors. In this research I will also introduce the argument that the goal of WPL is to facilitate learners’ practice capability development, so I will also be
considering how assessment tools should focus on practice capabilities within students rather than their behaviour and performance only.

While attending university school or discipline assessment meetings, I was under pressure from colleagues to address these and other issues. In particular, colleagues suggested that assessment of students' performance during WPL should be pass/fail only. I strongly disagreed, feeling that students who demonstrate high achievement should not have the same grade on their transcripts as those who did “just enough” to get by. I reasoned that a lack of something tangible to distinguish high achievers from students who practised surface learning only, would discourage the high achievers from continuing with their extra efforts.

I also noticed a reluctance on the part of clinical supervisors to fail students who clearly deserved to fail. There were many situations during my personal experience as a WPL academic where a clinical supervisor would phone to tell me that a student was not performing at a pass standard, yet they would still mark them highly in their end-of-placement assessments. This disconnect indicated that the assessment processes perhaps did not facilitate the supervisors’ ability to accurately assess true student performance, or that cultural issues existed within the profession whereby clinical educators were reluctant to fail students, even when student performance indicated that doing so was both justifiable and necessary. Perhaps there were elements of both.

It is important to remember that apart from the formative assessment goal of providing feedback to students and promoting their learning through assessment, assessors (practitioners operating as WPL supervisors as well as academics) are serving their community through the goals and practice of summative assessment, to ensure that graduates have achieved satisfactory standards to deserve graduation and a licence to practise.

Further dissatisfaction in assessment arose as I noted that all of the WPL performance assessment processes I had been acquainted with in my profession were designed as if the assessment of student performance and capabilities could be achieved satisfactorily using the same principles as assessment of on-campus academic content. The more I reflected on the way assessment of students’ performance during WPL currently occurred, the more I realised there were fundamental differences between the content and nature of assessment associated with WPL and on-campus/online academic learning and performance that needed to be addressed.

These issues, and my belief that current methods of assessing students’ performance during WPL in radiography education could be improved upon, formed the foundation of this thesis. One of my first steps was to research current literature in the field of assessment—in particular WPL performance and capability assessment—and investigate how this could be applied to education in my profession. WPL capability assessments in other health professions were studied particularly in those professions where an Australian national assessment tool had been
implemented. These professions included Occupational Therapy, Physiotherapy, Speech Language Pathology, and Radiation Therapy.

Preliminary investigations suggested that grades influence students’ learning by providing motivation and encouraging engagement with future courses (Sadler, 2009b). As Yorke (2011b) points out, if WPL is considered an integral part of the curriculum, assessing it as pass/fail gives unequal weighting to theory and practice. Students who have a strong commitment to their WPL performance should have that formally recognised in their grades (Sadler, 2009b).

Literature suggests healthcare professions provide an atmosphere of tension between roles for WPL supervisors. It has been suggested that radiography WPL supervisors’ dual roles as assessor and mentor can lead to a conflict that falls in favour of the mentor role, with the occupational culture of health “care” causing an implicit resistance to judging students negatively (Burchell, Higgs, & Murray, 1999). Further research suggests this is a widespread cultural practice across WPL in general, not limited to healthcare professions, with WPL supervisors not wanting the responsibility for failing students to rest with them (Smith & Wilson, 1992).

Duffy (2003) suggests that failing students can be difficult, pointing to the personal, emotional, and practical issues that arise from having to fail a student. Luhanga, Yonge, and Myrick (2008) suggest that this reluctance to fail students may also be due to a spate of other factors, including lack of experience as a WPL supervisor, reluctance to incur students’ personnel cost, personal feelings of guilt or shame, complacency or reluctance to assume the extra workload, and lack of appropriate evaluation tools and time to evaluate sufficiently. The literature points to many factors, common to many professions, that lead to student WPL assessment not being a transferable and dependable reflection of their true performance.

On-campus academic and WPL contexts are different, and thus must be assessed differently. The differences in the two modes of learning are such that while some basic principles are consistent between the two, there are some fundamental differences that mean the psychometric, tick-box methods used to grade on-campus content are not easily transferrable to the assessment of WPL performance (Yorke, 2011a). Trede and Smith (2014) agree, pointing out that assessment of WPL performance should be liberated from the narrow perspectives that have led to its assessment being treated as if it were no different from on-campus content. To assess WPL performance as if it consisted exclusively of academic achievement is to not acknowledge the unique, situated nature of each WPL performance that is assessed. In a WPL context, the learning that is to be assessed is a progressively expanding capacity to immerse oneself in socially situated collaborative practice, and make holistic judgements in novel situations (Hager, 2004).
Analysis of the relevant literature, and of the WPL performance assessments of students whose progress I was responsible for monitoring, led to questions about current practice in this area. These questions included:

- how to manage the lack of credibility of WPL performance assessments where it was obvious that minimum thought and effort had been applied;
- how to achieve transferability and dependability of what was being assessed and how it was being assessed across a range of different clinical sites;
- how to help students improve their clinical performance based on assessment feedback; and
- how to ensure that WPL performance assessment was reporting on required graduate attributes for radiographers.

It became clear that the assessment of WPL student performance in the radiography profession was under researched and lacked a theoretical underpinning. An inappropriate and obsolete paradigm of WPL assessment was being employed by universities, despite it being used to determine the progression of students into a professional career in health. I became convinced that, for the good of not only the profession and its graduates, but also the patients they would be looking after in the future, I needed to address these current inadequacies, and research a better way to deal with such an important issue.

1.2 CURRENT PRACTICE, HOW IT MIGHT BE IMPROVED AND UNDERSTANDING WPL CAPABILITY ASSESSMENT

In attempting to improve current assessment methods, it is important to have a well-articulated underpinning as to what constitutes good assessment of practice capability in radiography. In order to achieve unconditional registration by the Australian Health Practitioner Regulation Agency (AHPRA), graduates from a radiography program must demonstrate that a comprehensive list of capabilities is met. It is unreasonable to expect that students in more junior years of their course should be measured by the standards expected of a graduate. However, problematically, most current WPL performance assessment practice assesses students at every stage of their course against the same standards, without taking into account expected levels of translating knowledge in a practice situation and learning from practice experience for future practices.

Current practice in assessment of WPL performance of Australian radiography students largely follows the traditional tick-box approach, trying to measure scientifically a complex and highly divergent set of interactions (Hodges, 2011). There are variations of this approach, with some courses advocating a visual analogue scale (VAS) (Mishra et al., 2015; Wu, Ohinmaa, Johnson, &
Veugelers, 2013), while others use a numbered scale, and others still use a “pick the best statement from a list” approach. Theoretical bases for assessment also differ, with some courses using the novice to expert model to scaffold their assessments (Dreyfus, 2004) and others having no demonstrable theoretical basis at all. Finally, variations in assessment scoring system also exist, with some universities using a competence-based measurement strategy (pass/fail) and others using an achievement-based scoring system (graded) (Hodges, 2011). With the focus of developing a more holistic assessment approach, these person-centred factors can be brought to the forefront.

This study focuses on radiography WPL capability assessment practice in Australia. Because the author is familiar with the profession and its assessment practices in Australia, an attempt was made to study radiography WPL capability assessment practices in other countries. A search demonstrated that there is a dearth of literature on radiography assessment in any capacity. In fact, searching the literature revealed that in radiography education, assessment practices of WPL capabilities have been largely overlooked. Only one peer-reviewed journal article was found (Burchell, Higgs, & Murray, 1999). This article discussed assessment of competency and emanated from the United Kingdom, further supporting the decision to include the United Kingdom in this research. Although the research focus was on Australian radiography schools it drew comments from radiography academics in the United Kingdom.

Despite these variations in grading, the over-arching philosophy of radiography WPL performance assessment is one measurement of defined knowledge, skills and attributes, with little regard for the situatedness of students’ WPL experience, or latent criteria (Sadler, 1983). As such, it is more assessment of competence than assessment of capability (Fraser & Greenhalgh, 2001). Variables such as patient demographics, case presentations, type of radiology department (private—with patients who are largely ambulant and with no trauma, compared to public—with patients who are often immobile and uncooperative), time of year, location (metropolitan versus regional) and equipment (old versus new), among numerous other factors, are not considered in the WPL performance assessments prescribed by universities. Student factors, including the stage of study students are at and their cultural backgrounds, are also not routinely considered as part of radiography students’ WPL performance assessments. If internal student variables and the external workplace environment are not taken into account in the assessment of radiography students’ practice, the resultant assessment is not a true and transparent reflection of the complexity of the clinical environment, and therefore does not reflect the current capability of students.

Prominent researchers in higher education have discussed the importance of the individual in considering styles of teaching. Sadler (2010) introduces the concept of “attainment paths”,
implying that different individuals can achieve the same end result of learning despite following different paths. In the context of WPL, the desired outcome is progressing towards the capabilities of a qualified, competent practitioner. However, different students will follow different paths to achieve the same endpoint, so it is important that WPL supervisors accommodate and adapt their supervision styles for individual learners. A student’s typical approach to learning, and particularly to learning from feedback, may influence how he or she engages with, and is subsequently affected by, a specific environment or intervention (Wilson & Fowler, 2005). This then suggests that students’ backgrounds, in addition to the learning environment itself, must be taken into account in assessing student WPL performance.

Yorke (2011a) extends these ideas, stating that WPL grading practices are “socially constructed activities” (p. 251) and claiming that they don’t meet the expectations of scientific measurement anyway. Scientific measurement is most useful in the measurement of phenomena that can be assessed quantitatively, such as the number of problems correctly solved in a mathematics examination. From Yorke’s (2011c) perspective, clinical practice is a far more complex construct, and an action that is correct in one circumstance may be inappropriate in another, depending on the circumstances. From this, it can be concluded that attempting to measure WPL performance scientifically or psychometrically may not allow for the wide variety of factors that affect student performance to be taken into account, nor will it allow for all the facets of student WPL capabilities to be adequately considered. This is why in this thesis I avoid the term “measurement” and rather discuss assessment as a professional judgement.

WPL is an integral component of health sciences curricula. As such, the assessment of students’ performance during WPL should have a core place in overall student assessment along with the theory component of a course (Yorke, 2011b). It is important to acknowledge that there are fundamental differences between theoretical knowledge and professional practice knowledge. Theoretical content is taught and assessed in a controlled environment, and every student is assessed using the same or comparable tasks. On-campus content is assessed by the same assessor, or by a team of assessors who moderate each other’s work, thus enhancing consistency. Perhaps more importantly, on-campus assessors are more removed from the personality and individuality of the students whose work they are assessing, whereas WPL assessors see practice context and individuality as an integral part of the student’s performance (Yorke, 2011c).

Researchers have suggested that assessing WPL performance as pass/fail and theory as graded is to imply that the theory is more important than the practice (Yorke, 2011a). Sadler (2009b) extends this concept, stating that grades matter because they have a significant impact on learners and their learning, and they affect motivation and engagement. He further questions
why students should strive to achieve to the fullest extent of their capability when students who
do just enough to pass receive the same result on their academic transcript. On the basis of this
research, it could be concluded that for WPL performance assessment to function effectively, it
needs to have some type of grading scheme.

The second major point about assessing WPL performance is related to the nature of learning in
the workplace. The way that learning happens in a workplace setting is quite different to
theoretical on-campus learning. The experiential learning cycle is a key theory that helps to
explain the nature of WPL (Kolb, 2014). It outlines how experience feeds reflection, which leads
to abstract conceptualisation, which in turn feeds active experimentation, leading to further
experience in a continuous loop. Yorke (2011b) reinterprets the experiential learning cycle as a
spiral, where the learner builds professional practice knowledge with every loop of the spiral.
This knowledge increase needs to be continuous in the WPL environment, and describing
achievement (which will almost certainly be different for every learner) should be the focus of
WPL performance assessment. Engaging in this learning cycle and its assessment may facilitate
deeper learning during WPL for students (Hodges, 2011).

Further, WPL performance assessment should not just assess learning, it should facilitate
learning. This concept is often described in literature as assessment for learning compared to
assessment of learning (Boud & Associates, 2010; O’Donovan, 2004; Sadler, 2010). Students
need to develop learning in and from professional settings. WPL supervisors and students alike
need to be reflective practitioners, with these reflections leading students to reassess their
practice capability, and WPL supervisors to reassess what learning conditions have reaped the
required results (Orrell, Cooper, & Bowden, 2010).

Success in WPL is “centred around reflection” (Walsh, 2007, p. 83). Its success goes beyond the
acquisition of technical skills and involves reviewing experiential learning as a vital component.
Critical reflection on learning experiences is a vital learning mechanism (Wilson & Fowler, 2005).
Both my personal experience and the literature indicate that assessing students’ performance
during WPL requires critical reflection that is initially structured, encouraged, modelled and
taught by WPL supervisors and WPL academics (Orrell et al., 2010). This structured reflection
can be in the form of reflection-on-action, where the event is analysed historically, or reflection-in-action, where the analysis takes place during the event (Finlay, 2008). The Reflective Practitioner, the seminal book by Schon (1983) highlights nuances that occur after an event. These are called reflection-on-action. Reflection-on-action is predominantly employed by novices, or for the purposes of making meaning of professional decisions. He contrasted reflection-on-action with reflection-in-action, which occurs during decision making processes and work procedures. Whichever timing of reflection is applied, there are three fundamental
foci and processes involved in carrying it out: retrospection, where one thinks about a situation historically; self-evaluation, where actions and feelings surrounding the circumstance are analysed critically; and re-orientation, where the outcomes of the critical analysis are used to inform future behaviour (Davies, 2012). This would appear to be important, as a fundamental goal of WPL assessment is to modify future practice in the light of feedback received (Finlay, 2008).

Finally, WPL performance assessment needs to take into account the situatedness of the WPL context. A psychometric assessment of WPL performance does not take into account the contextual, social and relational influences of the WPL environment (Crossley & Jolly, 2012). Trede and Smith (2014) argue that just assessing WPL performance in terms of competence standards is narrow and limiting, and does not take into account factors outside of technical competence; factors which are equally important in the capability of the health professional. They contend, in line with a litany of other researchers, that professional judgement is a suitable tool for assessing student WPL performance and fitness to practise (Gonczi, Hager, & Palmer, 1994; Hager & Gonczi, 1991; Sadler, 2005, 2011). The term “objective” has often been associated with positive connotations in reference to judgements made about student performance. On the other hand, the term “subjective” has been used to describe judgements that have been considered biased and without rational basis. However, experts in WPL performance assessment are clear that in a WPL context, subjective judgements by professionals in the field are actually more reliable than the previously revered psychometric measurement tools. This is one of the critical factors that was investigated in this research. Finally, the thesis turns to the question of what is being assessed and argues that we should be talking about WPL capability assessment more precisely, rather than WPL performance assessment, since health sciences education should be educating for capability.

1.3 RESEARCH PHENOMENON, GOALS AND RESEARCH QUESTIONS

This research focuses on current (at the time of the research—2010–2018) WPL performance assessment practice in Australian radiography courses, and the fundamental principles of sound WPL performance assessment in general. This thesis also focuses on the capabilities required to practise as a radiographer, and the relationships between the principles of WPL capability assessment practice and those capabilities. The research endeavours to apply these relationships to propose a framework of assessment for radiography students’ WPL capability that will provide a method of assessment which will provide valid indicators of students’ capabilities in the context of their particular clinical placement. This context will take into account the category of placement location (private versus public, as earlier described), the degree of experience of the individual student, and other factors which may affect student
ability to demonstrate WPL capability. To summarise, my research phenomenon was the limitations in current radiography WPL capability assessment practice, including a lack of context specific assessment. My research goals were to understand and deconstruct current practices in assessment of student performance during WPL within radiography undergraduate courses in Australia; and to reconstruct a new method of WPL assessment building on current practices, good practice in the field, and current literature that is fit for this context.

To achieve these goals, the following overarching research question that underpins this study was: **What is an optimal method for assessing the clinical capability of radiography students?** To answer this question, I posed three sub-questions:

A. What are the perceived challenges and issues in contemporary radiography WPL assessment?
B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?
C. What assessment approaches lend themselves for assessing the key capabilities in a meaningful way in the context of A and B?

### 1.4 OVERVIEW OF RESEARCH METHOD

In order to develop a framework for assessment of radiography student capability during WPL I needed to design a method that was responsive to practice context. The method I chose was located in the interpretive paradigm and more specifically in constructivism. Because assessment practices already exist I needed to deconstruct them and then reconstruct them. My research was structured into three phases: deconstruction, reconstruction and new status quo. In each of these phases of enquiry I designed specific data gathering and data analysis strategies.

**Phase 1: Deconstruction phase:** Examination of current practice from a theoretical perspective; review of literature; consideration of the nature of practice; theorising the possibilities for WPL assessment; examination of current practices as derived from interviews and focus groups with stakeholders; analysis of the interactional, dynamic and contextual nature of practice.

As this study was restricted to examining assessment of students’ WPL capability in radiography education in Australia, “current practice” was limited to the methods of assessing student capability during WPL in Australian radiography courses. At the time this stage of the research was carried out, there were nine undergraduate radiography courses in Australia. Each of the Australian universities who offered undergraduate professional radiography education at the time of data collection were asked to provide me with their current WPL capability assessment tools and processes for analysis. Six of these universities agreed to cooperate with the research and provided access to their current methods of WPL capability assessment. Radiography
courses from universities who did not provide materials for inclusion in the research were analysed based on existing knowledge of the processes used, in conjunction with details provided by colleagues who taught at these institutions and information available online.

Analysis of these assessment processes included the following aspects: examining the capabilities that were assessed; identifying those that were not assessed; determining if the same assessment process was used for each stage of the course, or if the standards used to assess students against at each stage of the course progressed; comparing the standards used for WPL capability assessment with the professional capabilities required by the profession’s governing bodies; determining if the context of placements and other factors outside students’ control were considered in the WPL capability assessment processes; and identifying which of the themes extracted from the literature review were or were not addressed in the various university WPL capability assessment processes. In this phase I identified gaps in assessment practices.

Phase 2: Reconstruction phase: Analysis of stakeholder opinions regarding what should be assessed; development of draft assessment strategy; disseminating the draft assessment strategy to clinical practice; gaining feedback from supervising practitioners regarding its efficacy.

In order to answer the following research questions, stakeholders and experts were included in this research to gather empirical data regarding assessment of WPL capability in radiography education:

A. What are the perceived challenges and issues in contemporary radiography WPL assessment?

B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?

The following stakeholders and experts were included:

- A leading expert in the field of higher education assessment was consulted. I spent a day in face-to-face interviews with him; these interviews were digitally recorded and professionally transcribed. This expert was consulted because in my reading of the literature, his work presented fresh and innovative concepts, and challenged existing thinking in the area of higher education assessment.

- Radiography academics at an Australian university were invited to participate in a focus group to discuss current issues in radiography assessment. A focus group methodology was chosen to allow for discussion of the diverse range of issues faced in radiography WPL capability assessment.
• Interviews and focus groups were conducted with academic staff from six British universities. Where only one staff member was available, an interview was conducted. Where more than one staff member was available, a focus group was conducted. One of the participating universities chose to have their staff interviewed separately rather than have a focus group. These universities were chosen because of professional contacts I had made there, and their willingness to participate. They represented a diverse range of educational programs: from small, country-based courses associated with only a few clinical centres, to large metropolitan (London) based courses utilising large teaching hospitals for their students.

• Graduate Entry Master (GEM) radiography students at an Australian university were also invited to participate in a focus group. This student group was targeted for this study as all students had prior experience completing an undergraduate degree, and therefore had experienced different forms of assessment, enabling comparison with current radiography assessments. As primary stakeholders in the WPL assessment process, and the group with the most to lose from assessment not being valid and constructive, gaining their feedback and opinions was integral to the validity of the research.

• Australian radiography practitioners and academics were invited to answer an online survey (see Appendix D), the link to which was published by the Australian Society of Medical Imaging and Radiation Therapy (ASMI RT) (there were 105 respondents). An online survey was chosen because it was the best way to capture the opinions of a broad subsection of interested practitioner stakeholders from the profession.

• These interviews and focus groups were digitally recorded and professionally transcribed. The transcripts were thematically analysed in the same categories as the literature review. This methodology allowed for direct comparison between the conclusions drawn from the literature reviewed, and the ideas and opinions expressed by the research participants.

In particular, stakeholder involvement in the research was considered vital, as this not only promoted input of creative ideas, but, as advocated by Dijkstra, van der Vleuten, and Schuwirth (2010), also gave stakeholders a sense of ownership of the research and gained their vital support. Including and valuing the professional judgement of the stakeholder and expert reference groups adds value and credibility to this research.

I used findings from the literature review and the transcripts of the focus groups and interviews, to develop a new status quo of assessment of WPL capability in Australian radiography education that enables authentic assessment of students’ capabilities at every stage of the WPL learning process.

In this final phase, a survey was sent to all supervising assessors to gain feedback on the assessment strategy developed in Phases 1 and 2 (see Appendix E). This feedback was analysed and incorporated into the final draft of the assessment strategy, which has since been implemented at Charles Sturt University, and also at the University of Canberra.

1.5 THESIS STRUCTURE

My thesis is structured into seven chapters.

Chapter 1 of this thesis is an introduction to its background, topic and my rationale. It presents an overview of the literature, methodology, research goals and questions, and concludes with why this topic is of significance.

In Chapter 2, the research strategy is outlined in detail. It includes the goals and questions underpinning the research, and locates the research paradigm and the purposefully constructed research design. This chapter also discusses and justifies the data collection and analysis phases, and outlines inclusion and exclusion criteria of participants and their recruitment. It concludes with ethical and quality considerations and argues for coherence between the methodology and research phenomenon.

Chapters 3 to 6 comprise the findings chapters. The context and concepts of WPL assessment practices in radiography are outlined in Chapter 3. This chapter is based on an extensive review of contemporary and seminal literature on the topic of WPL capability assessment and comprises the first stage of the deconstruction phase.

Chapter 4 describes the second stage of the deconstruction phase of the research, analysing data regarding current WPL capability assessment practices as obtained from research participants.

In Chapter 5, the data from participants regarding what they considered should be assessed in WPL capability assessment is analysed, and this analysis discussed.

Chapter 6 reconstructs the data outlined in Chapters 4 and 5 to develop a draft WPL capability assessment strategy.

The new status quo brought about by the implementation of the draft strategy is outlined in Chapter 7. The conclusions from the study as a whole are also discussed in this final chapter.
1.6 SIGNIFICANCE OF THIS STUDY

Located within the broad field of WPL capability assessment, this research has significance for the radiography profession, and in particular the assessment practices in radiography during WPL. Firstly, this research contributes a social constructivist perspective to the chosen research phenomenon, recognising that any health professional is more than a sum of the competency parts of their practice. Secondly, it is particularly significant to the field of radiography education in Australia, as the profession is searching for national assessment standards. The presented assessment model for radiography WPL is a contribution towards a national approach. Thirdly, this study contributes to an approach to WPL assessment that goes beyond technical, competency assessment to professional judgements of student capability. Lastly, the new model allows for assessment of students’ stages in their progression from student to graduate. These four contributions to the field of radiography WPL assessment makes this study a significant contribution to the knowledge and practice of this field.
CHAPTER 2
THE RESEARCH STRATEGY

INTRODUCTION

In this chapter I present the methodological background to this research. In doing so, I outline the research goals and questions that the research was based on, describe the timeline and context of the research, present the research paradigm used, detail the approach used to undertake the research, and report on ethical considerations and the ethics approval process.

2.1 RESEARCH GOALS AND QUESTIONS

The goals and questions on which this research is based were derived from my clinical and academic experience. Having extensive experience as a clinical radiographer, an assessor of radiography students in the workplace, and a radiography workplace learning (WPL) academic, I experienced first-hand the issues with current practices in the assessment of student radiographers’ performance in WPL situations. This extensive experience led me to the conclusion that current practice in the area of student assessment during WPL should be subject to revision informed by contemporary literature and deconstructed in light of that literature. This information was then used to reconstruct a new model of radiography WPL assessment.

2.1.1 Goals

In this research I had the following goals:

• to understand and deconstruct current practices in assessment of student performance in WPL within radiography undergraduate courses in Australia; and

• to reconstruct a new method of WPL assessment building on current practices, good practice in the field, and current literature that is fit for this context.

2.1.2 Questions

As indicated in Chapter 1, the overarching question in this research was: What is an optimal method for assessing the clinical capability of radiography students? This question was analysed, and three key research sub-questions were constructed to guide the study. The sub-questions were:

A. What are the perceived challenges and issues in contemporary radiography WPL assessment?

B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?
C. What assessment approaches lend themselves for assessing the key capabilities in a meaningful way in the context of A and B?

2.2 RESEARCH PARADIGM AND JUSTIFICATION

2.2.1 The research paradigm

In this thesis I explore assessment practices in radiography WPL with a focus on practice capabilities. Capabilities imply that practice knowledge, skills and dispositions need to be examined in relation to the context within which they are performed (Nussbaum, 2011). My conceptual framework is based on assertions that practice is interactional, dynamic and contextual rather than absolute and objective. The research paradigm chosen for this research was therefore not the positivist paradigm but the interpretive paradigm. Within this paradigm, theorists and researchers employ culturally derived and historically situated interpretations of phenomena related to human interactions (Crotty, 1998). Higgs has stated that the central goal of the interpretive paradigm is:

> to seek to interpret the world, particularly the social world, [where] knowledge ... comprises constructions arising from the minds and bodies of knowing, conscious and feeling beings ... [Such research is] generated through a search for meaning, beliefs, and values. (Higgs, 2001, p. 49)

Within the interpretive paradigm, theorists seek to make sense of what is seen in the context of the research phenomenon and purpose by identifying patterns and recurring themes in the research data. The underlying purpose of identifying these patterns and themes is for the researcher to identify relationships between them and produce an interpretation of the research phenomenon in the framework of the research questions.

Underlying this choice of research paradigm is an ontological and epistemological position of constructivism. Constructivist theorists assert that what can be known, or ontology, is socially constructed. In the constructivist epistemological stance, we come to know and understand something through conversations with others and by acknowledging relationships (Gergen & Gergen, 2007). Berger and Luckman (1967) point out in their seminal text that reality is not one single truth but a socially constructed truth. Adopting this epistemological stance, these theorists assert that social phenomena and their meanings are continually being interpreted or reconstructed by those involved (Bryman & Teevan, 2004).

The performance of a radiography examination and a student’s capability in the interactional, dynamic and contextual domains of professional practice is a socially constructed phenomenon. The knowledge required by students or qualified professionals to perform a radiographic examination is not separate from human understanding; students learn the skills required to carry out professional practice from colleagues who already have those skills. Students are
professionally socialised to acquire professional skills. Their knowledge and skills are not detached from or acquired out of context. Assessment of a student’s clinical capability therefore involves an assessor’s interpretation of the student’s developing capability in a range of domains.

The theoretical perspective chosen to conduct this research is therefore consistent with the ontological and epistemological position of constructivism. It was also important to maintain a sceptical stance about how my participants constructed assessment practices and I therefore included a critical perspective. Critical inquiry was the chosen theoretical perspective. Crotty (1998, p. 157) described critical inquiry thus:

> In the type of inquiry spawned by the critical spirit, researchers find themselves interrogating commonly held values and assumptions, challenging conventional social structures, and engaging in social action.

My research is based on the paradigmatic assumptions that quantitative measurement is insufficient and remains incomplete for determining a student’s capability because it ignores interactional, dynamic and contextual dimensions of practice. This philosophical position and the chosen theoretical perspective align in that they share a focus on interactional, dynamic and contextual dimensions.

### 2.2.2 Justification for the chosen paradigm

The topic under consideration in this research, namely assessment of the performance of undergraduate radiography students during WPL, focuses on assessing a complex set of human interactions within complex circumstances. These interactions occur in the process of students learning the capabilities required of registered professional radiographers. All interactions must be viewed in the context of the reality and theory of practice. As discussed in Chapter 3, practice has been shown to be interactional, dynamic and contextual.

There are two aspects of practice to be included in this research: the clinical practice of students themselves, and the practice of their assessors in assessing them. To look at this in an alternative way, understanding practice in the context of radiography WPL involves what is to be assessed, how it is to be assessed and where/when (i.e., the context of students’ performance/practice being assessed).

The *interactional* aspect of practice refers to the fact that practice, particularly in a health profession, does not occur in isolation from the input and actions of other people. The interactional aspect of radiography practice is described by Björkman, Golsäter, Simeonson, and Enskär (2013), who put forward the argument that a radiographer’s technical skills are always exercised in an interactional setting. These authors are nursing academics from a Swedish
university, who have researched in particular paediatric responses to diagnostic imaging. In order for a student’s capability in human interactions to be assessed appropriately, these interactions should be observed and interpreted by an assessor.

The dynamic aspect of practice refers to the reality that practice is constantly changing due to advances in technology, and changes in education, societal expectations and many other variables. These changes are characteristic of professional practice, and thus by nature practice can be referred to as emergent (Boud, 2009) rather than fixed. Because of this dynamic and changeable nature of professional practice, restricting its assessment to pre-set criteria severely limits the value of assessments carried out in this way (Sadler, 2009b). Students’ ability to adapt to this dynamism of practice is partially manifest in the radiographic images they produce, and this can be quantified to a limited extent. However, students’ ability to adapt to the majority of the variations that are a natural part of practice should ideally be assessed by interpretation on the part of assessors in association with self-reflection on the part of students. Observation by an informed assessor allows for assessment (both formative and summative) of students’ performance and potential, while student self-assessment is an important part of helping them learn the key professional capabilities of self-critique and reflexive self-development.

The contextual aspect of practice refers to the fact that practice performance is influenced by many contextual and practitioner variables in addition to core profession specific skills. The way skills are practised depends on available resources, the time available to develop and exercise those skills, the nature of the patients with whom the skills are practised, the culture of the workplace in which those skills are performed, and the ability of the practitioner who is performing the task(s) (Orrell, Cooper, & Bowden, 2010). The ability of students to adapt to these context-based variables can most appropriately be assessed by an assessor interpreting their performance in light of the practice context.

Given the research questions on which this research is based, the interpretive paradigm is the paradigm that best allows for the many facets of student performance to be assessed effectively.

2.3 TIMELINE AND CONTEXT OF THE RESEARCH

2.3.1 Timeline

This research was conducted while I worked at two different universities due to my change in employment. It commenced at the University of Sydney in August 2010, continuing to February 2013, and subsequently at Charles Sturt University from February 2013 to May 2018.
2.3.2 Context

This research was conducted in Australia and the United Kingdom for pragmatic reasons, where I had opportunities to examine several radiography courses. Combining findings from data collected in both countries was warranted since Australian radiography practice is more closely related to the UK than to most other countries. Radiography academics from both countries, and practitioners from Australia, participated in interviews and focus groups, as outlined below.

At the time the data were collected, there were nine universities in Australia offering undergraduate radiography programs: Central Queensland University (CQU), Queensland University of Technology (QUT), University of Newcastle (UoN), University of Sydney (USYD), Charles Sturt University (CSU), Monash University (MU), RMIT University (RMIT), University of South Australia (UniSA) and Curtin University of Technology (CUT). All of the radiography academic leaders in these universities were notified of this research and were invited to participate by allowing me access to their WPL assessment materials.

Subsequent to data collection, two new courses commenced in Australia: at the University of Canberra (UC) and Deakin University (DU). At the time of writing, the assessment strategy that is the product of this research has been adopted by CSU and UC, and discussions have taken place with the University of Sydney, where it is yet to be implemented.

2.4 RESEARCH APPROACH: AN EDUCATIONAL PRACTICE RECONSTRUCTION STUDY

2.4.1 Definition, description and rationale for use

The research approach was an educational practice reconstruction study. This is a research approach designed to allow researchers to understand, critique, deconstruct, reimagine and reconstruct the practice phenomenon in question. The core elements of this research approach are illustrated in Figure 2.1 and are outlined below.

Deconstruction (Phase 1, Stages 1 and 2)

Phase 1 Stage 1 of this research—examination of current practice from a theoretical perspective, is presented in Chapter 3. Phase 1 Stage 1 was conducted as a desktop exercise, this phase being theoretical in nature. Subsequent phases involved data collection and analysis as described below.

Understanding and critiquing the status quo

Stage 2, an empirical examination of current practice, is presented in Chapters 4 and 5. In Phase 1 Stage 2, current practices of assessment of (radiography) student performance in WPL were critically examined.
This process involved:

- data collection of student assessment processes in nine courses and direct evaluation of the data; and
- a literature review of topics related to student assessment during WPL.

**Data collection strategies for each stage:**

**Phase 1 Stage 1**
- Examination of literature

**Phase 1 Stage 2**
- Interviews and focus groups (with GEM students [10], Australian [5] and UK academic staff [15], and higher education expert [1])

**Phase 2 Stage 1**
- Interviews and focus groups (as per Phase 1 Stage 2)
- Australian national survey of practitioners

**Phase 2 Stage 2**
- Targeted survey of CSU-affiliated radiography clinical assessors

**Phase 3 Stage 1**
- Analysis of all the above

**Figure 2.1. Research phases and stages.**
A critique of current assessment practices was conducted. This included data analysis and interpretation processes involving:

- comparison with current assessment practices as represented in the literature;
- review of contemporary assessment strategies in relation to the content of assessment during WPL (i.e., what student performances are being assessed currently)—literature on the theory of practice was particularly useful here;
- comparison with WPL assessment practices in other disciplines; and
- examination of the strengths and limitations of the current student assessment practices for radiography students in all Australian radiography programs, particularly focusing on those at the University of Sydney and Charles Sturt University (due to me being employed at these institutions during the course of the research).

**Interviews and focus groups (Chapters 4 and 5).** The interviews and focus groups in both Australia and the UK (with the exception of the interview with a prominent Australian academic), and the Australian nationwide survey (see Appendix D), were part of the deconstruction stage of this research; that is, taking apart current assessment in WPL practices and critically appraising them. Academics were chosen as participants for interviews and focus groups because WPL is a relational practice between academics, radiographers, and students. Ultimate responsibility for student learning rests with universities, because the qualification is awarded by them. However, while graduates are awarded a degree, they also need to meet professional accreditation requirements. So, in this university industry relationship, academics help practitioners become good assessors. This relationship was explored in Kilgour, Kilgour, Gerzina and Christian (2013). These aspects of the research strategy were designed to provide information about current assessment practice and rationale in radiography students’ assessment during WPL. The interactive processes of interviews and focus groups were the preferred method of data gathering, as clarification of points made by participants was possible. However, the online national survey was deemed to be the best means for gathering data on assessment practices (in Phase 2) from the large number of practising Australian radiographers ($N = 15,000$, approximately) as their widely-spread geographical locations rendered personal interviews or focus groups logistically impossible. Carefully constructed questions in the online survey yielded meaningful results (see Chapter 4).

The questions asked in the interviews and focus groups (and the reasons for the questions) were as follows:

1. Can you briefly state your name, years of experience as a radiographer, current role and years in that role, as well as any other relevant experience?
Demographic information is useful for a number of reasons, particularly when correlating opinions and attitudes with professional experience. In the context of this research, it was also useful to determine whether participants were answering largely from a clinical or academic standpoint.

2. In your opinion, what aspects of a student radiographer’s clinical performance need to be assessed? How would you rank the relative importance of each of these aspects?

Not every aspect of a student’s performance during WPL can be assessed. In fact, trying to compartmentalise performance into multiple pre-set criteria can have a deleterious effect on the veracity of the results (Sadler, 2007). Therefore, it was fundamental to this research that the aspects of student performance during WPL were identified that were considered by clinicians and academics to comprise radiographic practice capability. This identification was necessary in order to determine which aspects needed to be assessed in order to ascertain true practice capability.

Because this thesis considers assessment of student performance during WPL, it was important to define what is meant by student performance. Performance means practice capability within a given practice context. Therefore, the practice context and what makes a capable radiographer had to be discussed to frame “performance”. This thesis defines radiographic practice as an interactional, dynamic and contextual practice. The focus of the thesis is on how capability in such practice could be assessed.

3. What is your understanding of the term (practice) standards, with respect to assessment in radiography? What should be the application of these standards in assessing the clinical performance of student radiographers?

Standards-based assessment\(^1\) is a widely regarded assessment paradigm (Sadler, 2005). Therefore, it was necessary to first find out what characteristics of professional practice were deemed to equate to radiography practice standards, and second, whether these standards were considered relevant to professional practice capability. Professional practice capability is the primary attribute that any assessment in WPL settings seeks to assess, so this capability is what I was attempting to relate to standards in this research.

4. What is your opinion about the form that a clinical assessment tool should take? Consider the following points (please be prepared to support your answer):
   a) Graded, or pass/fail.

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\(^1\) “In education, the term standards-based refers to systems of instruction, assessment, grading, and academic reporting that are based on students demonstrating understanding or mastery of the knowledge and skills they are expected to learn as they progress through their education [bold added]” (The Glossary of Education Reform, 2017).
b) Numerical score, or some other scoring system (a visual analogue scale, Likert scale, choose most accurate statement from a list, etc.).

Sub-questions a) and b) (above) were intended to elicit the preferred format and actual structure of any subsequent quantitative assessment strategy developed as a result of this research. Stakeholder input is vital to the success of any new strategy introduced by a university into the workplace (O'Donovan, Price, & Rust, 2004).

c) Analytic, holistic or a combination of these.
   i. Analytic: supervisor makes separate qualitative judgements on each of a list of pre-set criteria.
   ii. Holistic: supervisor progressively builds up a complex mental assessment response to student work.

This question is fundamental to the whole approach to student assessment during WPL that was to be developed in this research. The analytic paradigm lends itself to a purely quantitative approach to assessment, whereas the holistic paradigm allows for the professional judgement of the assessor to be incorporated into the assessment (Burchell, Higgs, & Murray, 1999; Sadler, 2009b).

d) Worth 100% of clinical unit of study, or supplemented by other tasks such as written work, objective structured clinical examinations (OSCEs), etc.

This question was designed to ascertain whether the participants believed that radiography WPL student assessment should consist entirely of the clinical supervisor’s assessment or whether other WPL-related assessment tasks were relevant to assessing student practice capability. This is a fundamental variable influencing the structure of the assessment. It relates to the deconstruction stage of this research in that it is an important part of analysing current practice in light of the professional judgement of the research participants.

5. Do you believe we should set the standard we are aiming for as that of a graduate commencing the Professional Development Year (PDY)/National Professional Development Program (NPDP), or that of a fully accredited radiographer? What is your reasoning?

This question was asked in the interviews and focus groups in Australia only as it targeted an organisational issue in the radiography profession in Australia that was current at the time of the interviews and focus groups. This question is not strictly relevant to this research and has been included here only for the sake of completeness in describing the interviews and focus groups. It will not be discussed further in this chapter.
**National survey (Chapters 4 and 5).** The questions asked in the national survey performed as part of this research, and the reasons for asking them, are below:

1. Years of experience as a radiographer.
2. What is the highest qualification you have achieved?

Questions 1 and 2 are demographic questions, the rationale for which is explained in the previous section.

3. Are you actively involved in student supervision? If your answer is “No”, please go to Question 6.
4. If your answer to Question 3 was “Yes”, in what way are you involved in student supervision?
5. If your answer to Question 3 was “Yes”, how long have you been supervising students for?

Questions 3 to 5 were designed to ascertain the participants’ experience in the field that I was investigating. Correlating answer trends with participants’ clinical supervision experience and role was anticipated to reveal important information regarding the role of experience in student supervision towards attitudes to and opinions regarding student assessment during WPL.

6. Are you actively involved in student assessment? If your answer is “No”, please go to Question 9.
7. If your answer to Question 6 was “Yes”, in what way are you involved in student assessment?
8. If your answer to Question 6 was “Yes”, how long have you been assessing students for?

Questions 6–8 are based on the premise that clinicians who supervise students are not necessarily responsible for assessing students’ performance. Although clinicians who supervise students have valid opinions regarding what should be assessed, if these same clinicians do not actually participate in assessment, their background knowledge of assessment may not be of the same value as those who do carry out assessment. These questions were designed to discriminate between participants based on the role in WPL assessment they actually carry out.

9. In what category of radiology centre are you employed?
10. In which state or territory are you employed?
11. From which universities are students accepted at your institution? Choose as many as are applicable.

When the survey questions were being developed, it was anticipated that attitudes to WPL assessment would differ between categories of radiology departments due to the varying nature
of the work undertaken in those centres. These variations include the types of patients and patient examinations that are performed, which have a significant effect on the clinical role students must play during WPL. Asking which state or territory the participant was located in was important because there are differences in supervision regulations, licensing requirements and workplace cultures from state to state, and these affect the role of students in WPL. Asking which universities the clinical institutions accepted students from was included because different universities currently have different WPL assessment strategies, and this was thought to be a potential influencing variable for how participants would respond to the survey.

12. A national clinical assessment tool for radiography students is intended to address a number of issues that currently exist. Please rate the significance of each of the following issues: Uniform standard for the same qualification; reliability (consistency between clinical centres); validity (assessment measures what it is meant to measure); same assessment tool for all universities will minimise confusion; other.

13. Do you support the introduction of a uniform national clinical assessment tool for radiography students?

Questions 12 and 13 were designed to ascertain what issues about radiography WPL assessment were regarded as important by participants and whether there was professional support for standardised radiography WPL assessment across Australian universities.

14. This question is asking your opinion about how radiography students should be assessed. Please choose the response that agrees most closely with your opinion: Students should be assessed according to their competence in various medical imaging examinations; students should be assessed as pass/fail only in each category; students should be assessed as pass/fail in some categories such as punctuality, appearance, etc., and graded in others; areas to be assessed should be mapped to the scope of practice for radiographers.

15. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student’s knowledge and understanding: Key knowledge concepts; clinical skills and practice.

16. Please indicate the level of importance you place on each of the following areas relating to a student’s critical thinking and evaluation skills: Assess clinical situations and perform accordingly; application of clinical skills; analyse and respond to problems regarding operation and management; research and innovation; quality assurance.

17. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student’s professional and ethical practice: Autonomy and accountability; understanding of scope of practice for a radiographer; build and
m.. maintain professional relationships; patient advocacy; understanding of relevant legal
issues; management of quality of care.

18. Please indicate the level of importance you place on the assessment of each of the
following areas relating to a student’s patient care and clinical management skills:
Patient welfare; empathy; cultural sensitivity; management of clinical presentation of
patient.

19. Please indicate the level of importance you place on the assessment of each of the
following areas relating to a student’s commitment to lifelong learning: Professional
development; mentoring/teaching; participation in research and investigation.

20. Are there any other areas you think are necessary for inclusion in the assessment of a
student radiographer’s clinical competency?

Questions 14–20 were designed to determine what aspects of student radiographers’ WPL
performance and clinical reasoning processes were deemed important in determining their
clinical competence. If any assessment is to give an accurate picture of a student’s knowledge,
understanding and ability, it should assess those aspects of performance that make a
contribution to knowledge, understanding and ability.

21. Please indicate what format you would like a national assessment tool to take: Paper-
based; online; another format (please specify).

This question is a process question that has practical implications for the product of this
research, but not for the methodology.

22. Please indicate on the scale below your level of agreement with the following methods
of assessing clinical competence: A number from 1–10 for each graded category; a
number from 1–5 for each graded category; Likert scale; visual analogue scale; choose
the best statement from a list.

Again, this is a process question, and lends itself more to the practical applications of the
research, rather than to the methodology.

Comparison of status quo and possibilities

In Phase 1 Stage 2, the interpretations of current assessment practices in WPL made in the
previous stage were compared with what could possibly be achieved if the theory and nature of
the practice of such assessment as defined in the literature were considered. The methods used
to undertake student assessment were also examined in light of current thought and knowledge
concerning good practices in student assessment, particularly in WPL settings. This includes
aspects of assessment such as assessment scales (for example, numerical scales, Likert scales
and visual analogue scales), who carries out which aspect of assessment (clinical staff or academic staff), and quantitative assessment versus the more qualitatively-based professional judgement.

Current assessment practices used in Australian university courses during WPL largely involve quantitative measurement of specific skills, with some room for comments if assessors choose to supply them. For some of these assessment approaches, it is possible for assessors to simply write a series of numbers against supplied criteria, with no in-depth analysis of student performance required. Analyses available in the literature regarding current radiography students’ assessment methods in WPL (see Björkman et al., 2013; Boud, 2009; Trede, Mischo-Kelling, Gasser, & Pulcini, 2015) indicated those methods to be inadequate for determining students’ skills in WPL settings in that the nature of practice was not assessed meaningfully. This means that, although technical skills are assessed using methods that provide suitable indications of students’ capability in those skills, the interactional, dynamic and contextual nature of practice is assessed using methods more suitable for quantitatively measurable aspects of practice. The application of assessors’ professional judgement, while largely lacking in current radiography students’ WPL assessment processes, became a focus of this research, with methods of applying it in the assessment of radiography students during WPL being investigated (Burchell et al., 1999; Hager, Gonczi, & Athanasou, 1994; Sadler, 2011).

The interview with the prominent Australian academic belonged in this stage of the research as it involved comparing the status quo with his informed opinion regarding assessment practice. The interview consisted of a discussion rather than a specific list of questions. The contents of this interview will be discussed in Chapters 4 and 5.

**Reconstruction (Phase 2)**

**Developing and critiquing the proposed revised strategy**

The interpretations from Phase 1 above were synthesised in Phase 2 Stage 1 by comparing the interview and focus group findings with responses from practitioners in the national survey (see Chapter 5). This was done by means of a thematic analysis assisted by NVivo10™ software. An interpretation of student WPL performance in light of the interactional, dynamic and contextual nature of practice was developed as a result of this thematic analysis. Themes common to the interviews, focus groups and the national survey findings included the aspects of radiography practice that needed to be assessed, and whether analytic or holistic assessment strategies, or a combination, were more suitable to assess radiography students’ performance during WPL. In Phase 2 Stage 2 these common themes were then incorporated into the revised strategy (see Chapter 6).
Disseminating and gaining feedback about revised strategy

Phase 2 Stage 2 involved seeking and interpreting critical feedback from assessors by way of a targeted survey. The participation request was sent by means of an advertisement in an emailed member newsletter containing a link to an online survey asking questions of clinical assessors who had used the revised strategy in a pilot study.

The questions and associated answer options were as follows:

1. What is the purpose of clinical assessment? Please indicate your level of agreement with each statement (this was via a Likert scale):
   a. Define good performance
   b. Rank students against each other
   c. Certify for professional accreditation
   d. Identify students who don’t reach the required standard
   e. Help employers decide who to employ
   f. Show students how well they have learned the discipline knowledge
   g. Indicate how well teaching has presented essential knowledge
   h. Provide feedback for students
   i. Allow student performance to be measured

2. How do you rank the following qualities of assessment with regard to importance? Please indicate your level of agreement with each:
   a. Good level of numerical validity and reliability
   b. Ease of use by the educator
   c. Based on essential criteria matched to levels of importance
   d. Allows matching of student performance to discipline academic standards
   e. High level of relevance of questions to the discipline
   f. Format easily used by the students
   g. Provide data that the school can use to improve the curriculum
   h. Questions used reflect “real” professional practice
   i. Target high order thinking like complex problem solving
   j. Assessment guides and encourages effective approaches to learning
   k. Levels of achievement for each assessment category are given

3. Are you familiar with the old and/or new Charles Sturt University radiography clinical assessment forms?

4. What are the attributes of the new assessment form? (The survey was sent to people who had used it.)
5. Which form do you feel would give more reliable or more useful information regarding the student’s performance? Please give your reasons.

6. Which form do you feel provides better feedback for students regarding their performance? Please give your reasons.

7. The new assessment form compares student performance to increasingly advanced standards for each subsequent clinical block. Do you feel that this provides for an accurate and fair assessment of student performance? Please provide reasons for your answer.

Twenty-eight clinical assessors responded to this survey from a potential number of approximately 200 working across Australia at the time. The feedback gained from this survey was used to refine the emerging assessment strategy by a further thematic analysis of the responses, identifying common themes with regard to improvement of the initial proposal for revised assessment.

Implementing the new assessment strategy (Phase 2 Stage 3)

Putting the revised strategy into practice with planned ongoing evaluation

Once the revised assessment strategy was finalised based on Phase 1 and Phase 2 Stage 1, a program for ongoing evaluation of its effectiveness was developed. The implementation of the new assessment strategy will occur in the postdoctoral timeline of this research and therefore is not included in this thesis. There were two reasons for this: first, the research questions were addressed by the development of the new strategy; and second, the logistical and permission aspects of changing this core element of curricula in multiple systems required internal (within-university) and external program accreditation processes, and this was beyond the scope and timeline of this research. The success of this ongoing evaluation depends on the data collected being interpreted in such a way that they can be applied to successive iterations of the assessment strategy.

Interviews and focus groups with radiography practitioners, educators and students, as well as the Australian national survey of the profession, informed the deconstruction and reconstruction process employed in this research. The research produced a new model of radiography student assessment during WPL that reflects contemporary knowledge of good assessment practice (see Chapter 6).

2.5 PARTICIPANTS

This research involved several different data collection strategies. Focus groups were conducted with students and staff at the University of Sydney, and interviews were conducted with Australian radiography academics. A significant Australian researcher and author, who is an
Emeritus Professor of Higher Education, was interviewed. Radiography staff from six universities in the UK participated in interviews and focus groups. All of these preceding groups of participants participated in Phase 1 of the research. Finally, a national survey of Australian radiography practitioners was conducted. This was part of Phase 2 Stage 1 of the research.

2.5.1 Selection criteria

**University of Sydney staff**

All of the then-current staff of both the Bachelor of Applied Science (Diagnostic Radiography) and Graduate Master of Diagnostic Radiography courses at the University of Sydney were invited to participate in a focus group. The majority of staff at the University teach across both courses, and the assessment of student performance during WPL in both courses was identical, so all staff potentially had valuable input into the focus group. All staff who were available at the appointed time participated in the focus group.

**University of Sydney students**

Email invitations were sent to all current students in the Graduate Entry Master (GEM) of Diagnostic Radiography at the University of Sydney. The university permitted me access to the GEM students for this research rather than to the undergraduate students. All students in the GEM course were considered eligible, and they self-selected for participation.

**Emeritus Professor of Higher Education**

This distinguished academic was selected because of his prolific and progressive international work in the area of assessment of higher education. I had read a significant proportion of this person’s work and wanted to discuss both his work and his thoughts on the project. The professor kindly contributed a whole day of his time to the project.

**Staff from UK universities**

At this stage of the research, the co-supervisor for my doctoral candidature was a professor of radiography from the UK. He provided information stating that radiography education in the UK was similar to Australian radiography education, and indicated that it would be desirable to interview several UK-based experts in this field who would be able to contribute meaningfully to the project. This co-supervisor identified contacts at several UK universities, and those who agreed to participate were asked to participate in either focus groups or interviews, depending on their availability.

Staff from the following universities participated in the research: Cumbria University, Lancaster; Liverpool University; Salford University, Manchester; University College Suffolk, Ipswich; City
University, London; and Kingston University, London. Staff at Salford and Kingston universities were interviewed individually; staff at the other four UK universities all participated in focus groups.

**Australian national survey**

An invitation to Australian radiographers to participate in the survey was published in *Spectrum*, the monthly magazine published by the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT). At the time of data collection, ASMIRT was known as the Australian Institute of Radiography (AIR). Of the potential approximately 15,000 members of this group, 105 participated in the survey. It is important to note that the use of this method of invitation to participate in the survey was one of convenience and access. Most of the 15,000 radiographers in Australia would not be engaged as educators in student assessment, thus the number of respondents is closer to the estimated number of people actually engaged in student assessment.

**2.5.2 Student participants’ courses**

Students participating in the student focus group were enrolled in the GEM course at the University of Sydney. Although technically a master’s degree, this is a professional entry radiography program; those enrolled have a previous degree from a different discipline. Therefore, the GEM course is accelerated, with the same content covered as a 3-year undergraduate degree compressed into 2 years. Graduates of this course are required to undertake a 48-week period of supervised professional practice on graduation.

The University of Sydney staff who participated in the focus group all taught in the GEM course as well as the parallel undergraduate course. At the time of data collection, the undergraduate course was a 3-year degree, with graduates having to undertake a 48-week SPP on graduation. Both of these courses are conducted through the Faculty of Health Sciences at the University of Sydney. As stated above, students from the GEM course were permitted to participate by the University.

All six of the UK courses where staff were involved in the research were 3-year degrees. Unlike the Australian 3-year degrees, graduates were considered ready for independent practice, rather than having to undertake a 48-week SPP. Also, unlike students in the Australian courses, students in the UK courses undertook all their clinical placements in one clinical institution rather than at multiple institutions, as is the case in Australia. However, the curricula and clinical standards were very close to those in Australian courses.
2.5.3 Recruitment processes

*University of Sydney staff*

Staff at the University of Sydney were invited to participate by personal request at a staff meeting.

*University of Sydney students*

Email invitations were sent to all current students in the Graduate Entry Master (GEM) of Diagnostic Radiography at the University of Sydney. Students responded with acceptance of the invitation by email.

*Emeritus Professor of Higher Education*

A personal email invitation was sent to this person, and he responded by email with his acceptance.

*Staff from UK universities*

The then-current supervisor of this project wrote a personal letter of introduction on my behalf, which was emailed along with a request to participate. Some of these universities required ethics approval from their own human research ethics committees (HRECs), and this was gained. All communication was by email.

*Australian national survey*

An invitation to participate in the survey was published in the professional news magazine *Spectrum* (as noted above). This was considered to be the most straightforward way to reach the entire radiography population in Australia.

2.5.4 Profile of the participants

*University of Sydney staff*

Five staff from the University of Sydney participated in the research. They were all males. Four had more than 20 years’ experience as radiographers, but only one had more than 20 years’ experience as an educator. All were considered to be suitable participants, particularly due to their extensive clinical experience as well as their familiarity with the GEM program and its assessment of students. Information about these participants is provided in Table 2.1.
Table 2.1. Demographics of University of Sydney Academic Focus Group Participants.

<table>
<thead>
<tr>
<th>Code</th>
<th>Years as radiographer</th>
<th>Years as academic or clinical educator</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUS1</td>
<td>&gt; 25</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>AUS2</td>
<td>&gt; 25</td>
<td>&gt; 25</td>
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<td>AUS3</td>
<td>&gt; 25</td>
<td>&lt; 5</td>
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<td>6–10</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>AUS5</td>
<td>20–25</td>
<td>11–15</td>
</tr>
</tbody>
</table>

University of Sydney students

This University of Sydney participants consisted of a variety of students who were studying radiography as a second degree. There were 10 participants in this group. They were all mature-aged students, ranging in age from their mid-20s to mid-30s. The GEM course is officially known as the Master of Diagnostic Radiography. The only prerequisite for entry to this course is a previous degree in any area. Some of the degrees that students in the focus group had previously attained included Bachelor of Architecture, Bachelor of Arts (English Literature), and overseas qualifications in medicine and radiography. There are no pre-study requirements for this course. The transcript from this focus group did not discriminate between the different students who participated in it, so all references to the participants were assigned the code “GEMFG”.

Emeritus Professor of Higher Education

This prominent academic has widely acknowledged expertise in the following areas: assessing student achievement, especially in higher education; academic achievement standards, grading policy and grading practices; formative assessment, feedback and alternatives to feedback; assessment theory, methodology, policy and ethics; educational testing and measurement; and improving university teaching and learning. He has a dynamic research and publication program. His two research foci are academic achievement standards in higher education and making assessment work more effectively for improving student learning. His main work is published as articles in peer-reviewed journals. Within the university the professor is employed at, a consultancy service is available regarding assessment policy and grading to groups, faculties, departments and schools, as well as to other universities and public and professional agencies by negotiation. In addition, the professor is a member of the editorial advisory board and a manuscript reviewer for the journals Assessment & Evaluation in Higher Education (UK) and Assessment in Education: Principles, Policy & Practice (UK). He is also a journal manuscript reviewer for Educational Assessment (US), Educational Evaluation and Policy Analysis (US), Higher Education (UK), Higher Education Research & Development (AU), International Journal of Testing (US) and Studies in Higher Education (UK). References to the interviews with this person are indicated with the code “PE”.  

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Staff from UK universities

Fifteen staff from the six universities in the UK participated in the study. These were approximately evenly divided between males and females. The majority of these staff had more than 20 years’ experience as radiographers, and 11 had more than 10 years’ experience as radiography educators. Thus, they were well placed to offer their expertise in this research (see Table 2.2).

<table>
<thead>
<tr>
<th>Code</th>
<th>University</th>
<th>Years as radiographer</th>
<th>Years as academic or clinical educator</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK1</td>
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<td>&gt; 25</td>
</tr>
<tr>
<td>UK2</td>
<td>Cumbria</td>
<td>21–25</td>
<td>11–15</td>
</tr>
<tr>
<td>UK3</td>
<td>Liverpool</td>
<td>11–15</td>
<td>6–10</td>
</tr>
<tr>
<td>UK4</td>
<td>Liverpool</td>
<td>&gt; 25</td>
<td>16–20</td>
</tr>
<tr>
<td>UK5</td>
<td>Liverpool</td>
<td>&gt; 25</td>
<td>6–10</td>
</tr>
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<td>21–25</td>
<td>11–15</td>
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<td>21–25</td>
<td>21–25</td>
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<td>&gt; 25</td>
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</tr>
<tr>
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<td>Kingston</td>
<td>&gt; 25</td>
<td>11–15</td>
</tr>
<tr>
<td>UK15</td>
<td>Kingston</td>
<td>&gt; 25</td>
<td>11–15</td>
</tr>
</tbody>
</table>

Australian national survey

The survey was answered by 105 participants, all members of ASMIRT.

2.6 ETHICS

As I was employed at two different institutions while this research was being conducted (initially the University of Sydney, and subsequently Charles Sturt University), the issue of ethics approval needed to be considered for both universities. The data collection stage of the research was conducted while I was employed at the University of Sydney, so Charles Sturt University ethics approval was not required. Approval was gained from the University of Sydney Human Research Ethics Committee (HREC) (see Appendix A).

Ethics approval to include staff from New South Wales Health (NSW Health) institutions as participants can, by government regulation, be granted by one NSW Health institution. Therefore, ethics approval was sought and gained from Concord Repatriation General Hospital’s HREC (see Appendix A).

Ethics approval from each of the UK universities involved in the research was granted based on the University of Sydney HREC approval.
2.6.1 Ethics forms and information sheets

**Ethics forms**

Human research ethics approval was required for Phase 1 and Phase 2 Stage 1 of the research to be carried out. Ethics approvals can be found in Appendix A.

- Approval from the University of Sydney HREC
- Approval from the Concord Repatriation General Hospital (CRGH) HREC (chosen to gain approval through NSW Health because I was employed there at the time)

**Information sheets**

Ethics approval required each participant to be provided with an information sheet, so they could be fully informed about the research they were participating in. These information sheets can be found in Appendix B.

- University of Sydney participant information sheet
- University of Sydney consent form
- CRGH participant information sheet
- CRGH consent form

2.6.2 Ethical considerations

There were three main ethical considerations attached to this research: informed consent, confidentiality and risk minimisation for participants.

**Informed consent**

Informed consent means that all participants know exactly what the purpose of the research is, what their involvement will mean to them and to the research, and their right to withdraw from the research at any time. In giving their consent, the participants were informed about what they were agreeing to and what, if any, consequences might arise. Every participant in the interviews and focus groups was given an information sheet that covered the above topics and was given a chance to ask questions, and all participants were asked to sign a consent form indicating that they understood and accepted the above (see Appendix C). The basic premise of informed consent is that potential participants are given enough information to decide whether they wish to participate (Bryman & Teevan, 2004).

**Confidentiality**

Confidentiality means that all participants can be assured that their identity will not be revealed (except by other focus group participants), and that their answers to questions asked and their
comments in discussion will not be identifiable in any way. According to Bryman and Teevan (2004), examples of strategies to maintain participant confidentiality include:

- not storing participant names, addresses, or correspondence on accessible computer hard drives;
- using identifier codes on data, and storing hard copies in locked cabinets;
- ensuring that any person undertaking transcription sign an agreement agreeing to preserve confidentiality of participants; and
- ensuring transcripts do not include participants’ names.

All of these strategies were adopted. The participant information sheet assured participants that confidentiality would be maintained at all times.

**Risk minimisation for participants**

Although there was no physical risk for participants in this research, there is always risk that when opinions are being sought from participants, they could suffer psychological harm from feeling uncomfortable about the questions, implications of answering the questions, or other factors. This research was conducted with all participants being fully informed about the option of withdrawing at any time, including having their contributions to focus groups or interviews not used and deleted from all files. Participants were fully informed via the participant information sheet (Appendix B) and consent form (Appendix C) that all participants were given prior to commencing data collection.

### 2.7 CRITICAL APPRAISAL OF THE RESEARCH STRATEGY

The development of a research strategy includes choosing a methodology that it is anticipated will provide rigorous and sound outcomes as well as answer the research questions posed. During the conduct of research projects, there may be occasions in which the methodology needs to be adjusted. This occurs if the results obtained from the original methodology are not answering the research questions, for example, or if unexpected circumstances render the original methodology impractical, insufficient or unachievable. When a research project has been completed, a retrospective critical appraisal of the project strategy and outcomes is beneficial so that the credibility of the research can be appraised and lessons learned can be applied in future research.

The first aspect of the methodology used in this doctoral study that will be considered is the research paradigm used as the philosophical basis of the research. This study was based on the interpretive paradigm, which seeks to make sense of what is seen in the context of the research, and is used to identify meaning in patterns and recurring themes. Having completed the data
collection and interpretation of the data, the interpretive paradigm was still considered to be the most appropriate for this research. One of the fundamental aspects of practice is that it is contextual, so an analysis of practice with the aim of understanding how students’ practice performance is best assessed will produce the most meaningful results if the context of the research is taken into account in the analysis.

Within the interpretive paradigm, a methodology of educational practice reconstruction was used. This involved deconstructing current practice (student assessment during WPL), reconstructing it in light of evidence from the literature and the profession, and then proposing a new assessment strategy. This research approach proved to be appropriate and useful for this research.

The deconstruction phase involved an examination of current practice, a literature review, consideration of the nature of practice, theorising the possibilities for student assessment during WPL, and interviews and focus groups with stakeholders. The examination of current practice was thorough, considering current practice in both Australia and the UK (see Chapter 3). Specific limitations of this phase of data collection included the fact that only six of the many universities in the UK that offer radiography courses were involved in the research, and that Australian staff interviewed were limited to those employed at the University of Sydney. Although these sample groups did not represent the entirety of the profession in either the UK or Australia, they did represent a large cross-section of backgrounds and experience. The Australian academics and practitioners who did not have input into the interviews and focus groups were given an opportunity to contribute to the research through the national survey.

The reconstruction phase of the research involved an analysis of the interactional, dynamic and contextual nature of assessment practices as well as the development of a revised assessment strategy. There are many aspects to the nature of practice, and to consider only the interactional, dynamic and contextual aspects may be considered limiting to the rigour of the methodology as it ignores other aspects (such as the technical and profession specific skills required in radiography) that may be deemed relevant by some. However, given the interpretive paradigm within which the research was conducted, noting the context of radiography practice indicated that the interactional, dynamic and contextual aspects of practice were the most applicable to radiography practice in WPL. It was also noted that technical and radiography profession specific skills had already been addressed in contemporary assessment strategies.

The new assessment strategy phase of the research involved disseminating the revised assessment strategy to gain feedback from supervising practitioners regarding its efficacy. A strength of this phase was the involvement of people who actually assess radiography students’
performance. A limitation of this phase of the research was the use of feedback gained from practitioners who did not contribute to the development phase and who might have limited understanding of the theoretical basis of the proposed model. This has been addressed by an education program that aims to address the limitations as outlined above.

The research concluded with the development and critique of the new assessment strategy. This critique included analysis of a survey of supervising practitioners who had used the new assessment strategy in the workplace when assessing the performance of student radiographers during WPL.

Overall, I consider that the research methodology used was appropriate for the aims of the research and that the limitations have been addressed. I consider that the research produced a valuable and viable product. Ongoing evaluation after the thesis is submitted will further assess this critical appraisal.

2.8 CONCLUSION

In this chapter I have outlined the research goals and research questions that were investigated in this doctoral research. The timeline and the context of the research has been discussed, and the research paradigm has been identified and justified. The research approach has been delineated, the participants described, and their selection justified according to sound criteria. The ethics approval process has been included, and the research strategy critically appraised. These factors comprise a comprehensive consideration of the methodology used for the research.
CHAPTER 3
DECONSTRUCTING AND RECONSTRUCTING THE CONTEXT AND CONCEPTS OF WPL ASSESSMENT PRACTICES IN RADIOGRAPHY

INTRODUCTION
This chapter is based on Phase 1 Stage 1 of the research, as described in Chapter 2. In this chapter I examine the history of the profession, workplace learning (WPL) in radiography practice, and its practice context. I consider the theoretical concepts of WPL practice and apply them to the radiography context. I deconstruct models of assessment for WPL and examine their efficacy for learning. I conclude by reconstructing an assessment model for radiography WPL based on the conclusions drawn in the chapter.

3.1 BACKGROUND TO THE PROFESSION OF RADIOGRAPHY

In order to understand the nature of practice in radiography, and therefore radiography WPL assessment, it is necessary to examine its historical context, how it fits into the healthcare system and the way it is taught.

3.1.1 Historical context and overview of the profession of radiography

The profession of radiography is known by many different names around the world, and even in Australia there are significant variations. Professional practitioners in this field are known by the following terms: “diagnostic radiographer”, “medical radiation scientist”, “medical imaging practitioner” and “medical imaging technologist”. While literature utilising all of these terms is incorporated into this chapter, for the sake of consistency the term “radiographer” will be utilised throughout. I will also explain the historical developments of and reasons for the various titles given to the profession.

A medical image is known as a “radiograph”, which gives rise to the term “radiographer” being applied to the professional who produces the radiograph. However, as medical imaging technology has progressed, the role of radiographers has expanded to include much more than just producing radiographs. Around the world, radiographers’ roles vary, ranging from “technologist” status in the US, to “reporting radiographers” in the UK (Radovanovic & Armfield, 2005). A reporting radiographer actually writes reports on radiographs, which in most countries other than the UK, is the sole domain of medical specialists called radiologists. Regardless of the locality, radiographers now operate high-end technology such as computed tomography (CT)
scanners and magnetic resonance imaging (MRI) scanners, producing complex image datasets that cannot adequately be described as (simply) radiographs.

In addition, the educational standards required to join the profession have progressed at a similar rate. Originally, there was no qualification required to use x-ray machines. They were used for random tasks, including measuring children’s feet for shoes, and generally for amusement (such as showing the public “what the body looks like on the inside”) (Thomas & Banerjee, 2013, p. 59). However, as scientists discovered the dangers of improperly using ionising radiation, non-essential use quickly stopped and controls were put in place (Trapp & Kron, 2008). In medical applications, the person operating the x-ray machine changed from being whoever was available, to a dedicated staff member (Eisenberg, 1992).

In Australia, formal training of these dedicated staff members began as a certificate course at Colleges of Technical and Further Education (TAFE) in the early 1960s and progressed to an Associate Diploma, also through TAFE in the mid-1970s. In 1986, it became a Diploma of Diagnostic Radiography, offered through Colleges of Advanced Education (CAE). In the early 1990s, the first degree courses in diagnostic radiography were offered at university level. This was a significant change, as not only did it give radiography the status of a profession rather than categorising it as a paraprofession or trade-like career, but this move opened up the research culture of universities to radiographers, and provided opportunities for radiographers to progress to higher degrees such as Master and PhD levels (Cowell, 1999).

These changes in practice responsibilities, technology and the educational status of the profession have led some in the field to suggest that a change in the name of the profession, designed to reflect its growing status and responsibility, should be effected. To this end, the term “Medical Radiation Scientist” was coined and accepted by the profession, and is used in the New South Wales state award. However, this term also covers those professionals in the related fields of nuclear medicine and radiation therapy, so most radiographers have continued to refer to themselves by this commonly accepted term.

Radiography practice involves the production of images that are used to assist medical staff in the diagnosis of injury and disease, with treatments and surgery often depending on the outcome of imaging procedures (Australian Institute of Radiography [AIR], 2016). Radiography practice today uses technology at the high end of the spectrum, and practitioners must continually learn throughout their careers as technology advances (AIR, 2016).

Radiographers must have a strong background in science and technology in order to understand and use the equipment required to perform their job, but they need to combine this with generic professional capabilities (such as teamwork) and strong interpersonal skills. These skills include
empathy and understanding of incapacitated and fragile people, as well as a genuine interest in the welfare of their patients (AIR, 2016).

### 3.1.2 Radiography practice

Radiography practice is primarily technical, in that it is fundamental in disease and injury diagnosis (Reeves & Decker, 2012). However, it also has a strong patient care focus (Reeves & Decker, 2012). When considering this confluence of technical and people skills, it has been suggested to consider professional practice as a judgement-based practice of care for the service receiver (Polkinghorne, 2012). This concept is succinctly summarised by Björkman, Golsäter, Simeonson, and Enskär (2013), who highlight that in conducting an examination, the radiographer is responsible for simultaneously managing complex technical equipment, deciding on appropriate imaging protocols and sequences, and effectively communicating with patients.

Healthcare teams involve interdependent collaboration between healthcare practitioners (Feuz, 2014; Martin, O'Brien, Heyworth, & Meyer, 2005), with the radiographer a key member of this team. In clinical settings, professionals can enhance their knowledge and capabilities by learning from those who are expert in other fields, thus having a direct impact on the quality of patient care (Martin et al., 2005).

The field of knowledge and expertise which sets radiographers apart from other health-related professions (except the other medical radiation science professions of radiation therapy and nuclear medicine) is that of radiation safety (Ohno & Kaori, 2011). It is the responsibility of radiographers to ensure the safety of not only their patients and themselves, but other staff in the interdisciplinary team. Radiography practitioners take on a great deal of responsibility because they are administering potentially harmful radiation to patients (Reeves & Decker, 2012). Due to the high-risk professional activities undertaken by radiographers, it is imperative that safe radiation practice be an integral aspect of WPL assessment.

A significant proportion of radiography involves working closely with accident and emergency departments in busy public hospitals, and with patients who have suffered significant trauma, or who have been admitted with severe and possibly life-threatening diseases. This category of work often occurs on weekends or evenings, when the radiographer may be working alone or with minimal support (Reeves & Decker, 2012). Given these types of working environments in radiography, it is no surprise that radiographers tend to have and need high emotional intelligence (Mackay, Hogg, Cooke, Baker, & Dawkes, 2012). Mayer, Salovey, and Caruso (2008) define emotional intelligence as the ability to carry out sophisticated information processing about emotions and to use this information as a guide to thinking and behaviour. There is
significant personal stress involved for radiographers, and they must use emotional intelligence to learn to live with this occupational stress to safeguard their own mental health (Mackay et al., 2012).

These changes are part of radiography’s evolution to the level and status of a profession. As part of the professional responsibilities of radiographers, they need to cultivate attitudes and behaviours of professionalism which includes managing personal feelings in getting their job done (both their own feelings and those of their patients), being capable of building and maintaining professional relationships with patients, often in a short period of interaction, and considering situations from the perspectives of others (Mackay et al., 2012). This professionalism is shared with other healthcare professions involved in the frontline of emergency care. It is therefore vital that this professional skill set is embedded in the course curriculum and assessed.

3.1.3 Professional association and government regulation

The radiography profession is represented by professional associations both nationally and internationally. In Australia, the professional body for radiographers and radiation therapists was called the Australian Institute of Radiography (AIR) until June 2016, when it formally changed its name to the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT). ASMIRT sets expectations of professionalism for its members, offers indemnity insurance for members, organises conferences and online learning, and administers the Continuing Professional Development (CPD) monitoring system recommended by the national agency for professional registration. The international professional body for radiographers is the International Society for Radiographers and Radiation Technologists (ISRRT).

While membership of ASMIRT is not mandatory for radiographers, being registered with the Australian Health Practitioner Regulation Agency (AHPRA) has been compulsory since 2010 (AHPRA, 2016). Radiographers are also required to hold a radiation licence through their state-based Environmental Protection Authority (EPA) (Environmental Protection Authority of New South Wales, 2016). The professional and technical standards required of practitioners by these authorities are expounded upon in research-based publications associated with the relevant professional associations. These standards are expressed as professional capabilities that students are required to meet in order to graduate (AHPRA, 2016), and in the medical radiation sciences this includes the categories of professional and ethical conduct; communication and collaboration; evidence-based practice and professional learning; radiation safety and risk management; practice in medical radiation science; and practice in diagnostic radiography.

The professional journal for radiographers and radiation therapists in Australia is the Journal of
Medial Radiation Science (JMRS), which is an open access journal. It replaced the previous journal, known as The Radiographer, in 2013. Internationally, there are a small number of profession specific journals. These include Radiography (UK), and Radiologic Technology (US). For JMRS, a significant proportion of the content is original research by academic staff at universities. This research, however, is largely concerned with the technical aspects of the profession’s practice. Only two articles about assessment in radiography education have been published in Australian journals (Kilgour, 2011; Kilgour, Kilgour, Gerzina, & Christian, 2014). There have been several articles published in international journals, but their relevance to Australian radiography education is limited by differences in structure of the course, particularly the WPL components. For example, in the UK, students attend the same clinical centre for the entirety of their education, whereas all Australian courses utilise a multitude of different WPL locations.

3.1.4 Radiography professional education in Australia

There are currently 11 universities in Australia offering courses in radiography. All but one of these universities (RMIT University) offer four-year degree courses in radiography, and these courses all contain significant periods of clinical placement as integral components of the curriculum. The profession does not mandate a specific number of clinical hours in radiography training; in the courses this varies from the University of South Australia (UniSA) with 42 weeks, to Charles Sturt University (CSU) with 58 weeks over a four-year degree course. Many clinical centres accept students for WPL from multiple universities, this being particularly the case in the states and territories that have multiple courses (New South Wales, the Australian Capital Territory, Queensland and Victoria). Each of these universities has a different assessment framework for their students’ WPL experience, with the exception of the new course at the University of Canberra (commenced in 2016), which has adopted CSU’s WPL assessment framework.

Most allied health professions in Australia have internally established national standardised frameworks for the assessment of WPL across the various health professions, and all Australian universities use these standardised frameworks. Examples of this are Competency-Based Occupational Standards for Speech Pathologists (COMPASS) for speech pathology (Ferguson, McAllister, Lincoln, & McAllister, 2008); Assessment of Physiotherapy Practice (APP) for physiotherapy (Dalton, Keating, & Davidson, 2009); Student Practice Evaluation Form-Revised (SPEF-R) for occupational therapy (Rodger et al., 2016); and the Australian Universities Radiation Therapy Clinical Assessment Form (Dempsey et al., 2012). However, radiography does not have such a standardised assessment framework (Kilgour, 2011). Each university has developed its

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2 RMIT University offers a three-year degree in radiography.
own assessment forms which are similar in content. This is not ideal or appropriate for assessment of a student’s performance in the complex realm of professional practice (Dijkstra, van der Vleuten, & Schuwirth, 2010; Govaerts, Schuwirth, van der Vleuten, & Muijtjens, 2011; Yorke, 2011c), or for clinical educators working with students from multiple universities, in line with community expectation that graduates would achieve similar graduate capabilities and standards.

The challenge in assessing students’ performance, then, is to develop an understanding of the nature of radiography practice and practice standards expectations. This understanding must take into account the unique aspects of disciplinary knowledge and high-end technology skills and how they shape clinical decision making, communication skills and other soft skills to provide effective patient care. The capability standards for the profession, as defined by AHPRA and its subsidiary, the Medical Radiation Practice Board of Australia (MRPBA), should be a focus of teaching and assessment in radiography education. These capability standards allude to the fact that performance assessment in radiography is moving beyond the assessment of technical skills as its only focus, to acknowledge that professional practice involves professionalism, professional decision making and soft skills as well. Assessment frameworks employed in the assessment of WPL performance would need to consider the interactional, dynamic and contextual nature of radiography practice (Trede & Smith, 2014).

3.1.5 Professional culture in radiography

In order to understand the nature of the radiography profession, its professional culture should be examined. Even within the one profession, the culture varies from workplace to workplace. To succeed in their roles, radiographers must be capable of building and maintaining professional relationships in a short period of interaction, and of seeing situations from the perspective of others (Mackay et al., 2012).

In this context, culture is used as an inclusive term to describe the sum of a social group’s observable behaviours. Culture is an acquired social behaviour and encompasses: the way individuals within a defined group interpret the world around them and come to shared understandings; the way group-imposed norms operate in relation to how to function and relate in their sphere of existence; and the way that people in the group make and agree upon rules or decisions that affect common aims or ideas (Strudwick, 2015).

These agreed rules within a profession include internal hierarchies. New members of the profession soon come to learn the power structures, and the way to deal with and advance within these structures. The nuances of professional culture are intimately related to perceived hierarchies of healthcare professions (Hall, 2005). These characteristics of each unique
professional culture are reinforced through education, and thus the hierarchical structures are reinforced in student education. Professional education often has limited or no aspect of interprofessional learning and socialisation, which commences in the early stages of tertiary education, and becomes entrenched during WPL (Feuz, 2014). Thus, students are not exposed to professional cultures other than the pre-existing ones in their own profession, and the existing culture is perpetuated. This perpetuation can be either positive or negative, or a mixture of both. A key part of education should be to question taken-for-granted practices and assumptions.

Learners trying to negotiate the nuances of a particular professional culture soon learn that the specifics of the culture they are attempting to become a part of may either help or hinder their efforts (Watling, Driessen, van der Vleuten, Vanstone, & Lingard, 2013). For example, student radiographers who try to incorporate best practice in radiation protection for patients may be frustrated if they are placed in a setting where qualified radiographers are lax on this point. In this context, the culture regarding radiation protection which their tertiary educators are trying to engender is not being modelled by practitioners in students’ WPL settings. Students may have several responses to this, including adopting the lax practices being modelled, or continuing to do what they believe to be the right thing despite the poor example. In this example, the efforts of teachers in fostering enculturation and the efforts of students in pursuing enculturation are being hindered. However, should they be placed in another setting where best practice is carried out, students’ efforts at learning about the culture of their profession will be enhanced. It is therefore mandatory for those managing WPL programs to ensure students observe and participate in good practice and work with good role models during their WPL experience.

There are strong parallels between general or community-based social and professional group cultures, in that the ideas and constructs that affect the way the world is seen become innate to each individual in the group. In radiography, these behaviours, such as ways of phrasing speech, dress codes and reactions to stimuli, are learned by observing and copying qualified professionals in the workplace (Strudwick, 2015).

There is limited research that has explored the professional culture in radiography. Strudwick (2015) published a paper that explored various aspects of radiography professional culture. Radiographers within one large radiology department were surveyed regarding their views surrounding their professional culture. The professional values that rated the lowest among the radiographers surveyed were research, continuing professional development (CPD) and evidence-based practice (EBP), with resistance to change being most prevalent among older radiographers. These attitudes were attributed to much of the existing research in the field arising from the disciplines of medicine and physics, thus restricting the ownership radiographers had of the research and its findings. The paucity of research in the professional
culture of radiography reflects the challenge faced by educators seeking to assess radiography students’ performance in WPL without adequately considering the context of WPL performances: professional and workplace culture. To engage practising radiographers in meaningful WPL assessment of students under their supervision, it is important that they have a sense of ownership of the process, and it must reflect their perceptions of what is required in their profession (Kilgour, 2011).

Despite studies (Kilgour et al., 2014; Strudwick, 2015) that have identified negative aspects of the professional culture in radiography (e.g., emphasis on technical practices and lack of appreciation of human practice elements), Strudwick’s (2015) study found positive aspects as well. These included effective teamwork and collegiality in the workplace, fostering strong interprofessional relationships, positive role-modelling for junior professionals and a commitment to expanding the professional role of radiographers. Professional culture, as previously discussed, will vary from workplace to workplace. The effect of this variation in workplace culture on students’ performance will depend on individual students, but it must be taken into account when assessing their capabilities to practise.

In this section I have discussed radiography practice as an interactional, dynamic and contextual practice. Such practice is situated and, in addition to technical skill and disciplinary knowledge, requires responsive capabilities in unique practice situations. To assess radiography practices of students requires assessing their practice capabilities rather than their practice competencies. There are many different definitions of capability in the literature. Smith and Wilson (1992) provide a definition which is particularly salient, as unlike other definitions in the literature, it takes into account the situatedness of WPL.

The individual’s demonstrated capacity to perform, i.e., the possession of knowledge, skills, and personal characteristics needed to satisfy the special demands or requirements of a particular situation. (Smith & Wilson, 1992, p. 196)

This definition merges the commonly agreed aspects of competence—knowledge, skills and personal characteristics—with the situational and specific demands that represent the reality of WPL. Without considering these three practice features, interactional, dynamic and contextual assessment of student learning and capability development remains incomplete.

3.2 CONCEPTUAL FEATURES OF PROFESSIONAL PRACTICE

The previous section referred to the professional culture of the radiography profession. This culture has tended to largely focus on the technical skills required of radiographers. While these technical skills are vital to practising as a radiographer, they do not exist in isolation. Radiographers cannot practise these technical skills without incorporating the professional skills required of all healthcare practitioners. They need to work collaboratively, not only as part of a
healthcare team, but also interacting with patients, their families and the community in general. It is just as important to assess these professional skills in student radiographers as it is to assess their technical skills. The skills incorporated in radiography practice are represented in Figure 3.1.

![Skills for radiography professional practice](image)

**Figure 3.1. Skills for radiography professional practice.**

Professional practice is a broad and emerging field of research, and this section draws on ideas from leading researchers in the field, such as Kemmis (2009), Boud (2009) and Higgs (2010). The theoretical lens for exploring WPL assessment practices in radiography starts with discussing radiography as a professional practice located within a social practice frame of reference. There are three broad categories which summarise the unique features of professional practice: interactional, dynamic and contextual.

Professional practice is *interactional* (Higgs & Jones, 2008). This means it is about people, and so incorporates social and interpersonal aspects of professional practice. It is underpinned by professional culture, which should be an integral aspect of WPL assessment, even though it is often overlooked.

Professional practice is *dynamic* (Boud, 2009). Its nature changes over time. Some aspects of practice dissolve, become obsolete, others persist and new aspects emerge. This is firstly because the role of professionals is constantly evolving due to advances in technology, knowledge and research which dynamically influence professional practice. This is particularly the case in radiography, where equipment is rapidly evolving, and where research that informs WPL assessment practice is a relatively new, but expanding, phenomenon compared to other
professions. Cultural developments, the status of healthcare professionals in society and changes in the provision of healthcare also play into the dynamics of professional practice. WPL assessment in the profession needs to keep pace with the effect of technological progress on practice.

Professional practice is *contextual* (Boud, 2016; Trede & Smith, 2014). Practice does not occur in an empty, neutral space, but is shaped by its clinical practice environment. This includes factors such as geography, equipment availability, human resources, individual capabilities, policies and regulations, and workplace culture. Workplace cultures provide norms about what is valued and accepted. Professional practice needs to be understood in the context of the situation in which the practice takes place.

The remainder of this section explores each of these broad features of professional practice in the context of WPL assessment in radiography. These features overlap considerably but for conceptual reasons are discussed individually. A discussion of technical skill needs to be included in a comprehensive discussion of competence and capability in radiographers, and will be addressed in subsequent section 3.4.1.

### 3.2.1 Professional practice is interactional

Effective healthcare does not happen in the isolated practices of individual practitioners, it is interactional. Typically, radiographers work with other healthcare practitioners and patients and their carers. Quality healthcare provision typically involves teams working well together at a high standard of interaction, with patients in the centre.

With recent evidence that patient-centred care promotes health and recovery from illness (Boudreau, Cassell, & Fuks, 2007), radiographers can be a part of this person-centred process by combining their technical skills with people skills. This confluence of technical and people skills is succinctly summarised by Björkman et al. (2013), who highlight that in conducting an examination, radiographers are responsible for managing complex technical equipment, deciding on appropriate imaging protocols and sequences, and effectively communicating with patients, all simultaneously.

An integral part of this holistic approach to patient care is the concept of interdisciplinary practice and a team approach to patient care (Jansen, 2008). Healthcare teams involve an interdependent association of healthcare practitioners (Feuz, 2014; Martin et al., 2005), and radiographers are key members of this team. Other team members can, depending on the circumstances, include nurses, surgeons, anaesthetists, physiotherapists and speech pathologists, among others.
In the setting of healthcare teams, professionals can enhance their knowledge and capabilities by learning from those who are expert in other fields, thus having a direct impact on the quality of patient care (Martin et al., 2005). Radiographers exercising the level of patient care necessitated by being an integral part of such a team do not dilute their expertise and technical proficiency but rather enhance such capabilities. A patient who feels comfortable under the care of a radiographer is much more likely to be cooperative, and cooperation is vital for successful radiographic examination (Ehrlich & Coakes, 2016).

Radiography is a clinical practice and as such is interactional at multidisciplinary as well as intraprofessional levels. This ability to function as part of a radiography team is part of the professional culture of radiography, particularly in public health settings, where two or three radiographers can work together to carry out one examination. Each healthcare profession has a culture which is unique, rendering each profession a microcosm in the universe of healthcare. Each profession has specific professional values and expectations of its members, which reflects collective beliefs, customs, behaviours, attitudes, professional language and problem-solving methodology (Feuz, 2014). The unique professional culture of radiography provides a context for better understanding its WPL assessment practices and culture.

The concept of professional culture, and specifically its application to the radiography profession and its practice, was discussed in Section 3.1.5. The professional culture of a particular profession has a direct effect on not only the way it is taught in tertiary education, but in particular on the way practitioners teach professional skills in WPL. This effect was identified by Shulman (2005), who proposed the concept of “signature pedagogies”, whereby individual professions have their own unique methods for educating and socialising learners into their professional culture. These signature pedagogies, with their rules, structures and inherent responsibilities, help to understand productive learning methods employed in a particular profession (Watling et al., 2013). The signature pedagogies of a particular profession are also evident in the way assessments are carried out by members of that profession. WPL assessment frameworks need to account for the signature pedagogies of the relevant profession when assessing students’ WPL performance. Such frameworks assess students’ actual capabilities in context rather than out of context.

Professional practice is socially formed and structured (Kemmis, 2009). The fundamental nature of professional practice is based around social interaction on many levels. These levels include interdisciplinary and intradisciplinary professional levels but also the patient-professional level where individual backgrounds, needs and health beliefs come to the forefront. The way professional practice is viewed is determined by the “lens” through which the observer views it (Higgs, Loftus, & Trede, 2010). These lenses include features such as practice being a co-
production (not the work of any one individual), practice being conducted as part of a "community of practice", practice being viewed as an environment meant to transform the participants through critical reflection, and practice being carried out in order to meet specific standards and regulations. A psychometric “checkbox” approach to assessment of professional practice cannot possibly take all these lenses into account (Dijkstra et al., 2010; Yorke, 2011b). Professional practice is far too complex, diverse and multi-faceted to be assessed in this way.

More than framing the nature of professional practice, the way in which students learn professional practice must be considered. Students undertaking WPL learn through interaction with more experienced professionals on workplace placement (Rooney et al., 2013). Initially, learners may just be participating in work on the periphery (Lave & Wenger, 1991). They observe what experienced staff do, and then attempt simple tasks on their own. They look to more experienced staff for guidance and counsel, and through this, they gain the confidence to progress to increasingly complex tasks. Slowly and progressively, students are accepted as part of the team, and use the teams’ overall performance as their measure of acceptable standards (Boud, 2016). Not only is professional practice itself interactional, but the process of learning about practice is also interactional, perhaps to an even greater extent. Therefore, if a student’s progress in reaching the point of being able to practise independently is to be assessed, the interactional nature of both the learning and the practice must be considered.

3.2.2 Professional practice is dynamic

Professional practice never stands still and is never perfect. There are many aspects of practice which represent change in themselves, or which foster change. These include progress in technology, deeper understanding of disease and possible treatments, advances in educational techniques, shifts in culture and public awareness, and government funding changes, to name just a few. Because professional practice is characterised by these changes, it can be said to be emergent in nature (Boud, 2016). Practice is not only “fluid, dynamic and changeable”, but is characterised by its “alterability, indeterminacy and particularity” (Boud, 2009). Fortune, Ryan, and Adamson (2013, p. 217) emphasise that health practitioner graduates must have “…capacity to manage contestable, unpredictable, and highly complex situations” (p. 32) Because of this dynamic and changeable nature of professional practice, restricting its assessment to preset criteria severely limits the value of such assessments (Sadler, 2009a).

Radiography is a profession which is very dependent on technology (AIR, 2016). Progress in technology has more effect on its practice than other less technology-dependent professions. The last 40 years has seen the introduction of the CT scanner, the MRI scanner, rapid progress in ultrasound technology, general radiography progress from film developed in toxic chemicals to fully digital environments, and electronic image archiving, to name a few advances (Hillman
Within these broad categories of technological progress, there are subcategories as well. CT scanning technology has progressed from just being able to produce axial scans of the brain, to a modality capable of imaging virtually any body system in any plane. MRI is a more recent innovation but has also progressed dramatically in its capabilities (Runge et al., 2015). Ultrasound has developed from producing poorly defined images with little clinical benefit, to the point where it is considered a profession of its own by many (Romero, 2010). Producing images on film which are difficult to archive, difficult to transmit and subject to deterioration, has been replaced by a fully digital environment which is faster, safer and productive of a more permanent medical record (Okada & Blankstein, 2009).

The above is but a very brief synopsis of a handful of the technological changes in the profession in recent years. As a consequence, radiography WPL programs have had to adapt to this avalanche of new technology, in that students are, and need to be, exposed to these advances as part of their placement experience. However, the assessment of students working in this rapidly changing environment has not kept pace with these developments. In particular, the ability of students to adapt to changes in the profession brought about by technological advances is not currently assessed. Clearly, the dynamic nature of the technology involved in radiography must be incorporated into its assessment if the assessment is to be meaningful and authentic (Solomon, 2007).

Progress in technology is a result of the nature of science—scientists are always exploring new and potentially better ways of achieving goals (Flick & Lederman, 2004). This same overarching scientific principle of enquiry also applies to disease and injury and their treatments (Cohen, 2012). Scientists are constantly making new discoveries about disease and its treatment, and this leads to new imaging techniques to diagnose and treat. One of many examples of this process is the recently developed procedure known as vertebroplasty, where vertebrae suffering collapse due to osteoporosis are injected with bone cement under fluoroscopic control (Jay & Ahn, 2013). There are countless other examples of radiography procedures being developed and refined for new diagnostic and interventional requirements. In order to be a professional practitioner in this rapidly developing field, students must be assessed as to their ability to adapt and progress with the procedures they will be an integral part of as practising professionals. Clearly, WPL assessment in radiography must be flexible and adaptable to accommodate such progress.

Because of this changing technological landscape, radiography practitioners must be prepared to be dynamic in their adaptation to the changes. However, this dynamism is not restricted to adapting to technological change. Every situation practitioners come across requires them to be dynamic in adapting their practice to the unique requirements of that situation. Professional
practice requires practitioners to exercise reasoning, judgement and decision making in a
dynamic environment (Govaerts et al., 2011). In order to facilitate learning in such a clinical
environment, placements must be supervised and assessed, acknowledging that facilitation is in
itself a dynamic process, where supervisors and students work together in an environment of
mutual respect (Dickson, Walker, & Bourgeois, 2006).

As technology and knowledge of disease and injury has progressed, so has education for health
science practitioners (Juanes & Ruisoto, 2014). As has been discussed previously, radiography
education has progressed from a TAFE-based certificate course to university degree courses in
recent years. Even within degree courses, there has been change to accommodate evolving
circumstances, an example being the gradual change from three-year to four-year degree
courses. Universities offering courses in radiography have had to introduce new subjects and
new equipment to give students the theoretical background for entering dynamic clinical
environments. However, this has not been reflected in concomitant changes in the way
students’ WPL performance is assessed (Kilgour, 2011). The radiography profession in Australia
has realised that changes in clinical education are necessary, and this has resulted in
organisations such as Medical Imaging Clinical Educators (MICE), which originated in Queensland
and has chapters in Victoria and New South Wales. Nonetheless, this movement from within the
profession has not resulted in universities changing the way that WPL is assessed to incorporate
these curricular changes.

Just as technology has progressed, and radiography education has progressed to meet practice
requirements, so public perceptions and expectations of healthcare have advanced (Amira ep
Koubaa, 2011). Healthcare is much more patient oriented in current times than even 40 years
ago (Titter, Koivusalo, & Ollila, 2010). Thus, “customer service” is an increasingly essential part
of every radiographer’s skillset. Another important factor which has led to the requirement for
advanced interpersonal skills in Australian radiographers is the increasing multiculturalism in
Australian society (Healey, 2005). Multiculturalism has led to challenges in communication,
religious taboos and requirements, understanding of the role of family in healthcare, and even
simple social norms such as greeting with a handshake. Thus, the provision of culturally
competent healthcare for an increasingly multicultural society has become increasingly
complex. The ability of radiography students to adapt to these changes is not assessed in current
WPL assessments, and this must be addressed if students’ true capabilities are to be determined
by such assessments.

An aging population, increasing financial demands of implementing technological change, and
an increasing percentage of the population dependent on welfare mean that government
funding for healthcare in Australia is struggling to keep up with demand, particularly for high-
cost services. Thus, professional practitioners need to be increasingly resourceful in finding ways to do more with less. Professionals need to be innovative and be able to demonstrate efficient use of scarce resources. These attributes are all part of the dynamic requirements of modern professional practice, and thus need to be part of the WPL assessment for radiography students.

Practice is always transformative (Kemmis, 2009), meaning that it produces changes in peoples’ understanding, physical circumstances and social interactions. The ability of practitioners’ actions to produce these changes is a reflection of how well their practice implements the dynamic nature of professional practice. In order for WPL assessment to capture this feature of students’ performance, the assessment process must be sufficiently broad and flexible to ensure that changes in practice are reported on and considered as part of their professional capabilities.

3.2.3 Professional practice is contextual

Professional practice is influenced by so many factors outside of the core profession specific skills, the context of the assessed performance must always be taken into consideration. The way skills are practised depends on existing resources, the time available to exercise the skill, the nature of the patients for whom the skill is practised, the culture of the workplace in which it is carried out and the ability of the practitioner who is carrying out the task (Trede, 2015). Therefore, determining students’ capability to undertake professional practice must take these contextual factors into account in order to be a reflection of their actual capability.

Whether the exercise of skills should be classified as an achievement depends very much on the context of the situation in which it was exercised (Sadler, 2010). A fundamental aspect of the efficient and capable performance of professional activities relates to situational understanding, which involves taking the context of the performance into account. Because of the variations in the contexts of clinical performance, no single assessment method can evaluate the entirety of a student’s professional capabilities (Hager, Gonczi, & Athanasou, 1994).

Students’ performance in the workplace is moulded by a variety of external factors, including the context of the situation, as well as the interactional, social and dynamic features of professional practice already discussed. Therefore, the assessment of students’ workplace performance should be based on their practice capability, rather than theoretical achievement (Trede & Smith, 2014). The skills that students develop in handling these external factors in real practice contexts creates confidence for them to work in other contexts which are previously unencountered (Walsh, 2007). The situations into which students are placed in order to develop these skills should be deliberately designed to promote transferability from one context to another (Orrell, Cooper, & Bowden, 2010). This argument emphasises a vital feature of professional practice, that is, practitioners must be able to undertake their practice irrespective
of the context of their practice. They must be able to adapt to whatever circumstances are present and remain competent and capable.

When these general principles are followed in planning and implementing students’ WPL experiences, students are enabled to encounter a wide variety of contexts in their courses. Therefore, due to the wide variety of contexts which students experience in such placements, adopting traditional assessment methods will result in questionable credibility of the assessments produced. These traditional methods attempt to apply the scientific, psychometric assessment processes used in traditional education to the constantly changing context of WPL. The world of WPL requires a different assessment paradigm to that of theoretical, on-campus academic assessment of learning (Hodges, 2011). This paradigm is not so much about measurement, as it is about reasoning, judgement and decision making in the variety of contexts encountered (Govaerts et al., 2011).

3.3 ASSESSMENT MODELS FOR PROFESSIONAL PRACTICE ENTRY

In this section I discuss broad assessment models for professional practice entry. The purposes of assessment and how these models align with these purposes is considered, followed by the concepts of formative and summative assessment. Knowing and doing are vital aspects of professional practice, and these will be examined in the light of WPL assessment. Finally, the relationship between assessment and learning is explored.

3.3.1 Purposes of assessment

Assessment is a valid educational tool (Moore & Vaughan, 2016), and can take on a variety of forms for a variety of purposes (Baartman, Bastiaens, Kirschner, & van der Vleuten, 2007). The one thing all forms of assessment should have in common is that they are useful for facilitating learning. Only in recent times has WPL assessment been seen as a unique area of educational practice and of research, and traditionally methods of academic assessment had been applied to WPL contexts (Hodges, 2011). Traditional assessment strategies are narrow and focus on the act of judging or deciding the amount, value, quality or importance of something, or the judgement or decision that is made. However, definitions such as this say nothing about assigning grades to what is assessed. Assessment takes many forms, and fulfils a variety of interrelated necessities (Hodges, 2011). While supporters of traditional assessment strategies may see assessment with no grade attached as being of minimal use, it must be understood that traditional assessment is inextricably linked to norm-referencing. Norm-referenced assessment ranks the assessee among his/her cohort, who are all undertaking the same assessment task. This is opposed to standards-referenced assessment, where students are assessed against standards agreed on by their profession, and not against other learners undertaking the same
assessment task. Contemporary thinking has realised that assessment goes far deeper than just ranking the members of a cohort.

Consideration must then be given to understanding the differing purposes of assessment and making sure that the form of assessment chosen matches the purpose of the assessment. Making the delineations between different assessment purposes clear and making sure the assessment method aligns with its purpose, will ensure that the assessment not only allows students to attain the intended learning outcomes, but also makes sure that the attributes being sought are the ones being assessed (Baartman et al., 2007).

The WPL environment and the academic environment are vastly different, and thus student performance in each of these environments needs to be assessed differently (McGill, van der Vleuten, & Clarke, 2011). Furthermore, academic assessment is a measure of what has already been learned, whereas practice assessment in WPL makes judgements regarding the more intangible facets of students’ overall capabilities in action in practice.

Academic staff who adhere to the “silo” concept of knowledge and do not understand the more intangible judgements required in assessing WPL performance tend to teach in a way that promotes knowledge retention rather than understanding. However, those with a whole-of-course perspective, which includes WPL, see their role more as encouraging students to understand concepts rather than isolated facts (Prosser, Martin, Trigwell, Ramsden, & Lueckenhause, 2005).

Quality assessments, irrespective of their purpose—that is, whether formative or summative—should always have learning and, in a WPL context, performance improvement, as their focus (Hodges, 2011). One of the differences between the two types of assessment is the recording of grades for the summative assessment. Sometimes, grades are awarded for formative assessment, but these do not count towards the overall grade for the subject—they are meant as feedback for students. Academics have the task to align WPL assessment design with the overall subject design for assessment. Unlike the academic environment, where one academic staff member, or a small team of academic staff members, grades the work of a single cohort, the same cohort in the WPL environment has multiple assessors. Even within the one WPL placement site, the same student may have multiple staff contributing to the final assessment consolidated by the primary supervisor, or formative and summative assessments that contradict each other because of different perceptions by different staff (Kilgour, 2011).
3.3.2 Formative and summative assessments

Assessment is generally divided into formative and summative assessment. The primary distinction between formative and summative assessment relates to purpose and effect, not to timing (Sadler, 1989). Therefore, it is essential that academic staff designing assessment tasks keep the purpose and the desired effect clearly in mind when developing the strategies to be used. It is also essential that assessors stay focused on the purpose and effect of the assessment when carrying it out.

Formative assessment involves student reflection and utilisation of feedback, and is focused on performance and the application of conceptual learning and integration of capabilities into everyday practice (Orrell et al., 2010). While good evaluations and well-constructed feedback can have a positive impact on student performance and development, poorly thought through and unwarranted positive evaluations not only give students a false idea of their ability, but also put patients, the placement site and students themselves at risk in a WPL setting (Orrell et al., 2010). Good feedback is always free from assessment of factors which are not relevant to student performance (Sadler, 2010). These extraneous items in an assessment can inhibit students from determining what the attributes of good performance actually are. It is therefore important that assessors understand the specific purpose of an assessment task and limit their comments to that purpose. It is also important that the designers of the assessment task keep the objectives firmly in mind, so that students are not being assessed on areas that are not relevant to the required learning.

Although formative assessment is vital, there is still a need for summative or graded assessment of students. This is necessary to recommend a student for graduation, and membership of a profession (Moore & Vaughan, 2016). Summative assessment does not have the hallowed status within higher education that it once had (Boud & Falchikov, 2007). At one time, the exam was considered the definitive assessment, and the true indicator of students’ learning. Subsequently, other graded assessment tasks, such as essays and other research assignments, rose to equal status. As concepts such as reflective practice and learning styles have been researched, so new variations of assessment have been developed. More recently, as the concept of assessment for learning rather than assessment of learning has taken precedence, with formative assessment tasks introduced into the mix (Baartman et al., 2007; Orrell et al., 2010). Indeed, many scholars have criticised summative assessment as having a deleterious effect on learning and the progression of students’ understanding (Ecclestone, 1999; Knight, 2002; Knight & Yorke, 2003).

Despite this growing chorus of detractors, there remains a need for summative assessment in courses of study, including in the domain of WPL. This need is driven by the requirements of professional and government bodies, as well as employers, for higher education to have
defensible and sound proof of students’ capabilities developed within their studies (Moore & Vaughan, 2016). Ultimately, society expects that there will be sound and comprehensive assessment of students’ skills before they are allowed the privilege of joining the profession they have studied for. Quality summative assessment provides the assurance that they are fit to practise (Embo, Driessen, Valcke, & van der Vleuten, 2015). In particular, with regard to Australian radiography courses, universities need to be able to prove to the government regulating authority (the MRPBA) that graduates have met the required professional capabilities and a summative assessment is thus the best form of assessment to achieve this outcome (AHPRA, 2016).

For summative assessments to meet the requirements of defensible proof of students’ capability, the marks awarded should be intelligible to all stakeholders (students, assessors, higher education staff and employers). However, when summative assessment is restricted to the use of standardised assessment forms, as has traditionally occurred in radiography WPL assessment, the multitude of individual circumstances that shaped student performance in the assessed tasks is ignored, and the critical nature of the assessment is “dumbed down” or lost altogether (Trede & Smith, 2014). Currently, no published research has investigated radiography WPL assessment beyond the use of standardised forms. In addition, there is no published research which investigates the consideration of the context of radiography WPL placements on student performance and demonstration of capability. The need is obvious for radiography as a profession to find a more credible, dependable, confirmable and transferable framework to assess its WPL programs.

The perceived need to defend decisions regarding student capability has had a tendency to incline summative assessment of WPL towards rubrics and finely specified assessment criteria. While this approach may have some merit in a purely academic context, it does not consider the complexity of the WPL environment (Yorke, 2011a). True clinical capability considers professional behaviour in a range of applicable circumstances. To provide a summative assessment of clinical capability using measurement tools designed to assess quantitative knowledge is to use assessment methods applicable to students being passive receivers of knowledge, rather than active participants in the learning process. This is limited to providing an accurate picture of basic knowledge, rather than complex clinical skills (Baartman et al., 2007). The WPL environment is a complex environment, and the desired skills are complex skills, so a traditional scientific measurement process will never be adequate to describe students’ complex skill development (Fraser & Greenhalgh, 2001; Gardner, Hase, Gardner, Dunn, & Carryer, 2008).

Because all assessment in WPL is situated and varies from context to context, a checklist approach to summative assessment can never do student performances justice. No assessment
checklist can possibly cover the infinite number of situations that can present in the clinical environment. Therefore, assessment must be based on informed judgement (Yorke, 2011d). Of course, there must still be assessment of technical skills, but it must be remembered that technical skills are only one part of the overall capabilities of students (Yorke, 2011d). Multiple assessment tasks are required to cover the various skills and competencies that make up overall capability. These tasks need to be varied like the skills they assess, and the course learning outcomes they address (Sadler, 2015).

Quality assessments, whether formative or summative, should always have learning benefits and, in a WPL context, performance improvement, as a key focus (Hodges, 2011). The difference between the two types of assessment is the recording of grades for the summative assessment and its focus on achievement of overall standards. These grades must be a valid representation of the true merit of student performance (Walsh, 2007). In order for this to occur, the following must take place: assessors must focus on the required learning outcomes (that is, the description of what true capability looks like); assessment must be continuously consistent with a student’s overall performance; and different assessors should be able to come to the same conclusions regarding student performance when observing the same event multiple times (Orrell et al., 2010).

When discussing summative assessment, it is important to consider the effects that the nature of the assessments has on the learning processes of students. This is because the effectiveness of student learning has been shown to be affected by the perceived demands of the assessment tasks set, and the way the tasks are constructed. The cognitive and metacognitive processes of students are all regulated by their perceptions of what is required of them to be deemed capable (Cilliers, Schuwirth, Herman, Adendorff, & van der Vleuten, 2012). This has important implications for educators when designing assessment systems, as all assessment should be productive for students’ learning (Orrell et al., 2010).

The vitally important nature of summative assessment in developing capability leads to some serious questions regarding how the summative assessments are carried out. Many of these questions are related to the nexus between the lack of recent clinical experience of most academics, and the lack of educational experience of most clinical staff. The remainder are related to the integration of WPL and its assessments into academic curricula (Yorke, 2011a).

There needs to be coherence between the academic and WPL components in a course of study—particularly their assessments (Yorke, 2011d). This coherence requires academic and clinical staff to be “on the same page” with regard to their roles, and the place of summative assessment in the degree. There needs to be education of those stakeholders outside academia as to what
summative assessment can actually achieve, and the myths surrounding it (Yorke, 2011c). These myths include the notion that adding up numerical scores awarded to discrete attributes can give an accurate picture of practice capability, and that a list of these attributes can somehow describe every necessary aspect of practice.

Both formative and summative assessment are vital to assessment of WPL because they perform different roles. These different roles need to be distinct and not confused (Orrell et al., 2010). Hodges (2011) contends that the prime purpose of judgement in formative assessment is student improvement, whereas in summative assessment, the judgement itself is the primary purpose. Sadler (1989) concurs, stating that the most significant difference between the two is the purpose of the assessment and its intended outcome. However, Burchell, Higgs, and Murray (1999) state that the formative and summative assessments should be in the same format for the purposes of preparing students for the final assessment task and avoiding confusing messages. If the same format is used for formative and summative assessment, the differences between the two assessments need to be clearly outlined to students so there is no confusion, and so that they gain maximum benefit from them. This is key to how the required professional capabilities are assessed—students and assessors must be in no doubt as to the purpose of each assessment task, and whether it is formative or summative.

3.3.3 Knowing and doing—Miller’s pyramid

Miller’s pyramid is a concept first described by Miller in 1990 (Miller, 1990), and is an often-used illustration of the stages of developing clinical capability, and the depth to which it is assessed by various assessment strategies (see Figure 3.2).

![Miller's pyramid of competence](image)

Figure 3.2. Miller’s pyramid of competence.
When students are taught the theoretical basis of the skills required for their chosen profession, they “know”, or can describe, the relevant theory. When they are asked to describe how those skills would be practised, students can show that they “know how” to practise them. When asked to demonstrate the skills in a simulation environment, students can demonstrate that they are able to “show how” the skill is performed. When they actually demonstrate the skill in a real clinical environment, they are able to be assessed on the “does” level of the pyramid (Crossley & Jolly, 2012).

WPL is regarded by many as the best setting for students to demonstrate their actual capability to practise. For this reason, it is vital that the assessment of the WPL experience is a credible, dependable, confirmable and transferable judgement of that capability (Smith & Wilson, 1992). It must be a judgement rather than a quantitative measure (Baartman et al., 2007; Orrell et al., 2010), as the skills being assessed are contextual (Govaerts et al., 2011). In order for this to happen, the assessment must be a seamlessly integrated part of the WPL experience (Dijkstra et al., 2010; Hager et al., 1994). When WPL assessment is seen as a “tacked on” requirement rather than an integrated part of the placement, the context of assessable situations is lost, and with it the relevance of the assessment.

One of the main benefits of integrating assessment in this manner is that it facilitates all assessment into a learning focus; that is, students gain relevant skills and knowledge by engaging with all set assessments. The assessment tasks are not just a measure of what knowledge students have retained, and what skills they have mastered, but are actually an exercise in learning in and of themselves (Baartman et al., 2007; Sadler, 2010). This also speaks to the importance of having WPL components of a course integrated into the curriculum, not just existing as separate entities, or considered to be of lesser importance (Yorke, 2011d). When WPL is not considered an integral part of curricula and curriculum design, it becomes an “afterthought”, languishing on the edges of course design, and not taken seriously by academic staff (Hodges, 2011). The importance of WPL must be recognised by faculty, otherwise it will not be given the same level of importance as theoretical academic content. When this situation is allowed to develop, courses will not be able to graduate practitioners who have credible, dependable, confirmable and transferable fitness to practise. Lester and Costley (2010) discuss the importance of integrating assessment in developing the self-management and independence of thought required to be an expert practitioner:

The aim of assessment is generally to assess learners’ progress as ‘map-makers’ or self-managing practitioners, not to confirm their conformance as ‘map-readers’. (Lester & Costley, 2010, p. 566)
This quote neatly summarises the vital attributes of work-ready professionals in any field. They are not just people who can follow direction (although they can do so when required); they are people who can assess a situation and work out what is the best direction to follow in that situation (Biggs, 1996). It is essential, then, that this ability to be dynamic decision makers, and to be able to interpret ever-changing clinical presentations, be assessed in students’ WPL performance (Govaerts et al., 2011). Of course, this context specific decision-making capability is developed through working in different contexts, and equally importantly, these contexts must be taken into account in the assessment regime implemented (Finlay, 2008; Fraser & Greenhalgh, 2001).

3.3.4 Assessment and learning/relatio of assessment to learning

Assessment, regardless of whether formative or summative, should always include elements for learning (O’Donovan, Price, & Rust, 2004; Sadler, 2010). Assessment practices fail to address students’ needs when they encourage teaching for assessment, rather than teaching for learning (Baartman et al., 2007). When this happens, assessment tends to be substituted for genuine learning, which is far from ideal (Torrance, 2007). It is thus vitally important to consider the exact purpose of a proposed assessment when designing curricula. The purpose will inform the design of the assessment, and also the way students are instructed regarding it. Specifically, curriculum designers must, when considering WPL and its assessment, consider exactly what it is that is being assessed. Investigation must take place into the design of WPL assessment in radiography, to ensure that context is considered, and that all possible criteria for determining students’ capabilities are examined.

Baartman et al. (2007) make some salient comments on the relationship between assessment and learning. Not only does assessment which only aims to measure learning fail to promote learning, but it ignores individual differences between students. It promotes what Sadler (2007) refers to as “coaching over the line” (p. 390), where students gather just enough information to pass the assessment tasks which are set, rather than engaging with the content and absorbing it into their practice. This type of assessment does not take into account the situated nature of the WPL environment, nor does it consider the ability of students to modify behaviour based on the situations that confront them. Orrell et al. (2010) call this “surface learning”, using this term to describe when students know what to do in prescribed situations, but do not understand how or why to modify performance to take into account the changing nature of clinical practice.

It is this situated nature of clinical practice which is the most complex part of assessing WPL performance. The theoretical basis of health science practice can be assessed at the low levels of Miller’s triangle, but the practical skills which are fundamental to practice cannot be assessed by the same methods, as these only make judgements regarding superficial learning out of
context (Crossley & Jolly, 2012; Hager & Gonczi, 1991). A good way that the “does” level of Miller’s pyramid, and thus deep learning, can be assessed, is in the WPL environment (Wass, van der Vleuten, Shatzer, & Jones, 2001).

Specifically considering the radiography profession, the assessment practices used for students undertaking WPL must be further developed so the depth and richness of practice within its wider context is acknowledged and assessed. Traditionally, WPL assessment in Australian radiography courses has tended to concentrate on technical aspects of competence (Kilgour, 2011). While this approach can graduate practitioners who possess the ability to successfully undertake a medical imaging examination, it leaves the patient care aspect of the profession up to the individual’s personality traits, rather than making it a prerequisite and assessable item for entry into practice. There is a paradox in measuring performance supposedly at the top of Miller’s pyramid using assessment best suited to the bottom level. This is unacceptable, and completely neglects the concept of patient-centred care (Marshall, Kitson, & Zeitz, 2012).

While radiography practice is primarily technical in that it is fundamental in disease and injury diagnosis (Reeves & Decker, 2012), technical competence must not be at the expense of interpersonal competencies. These competences are not, and should not be, mutually exclusive. To state that the profession is primarily technical is to imply that this aspect is the most important, and patient care is secondary, if considered at all. Whilst a radiographer’s role is concerned with diagnosis, if it is to be considered part of the work of the larger medical community, patient care must be viewed holistically, and these holistic care capabilities must be part of the assessment regime. Therefore, it can be seen that, given the adoption of the principle of assessment for learning, assessing student radiographers’ WPL capability of necessity will incorporate the learning of these skills as part of the assessment regime applied.

Many different models of assessment exist, and for assessment to be credible and transparent, the models employed need to have a good match with the purpose of what is being assessed. Psychometric measurement models are suitable to assess technical domains but they are not sufficient to credibly assess for student capability which should include interactional, dynamic and contextual features. Yet current models for assessment of WPL performance in radiography students are largely psychometric (Kilgour, 2011). The professional judgement of experienced practitioners has been shown to be trustworthy in determining the capability of students they are assessing (Yorke, 2011c), and yet in current assessment models, this is largely ignored.

The following section will conceptualise a radiography assessment practice model which seeks to include the currently unassessed aspects of practice, while not neglecting the important technical skills required of radiographers.
In the final section of this chapter I bring together the discussion above in a conceptual assessment model for radiography. This model takes into account the changing nature of radiography as a profession, the theoretical concepts of professional practice and pertinent models of assessment. Figure 3.3 illustrates this conceptual assessment model.

![Figure 3.3. A conceptual assessment model for radiography underpinned by social theory of practice.](image)

This model consists of four interdependent dimensions which together make up professional practice capability. These are technical skill, contextual, dynamic and interactional dimensions. Each on their own would remain incomplete and only when assessed together can professional practice capability be evaluated. Because each dimension focuses on different features of practice, different assessment strategies might be applied for each dimension. The nature of the radiography profession, with its unique combination of these four dimensions, means that if a well-researched and conceptualised WPL assessment strategy is not employed, the skills required for effective practice are not effectively or holistically assessed.

Radiography practice is a high risk, highly technical practice and it is imperative that students are assessed on their technical skills to ensure future practice safety. Assessment of radiography WPL has typically confined itself to assessing technical competence. This focus on technical competence is historically situated because the professional culture of clinical radiography has typically valued technical skills over professional skills (Reeves & Decker, 2012), often at the cost of neglecting interactional, dynamic and contextual domains when assessing students’ WPL performance. This is a situation not unique to radiography, and other allied health disciplines such as occupational therapy also focus on skills and knowledge that are technically focused (Fortune, Ryan, & Adamson, 2013).
The past focus on assessment of technical skills has meant that clinical radiography supervisors feel under-equipped to assess students’ broader professional skills. They either use their own ideas of what constitutes good performance, without reference to standards or assessment criteria, or write an incomplete report, feeling that this makes them less likely to be “wrong” (Burchell et al., 1999). The result is a superficial approach to student WPL-based assessment in the radiography profession (Kilgour et al., 2014), with a focus on what is measurable and visible.

This superficial approach to assessing professional skills is reflected in the student assessment strategies employed by most Australian universities for radiography WPL. These typically report rigorously on technical skills, and when other skills are included in assessment, the assessment strategy is psychometrically based. Psychometric assessment strategies are broadly suitable for assessing technical competence—in that many highly technical skills are either “can do” or “can’t do” (Yorke, 2011c). However, such an approach is not sufficient for assessment of more complex professional practice capability. From the point of view that capability is not the sum of separate entities but an integrated whole, it is only logical to conclude that no single instrument, no matter how psychometrically sound, can provide all the information for a comprehensive evaluation of competence in a health-related domain (Dijkstra et al., 2010). Different aspects of capability therefore require different assessment strategies.

3.4.1 Technical skill dimension

The theoretical model proposed includes psychometric measurement of specific required technical skills. Focusing on the quantitative properties of tasks or processes being assessed correlates well with pre-determined assessment criteria, and can be used for the assessment of discrete technical skills (Govaerts et al., 2011). In radiography, these specific technical skills must be demonstrated to gain approval from the MRPBA for professional registration. These technical skills include patient positioning to demonstrate queried pathology, anatomical and pathological knowledge, understanding of radiation safety and the “as low as reasonably achievable” (ALARA) principle, computer-based skills required for the successful operation of imaging equipment and the associated information systems, the fundamentals of x-ray production and how this relates to exposure factors, and a plethora of other technical skills (AIR, 2016). A psychometric assessment strategy is appropriate for the assessment of these skills, as they are measurable using scientific measurement strategies (Crossley & Jolley, 2012; Govaerts et al., 2011).

The technical skills measured in this way, while important in terms of assessing technical prowess, cannot be assessed with the same assessment strategy as the interactional, dynamic and contextual nature of professional practice. The latter domains require other assessment strategies to assess overall professional practice capability (Dijkstra et al., 2010). Assessing technical skills is fundamentally different from assessing integrated practice skills (Trede, 2015).
Psychometric assessment is not appropriate for judgements of students’ ability to demonstrate holistic capability (Dijkstra et al., 2010; Govaerts et al., 2011). For example, if a WPL assessment framework uses a rating of 1–10 for every assessment criterion, and one of the criteria is “Fits in with workplace culture”, a score is meaningless. Such criteria need a descriptive assessment for them to have any meaning, and also for them to have any formative value to the student. As one moves from straightforward technical ability to situations calling for integration of capabilities, assessment becomes more a matter of judgement, and therefore a shift in assessment paradigm is required (Yorke, 2011d). In the model proposed, therefore, the psychometric assessment of specific technical skills needs to be meaningfully integrated with other assessment strategies. The model acknowledges that psychometric assessment of technical skills is already carried out satisfactorily in Australian radiography WPL assessment, and the purpose of this proposed conceptual model is to integrate the technical skill dimension with assessment strategies suitable to assess the other three dimensions required for professional practice.

3.4.2 Interactional dimension

As discussed earlier in this chapter, effective healthcare does not happen in isolation. Radiography is progressively becoming more a part of interdisciplinary healthcare, which is generally considered the way of the future for healthcare (Boud & Falchikov, 2007). This interdisciplinary team involves radiographers working with not only other health professionals, but also patients and their carers. As this is a vital part of contemporary healthcare, it should be assessed in any WPL assessment strategy.

Having practice knowledge is a vital contributor to professional practice. Practice knowledge is best demonstrated and put into practice in a supportive environment, where radiography students are a part of positive interactions between themselves and other staff, and where they are supported to apply their knowledge in their interactions with patients and their families. Because radiography involves the application of potentially harmful radiation to patients, it is important that this aspect of knowledge is thoroughly understood. While knowledge of radiation safety is largely technical, learning to apply it safely in the multitude of situations faced by radiographers in daily practice is learned best in an interactional environment. This also speaks to students’ clinical reasoning. While they might have technical knowledge of specific injuries and diseases, and understand the best way to demonstrate these conditions radiographically, actually being able to reason from cause to effect in the application of this knowledge is a skill which is a vital part of professional practice and needs to be assessed.

Part of being a graduate healthcare practitioner is independence of practice, or the ability to act competently and responsibly without supervision. During WPL placements, students will
develop independence slowly, with their confidence being enhanced by positive interactions with colleagues and patients during their training. This development also links to students’ time efficiency, which is a product of growing confidence in their knowledge and ability.

Task ability is the ability to carry out a specific task, regardless of the other issues surrounding the situation practitioners find themselves in. An example is achieving diagnostic images with a patient who is inebriated or severely injured, as opposed to a more cooperative patient. Achieving the imaging goals in trying circumstances is an interactional not just a technical task, so it can be seen that the interactional dimension of professional practice again is a critical part of students’ WPL assessment.

Interpersonal capabilities are seen by the MRPBA as a specific attribute, yet it actually encompasses all the dimensions of professional practice discussed thus far. The term “interpersonal capabilities” describes the interactional nature of professional practice, in that a practitioner with only technical skills is not able to develop the other requisite skills for professional practice.

In order to reconstruct WPL learning assessment, broad principles for assessment are discussed in the following. The first issue that needs to be addressed is identifying the range of skills and knowledge that are to be assessed. In particular, students’ interpersonal skills are an important factor. One way of capturing these skills in an assessable format is to engage students in critical reflection (Hodges, 2011). Many learning opportunities of this nature occur informally, and WPL assessment strategies should take this into account.

WPL assessment strategies that are based in scientific or psychometric measurement are not suitable to measure professional achievement, and should be replaced by assessment methods that use professional judgement to inform assessment outcomes (Yorke, 2011b). This enables the prevailing circumstances to be taken into account when assessment decisions are being made. Professional practice capability cannot be pre-specified and assessed out of context (Yorke, 2011b). Thus, the model proposed for assessing the interactional dimension of professional practice would include an element of reflective writing by students, and an assessment from clinical supervisors which allows supervisors’ professional judgement to inform the assessment outcomes.

3.4.3 Dynamic dimension

Professional practice cannot be static. The nature of a profession is that it is “fluid, dynamic and changeable” (Boud, 2009, p. 32). This applies to technological progress relevant to the field of practice, education for the profession in question, budgetary constraints, public perception and expectations, and many other facets. Thus, to assess the dynamic dimension of professional
practice, the assessment regime used should also be dynamic. This section will look at the
dynamic dimension of radiography practice and discuss how it may be assessed to take this
dynamism into account.

Because the knowledge base of the radiography profession is rapidly increasing (AIR, 2016), the
practice knowledge employed by practitioners and students should also increase. Radiography
equipment and the related technical operation processes are subject to continual research and
improvement, and practitioners need to keep pace with this. Radiography is also increasing its
professional status (AHPRA, 2016), and this requires increasing professionalism from
practitioners.

Practice knowledge, however, involves much more than technical skills. It also involves being
able to cope with the changing nature of professional practice, and to adapt to changing
circumstances (Hodges, 2011). This is the essence of the dynamism of professional practice, and
it is this multidimensional dynamism that should be assessed if students’ true performance is to
be captured in the assessment.

Professional and clinical reasoning is a capability that reflects the dynamic nature of professional
practice. Clinical reasoning, problem solving and critical appraisal are all integral parts of
professional practice (Moore & Vaughan, 2016). In the environment of radiography practice,
every patient presentation is unique, and thus there are new clinical reasonings to implement,
different problems to solve and alternative outcomes to critically appraise. These skills segue to
the task ability aspect of practice, which involves integrating external complexities into
practitioners’ clinical decision-making processes. These complexities can include patients who
have limited English; patients who are angry, in pain or unresponsive; equipment malfunctions;
cultural issues with patients or their families; and a plethora of other possible issues.

Traditional assessment methods have insufficient concentration on the development and
assessment of clinical reasoning (Hager et al., 1994). As the clinical reasoning required in every
clinical situation encountered is dynamic, a “one size fits all”, psychometric approach to
assessing it cannot be suitable if a true assessment of a student’s capability in this area is to be
obtained. The major difference between WPL and learning undertaken in an academic
environment is that WPL events are inherently variable, unpredictable, often brief and not
replicable. Therefore, assessments of WPL performance need to be equitable, mindful of the
diversity of WPL experiences, and include a variety of tools which capture different aspects of a
student’s WPL capability (Moore & Vaughan, 2016). Qualitative feedback provides more useful
feedback to students than does quantitative, in that it allows them to act on specific
shortcomings observed in their performance (Moore & Vaughan, 2016). Therefore, the
quantitative, psychometric assessment strategies traditionally used in radiography WPL assessment to measure technical competence are best supplemented by qualitative assessments, using the professional judgement of assessors as the fundamental basis for both feedback and summative scores (Yorke, 2011c).

3.4.4 Contextual dimension

Every circumstance of clinical practice has its own unique context. Factors influencing the context of a clinical situation in radiography practice include available resources, location in public versus private radiology departments, current patient load and thus time available for the examination, and prevailing workplace culture (Trede, Mischo-Kelling, Gasser, & Pulcini, 2015). No assessment of a student’s WPL performance can be considered complete without considering the contextual dimension of practice.

In a radiography professional practice situation, consider two patients presenting for a chest x-ray examination. The first is a walking patient, 20 years of age, female and of average body habitus (that is, within the mean range of body mass for their height), with a clinical history of a cough for one week. The second is a man lying supine on a fracture board, having been extricated from a car accident. This patient is 75 years old, weighs 180 kilograms, presents with multiple serious injuries, and is uncooperative and aggressive, possibly due to a closed head injury. Both patients require the same examination, but the context of the examination is vastly different. The practice knowledge required to carry out the same examination is significantly different, and yet traditional Australian radiography WPL assessment pays little if any attention to these differences.

This hypothetical scenario leads to the next aspect of professional practice to be considered: degree of independence. It will be relatively easy for students to demonstrate independence of practice with the first patient, but they will need to have far more advanced skills in order to demonstrate independence with the second patient. These factors need to be captured in the WPL assessment strategy applied if it is to give a true indication of a student’s capability.

In the above scenario, the first procedure would take a capable student less than five minutes to undertake, whereas the second would take significantly longer. The time efficiency of the student’s practice cannot be commented upon unless the circumstances encountered are considered in the assessment. The same comment can be applied to the clinical reasoning aspect of professional practice. The first patient does not require a significant amount of clinical reasoning from her attending practitioner, as the examination is relatively straightforward. The second one, however, demands high level clinical reasoning to ascertain how to achieve the required results under the difficult circumstances presented. The two examinations cannot be
reasonably compared on this basis, implying that assessment of a student’s clinical reasoning skills must consider the practice context in order to be meaningful.

To assess a student’s actual capability in professional practice, the contextual dimension of practice must be taken into account. There is no precise decision-making process specified for the assessor to follow, leading to the conclusion that the contextual dimension can only be assessed through the exercise of professional judgement (Yorke, 2011d). Professional judgement plays a crucial role in the assessment of a student’s professional capability and has been shown to be no less reliable than alternative objective assessments (Hager et al., 1994).

3.5 CONCLUSION

The literature deconstructed and reconstructed in this chapter allowed the research questions to be examined in the light of current learning. These questions, as introduced earlier in this thesis, are:

A. What are the perceived challenges and issues in contemporary radiography WPL assessment?

B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?

Current practice in Australian radiography WPL assessment remains fragmented and heavily psychometric-based with a focus on assessing technical skills, and little consideration given to either the professional judgement of students’ supervisors, or the interactional, dynamic and contextual dimensions of clinical practice that together with the technical skill dimension make up professional practice capability. With this chapter, a conceptual assessment model was reconstructed, informed by theoretical ideas of professional practice and how such practice capability can be learned. Drawing on the theories and research findings discussed above will require a cultural shift for radiography assessment practices because it would mean embracing the interactional, dynamic and contextual dimensions of practice that together with technical skills make a capable radiographer. Past evidence demonstrates that radiography as a profession, while quick to accept changes in technology, is slow to accept changes in education and its assessment (Kilgour et al., 2014).
CHAPTER 4
DECONSTRUCTION OF CURRENT WPL ASSESSMENT PRACTICES IN RADIOGRAPHY

INTRODUCTION

In order to deconstruct current practice, the responses of participants in this research were examined to ascertain their perceptions of current practice. The analysis contained in this chapter examines the deconstruction phase of the research as described in Chapter 3. The deconstruction phase was designed to analyse data from participants about their current practices. The challenges of current practices as perceived by participants are identified and discussed.

In this chapter I discuss the reflections of the participants in this research. Transcripts of interviews and focus groups with participants were thematically categorised, then analysed in order to ascertain what the opinions of participants were regarding the selected themes. The combination of student participants, academic participants, current practitioner participants and a participant who is an expert in tertiary education assessment provide a balanced spread of opinion from all categories of stakeholders in the radiography workplace learning (WPL) assessment process. The participants who contributed their perceptions of current assessment practices included students enrolled in the Graduate Entry Master of Diagnostic Radiography at the University of Sydney (this focus group is coded as GEM), and radiography academics from six universities in the United Kingdom (these participants are coded as UK1–UK15).

The following questions were posed to the interviewees and focus groups: What concerns do students have with current WPL assessment practices? What format does student assessment during WPL currently take, and how do participants see the suitability of this? These questions were designed to explore participants’ perceptions and stances to current assessment practices and formats, and to identify the gap between current practices and desirable practices. They helped to explicate the participants’ perceptions regarding the contested issue of professional judgement versus the largely psychometric approach in current WPL assessment practices.

The literature clearly points to the value of professional judgement in the assessment of complex clinical skills, and part of the data interrogation was to understand the participants’ view of the use of professional judgement in assessment and whether they regarded it as a vital component.

3 “Their” is used as both singular and plural pronoun to preserve anonymity within this limited population.
of radiography WPL assessment. A related data analysis question was: Why do students who academic staff feel should fail WPL placement obtain a pass? This question intended to scrutinise the practices behind failing students and what was needed by assessors to make assessments meaningful.

Guided by these analysis questions, the following themes emerged:

• the role of standards in WPL assessment;
• credible use of assessment standards;
• the role of student-supervisor professional relationships;
• binary versus graded WPL assessment;
• the role of professional judgement of WPL supervisors;
• perceptions of current WPL assessment methodology;
• failure to fail students; and
• professional development for clinical supervisors.

4.1 THE ROLE OF PROFESSIONAL STANDARDS IN A FAST-CHANGING SKILL LANDSCAPE

Like any other professional entry tertiary degree, radiography courses have specific standards that must be clearly met in order for the course to be accredited, and for its graduates to be registered to practise. The UK academic participants in this study referred to three different sets of standards against which they were required to map their courses. These were summarised by Participant UK2:

In the UK, standards are set by regulatory bodies. We have the Health Professions Council, the HPC, who the students register with in order to practise as a radiographer. They have a very well-defined set of standards and we are very closely scrutinised in relation to measurements of these standards and if we are actually teaching them in the course. So that’s an ongoing process. We also have the professional body which is the Society and College of Radiographers. They have their own set of standards as well. They come in when we have a [course] validation and have a look to see if we’re applying their standards because obviously we want to be accredited by our professional body. So, we’ve got two sets of standards we’re required to adhere to. Also, the people we have a contract with within the NHS [National Health Service], the Strategic Health Authority, they have their own set of standards as well. So, we have three sets of standards we’re always chasing. (UK2)

Other UK participants referred to the same sets of standards. In Australia, standards against which radiography courses must be mapped include those set by the Medical Radiation Practice Board of Australia (MRPBA), the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT), and the Tertiary Education Quality Standards Agency (TEQSA). While it is incumbent upon tertiary institutions to map their academic content against the prescribed standards, it is more difficult to ensure these standards are the yardstick for WPL assessment. Clinical
supervisors who are not directly affiliated with universities are not required to have the same level of understanding of these various sets of standards. Without training supervisors might use their own ideas as the standards against which students’ capability should be measured. How, then, should the relevant standards be applied to the assessment of WPL capability?

Participant UK15 provided some insight into this question:

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\text{[Students are] assessed according to a set of expected competencies. But they’re all based on what’s written from our professional body. So they state what they want all radiographers to be able to perform. However, because the standards of the professional body are quite [non-specific] ... you can loosely interpret it. What we do is—we need to round up our clinical colleagues twice a year and we’ll refine the actual examinations around their protocols. So those are our minimum standards they have to achieve. So, for example, just recently we adjusted one of our competencies which the students had to be competent in—a barium swallow, barium meal, barium enema, etc. But because a lot of people aren’t doing a lot of barium enemas anymore and it’s changing to colonoscopies, we just said they need to be competent at abdominal screening. So, the minimum standard has changed in relation to how the departments are working. (UK15)}
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This statement refers to an issue that is well recognised within the radiography profession. The dynamic nature of radiography practice means that there are many examinations and procedures which are being phased out as newer technologies are implemented, but because there are some clinical sites where they are still practised, their performance is still contained in the standards that courses are aligned with. However, because not all students are realistically able to be exposed to such procedures during their WPL experience, universities have had to apply looser definitions of these standards in their WPL assessment procedures.

Participant UK15’s quote above reflects the necessity for standards to be adapted to required capabilities in the WPL setting. While not every one of the standards that courses are required to be mapped against are applicable to the WPL setting and capability in professional practice, UK15 proposes that academics determine those which are, and articulate these standards in such a way that clinical supervisors can see the applicability. This participant is implying that academic staff are best placed to decide which of the required standards are applicable to the practice of WPL, and also to decide and implement how actual student performance can be measured against them. While Participant UK15 is suggesting the pre-eminent role in this process should reside with academic staff, they also propose the input of clinical supervisors, who have the most up-to-date clinical knowledge. This is a critical recommendation.

In the assessment literature, standards-based assessment is often upheld as the paragon of assessment strategies. In assessment of campus-based theoretical learning, usually graded by one academic (or a small group of academics who consult on criteria for assessment quality), there is an easy fit of assessment criteria to defined standards. However, when considering the
complexities of student assessment during WPL, the participants tended to agree that pre-defined standards were a poor fit with optimal WPL capability. Some specific competencies previously common in radiography practice are becoming increasingly difficult for students to have opportunity to observe, much less perform. For example, plain radiographic examinations of the skull, facial bones and mandible have largely been replaced by computed tomography (CT) scanning, yet students are still required by the MRPBA to demonstrate capability in these plain examinations. However, participants noted that the standards against which universities are expected to map learning outcomes do not reflect this dynamism within the profession.

Academic participants also saw radiographers’ capability as more than just the sum of discrete competencies. They felt that the requirement to map all course assessments directly against pre-defined standards limited the opportunity for clinical supervisors to use their professional judgement to assess student capability.

4.2 PERCEPTIONS ABOUT CREDIBLE USE OF ASSESSMENT STANDARDS

Students in the GEM focus group were asked to comment on the concept of WPL assessment being graded against pre-determined standards, rather than assessment involving comparison between different students’ performance. One participant made the following observation:

_I don’t think that in practice [standardised assessments] will work—it’s natural human behaviour to compare. So, I don’t think—I know in my prac, in my clinical notes, she said because I have a high standard I could tend to be a bit slower. There was another student from our placement on with me—and I’ll admit I probably am slower, but then that’s a whole other thing. Is there a standard of how fast you need to work? I would rather do it slower and not make a mistake and irradiate someone for no reason. Yet there may be someone who’s faster who can get through patients quicker but they’re going to have to repeat the exam. So, I just think in theory it sounds good that you shouldn’t have them compared but they always will. I don’t think you’re going to be able to change that._ (GEM)

This student observed that clinical supervisors had their own ideas of what standards a student should be measured against and believed supervisors would use their own ideas in preference to pre-determined standards irrespective of what was required by the university or the profession. The example provided was time entangled with safety which is inherently difficult to standardise. Novices usually take longer than experts to conduct a procedure. This student’s perception was that they were compared to other students. This view was reiterated by other student participants in this group, and the general consensus of this group was that they all perceived it as inevitable that supervisors compared students and they thought it almost impossible for supervisors to carry out completely standards-based WPL assessment.
Other students in the GEM focus group gave examples of where they felt supervisors overrode the WPL assessment standards set out by the university, and instead used their own tacit standards. One student participant related an example of being on placement with another student who had a brighter, more outgoing personality, and the student felt that assessment was based on comparing personalities, rather than on their respective capabilities as (novice) radiographers. Another student participant related an incident on placement where the supervisor said words to the effect of “I know the course has changed, and students do less placement before second year than in the old course, but this is what I think a second year student should be able to do” and proceeded to fill out the assessment form while ignoring the assessment criteria provided by the university.

These student comments indicate that they believed in the university assessment criteria and preferred that personality and professional skills were separated and that only the latter should be assessed. It highlights a potential tension between students and their clinical supervisors about what should be assessed. These student participants believed that clinical educators prefer to use their own assessment criteria over the ones provided by the university. Another student in the focus group made the following observation:

*When you’ve got different people, different people will see [student performance] differently. It’s like the marking criteria. The chief or the supervisor in different places will view that differently. What they expect a student to be able to do will be different for each of them. So, there’s no way you’re going to get the same mark no matter what you do. (GEM)*

Again, this student implied that supervisors have different ideas about what constitutes good performance, and would use their ideas regardless of the type of assessment or standards provided for them to assess students against. Every clinical supervisor has his or her own “mental picture” of what students’ performance should look like, and what students should and should not be able to do at each stage in their development. Students who participated in the focus group were all of the opinion that their performance on placement was compared to a supervisor’s mental picture, rather than to standards provided by the university; furthermore, students who most closely matched the supervisor’s mental picture would be assessed at the highest level. Students were doubtful that any changes could be made to the WPL assessment regime to rectify this situation.

### 4.3 THE ROLE OF STUDENT-CLINICAL SUPERVISOR PROFESSIONAL RELATIONSHIPS

Students who participated in the GEM focus group also expressed concern that biases held by clinical supervisors had the potential to affect their WPL assessment results. One student discussed their concerns this way:
I think by the end of the six-week placement you become friends with your supervisor, so they'll do anything to try and help you progress through uni. Like you get—I remember I had some placements where they were really strict and they would do nothing, but there were other placements where by the end of the six weeks they'll sign anything if it will benefit me. Because they become your friends. Like six weeks, 40 hours a week. (GEM)

This statement illuminates the importance of building professional relationships between students and supervisors. These relationships can work both ways; they can unfairly advantage or disadvantage students. Students felt that being liked by a supervisor should have nothing to do with how they are assessed, nor what opportunities they are given. However, the student participants’ experience was that their WPL assessments and the practice and learning opportunities they were provided with were influenced quite significantly by personal-professional relationships. It is difficult to pinpoint the characteristics of the types of personal-professional relationships which students find helpful. It is likely that shared professional values or some personality pairings will lead to better working relationships than others. There is often an element of personal judgement of the other person’s character, behaviour or other attributes. A professional judgement-based assessment is also subject to the same limitations of rational, objective criteria. This, however, does not limit its usefulness in the assessment of student performance during WPL.

The perceived bias of, or students’ lack of trust in, professional judgement, raises equity issues for students which are not easily addressed. Students indicated that they expect equity of opportunity and supervision, irrespective of race, religion, personality, sexuality or any other aspects of their persona. This equity should take into account student diversity, even within these subgroups, as well as individual needs. Radiography is a relatively small profession in terms of numbers, and radiographers tend to be well connected with other radiographers. Students felt that any disagreement or personality clash with clinical supervisors could adversely affect their employment prospects after graduation. Referring to this, one student participant stated:

You've got to go for a job; people who aren't really as good as you still get the job because they've got the pass. (GEM)

The implication from this statement is that the pass some students obtain on clinical placement is perceived to be based on personality, rather than capability as a radiographer. These types of factors on which students felt they were sometimes assessed were considered irrelevant to students’ professional capabilities. This was expressed by one of the GEM focus group participants:
Every prac I’ve been on I always—even if they didn’t really want us there—I’ve always thought well you know, do the best you can. You listen to them even though half the time I thought okay, that’s not right, you don’t know what you’re talking about. I just took it. They criticised me for something which didn’t relate and I’d be like okay, yes, no worries, I’ll do it next time. You just tell them what they want to hear but it doesn’t necessarily mean it’s going to make it any better. (GEM)

This statement reveals a sense of frustration and resignation or even submission. This student felt that she had to accept whatever the clinical supervisor said if she wanted a good WPL assessment result, even if it was not relevant to her professional practice. Clinical placement was seen as a process of working out what the clinical supervisor wanted and acting on that, more than being provided with opportunities to ask questions and developing the student’s own capabilities that are required to be a professional radiography practitioner. This quote also highlighted that even if students worked out what the supervisor wanted and complied with it, it still wouldn’t necessarily have a positive effect on their assessment outcomes. The type of issues expressed here relate to power relationships.

This sense of frustration was not exclusive to students—it was equally apparent in the academic staff who were interviewed. Participant UK10 expressed it very well in the following statement:

We have had radiographers who would fail students who were clearly competent. Very, very, very harsh marking and I do think it’s got more to do with the radiographers than it ever has with the student’s performance. You need somebody who’s preferably halfway between clinical and academic that has responsibility to see a high clinical standard and a high academic standard. (UK10)

This academic expressed frustration that clinical supervisors, with allegedly no understanding of assessment or the relevant criteria, were failing students irrespective of the students’ actual, demonstrated capabilities. This statement goes so far as to say that the problem lay with clinical supervisors more than it did with students. This statement by Participant UK10 aligns with the student perceptions already discussed. However, student perceptions of assessment based on personality rather than performance seem to ignore any possibility that students themselves may be at least partially responsible for poor assessments of their WPL capability. It appears that students were unwilling to accept this possibility, and tended to blame poor assessments on supervisors, with personality compatibility seeming to be a convenient excuse.

Some of the academic staff interviewed had similar perceptions to the students in the focus group. Participant UK14 pointed out the lack of thought and care some clinical supervisors put into completing WPL assessments:

We’ve just got tutors that were just ticking [the boxes], which meant nothing. At the end of the day, these students would just go like that … no thoughts in it at all. (UK14)
This quote highlighted a disconnection between academics and clinical supervisors. It implies that some clinical supervisors’ attitudes showed that they lacked effort in making assessment meaningful, or in making assessments of use to students.

This lack of thought and effort by clinical supervisors was one of the most prominent issues with current assessment of radiography students during WPL that emerged from the interviews and focus groups data. Another prominent issue was supervisors filling out assessment forms based on personal opinion rather than on university standards. There is a significant difference between personal opinion and professional judgement. Personal opinion includes factors which don’t necessarily affect the professional capability of a student, including personality traits, appearance preferences, and other personal reasons for bias. Professional judgement in assessing student capability, however, is based on the professional standards and experience of the supervisor and ignores extraneous factors that may be considered personal opinion. The perceived dependence of many clinical supervisors on personal opinion to assess students’ performance was expressed by Participant UK15:

*I think they mark according to their own opinion. Why I say that is because I look at some of the—you know they say to me ‘the student is this, this, this’ and I’d say ‘that’s not what you’ve put on the feedback’. They’d say ‘I’d just ticked those’. (UK15)*

The anecdotal evidence from other participants supported the assertion made by Participant UK15. For instance, Participant UK5 made the following remark:

*I’ve had a student this year who’d passed their assessment and did very well in their assessment. But the supervisor didn’t like that student and the comments were quite clear that the supervisor didn’t like the student … I’m not saying. I just think you’ve got to be a bit careful. (UK5)*

Reflecting on this quote more deeply uncovers some unanswered questions: What was the basis for the supervisor’s apparent dislike for this student? Could the student have behaved in a manner deemed unprofessional by the supervisor’s professional judgement, but which was not addressed in the provided assessment criteria? It is possible that although the provided assessment criteria left the supervisor with no option but to pass the student, the supervisor actually felt that the student deserved to fail, and the comments made above were his or her only recourse to express this. It is also possible that Participant UK5 misinterpreted the supervisor’s comments, and that rather than dislike for the student, the comments expressed frustration with the inappropriateness of the assessment framework provided. Perhaps this supervisor, or supervisors in general, were disengaged with the assessment process, which could explain the lack of thought apparent in assessments during WPL which was noted by several participants.
Assessments can have significant consequences for students’ future employment prospects. Although students may meet all the requirements to pass their WPL assessment, supervisors can hold beliefs about the employability of particular students, which are informally verbally transmitted in the close-knit radiography community. These opinions (founded or unfounded) may also be relayed in reference check phone calls. Radiography employers are more likely to place significance on comments written in WPL assessments than they are to look at formal grades, and they frequently ask to see actual WPL assessments in applications and at interviews. This was evidenced in the national survey of radiography educators, where comments included the following:

*There should always be scope for comments as well as a grading as quite often a range of statements may not cover what you want to say about a particular student.* (NS)

*For me a number system is easy to understand providing there are adequate comments to justify the value that has been achieved. The problem with the number grading system is the consistency across multiple assessors.* (NS)

Thus, under the current regime of WPL assessments, there seems to be support for the scope to accompany checklists and rating scales assessments with qualitative comments. It appears that academic participants in this study remained suspicious about the credibility of some qualitative comments. Participant UK9 referred to research literature in agreeing with colleagues:

*There’s quite a lot of stuff written about how students who are liked, get graded much more highly.* (UK9)

While it is a human condition and not inappropriate for some supervisors and students to have personalities which match better than those in other supervisor/student professional relationships, a supervisor must have the discrimination to assess students’ professional capability without reference to their personality. Another aspect of perceived unfairness in radiography WPL assessment raised by the GEM focus group was a challenge faced in larger radiology departments where students believed that assessments were carried out by supervisors who had rarely or never worked directly with them, and thus the assessments were not an accurate reflection of students’ true capability.

*One thing I found is just in public hospital settings normally [the] supervisor doesn’t work with us. It’s the other radiographers who are working with us. On the day we’re having our assessment he put in our mark and then I thought oh what’s the point of it, because whether he knows me or not. So, I actually suggested to one of the supervisors can you ask the people who worked with me actually, how I work. Then I’ll be—whether it’s harsh, whether it’s good, I’ll be satisfied because I will know what it’s like.* (GEM)

The student who made this comment perceived that an assessment written by someone who had not worked directly with them could not be a true reflection of their performance. This
student did not take into account that the supervisor may have been compiling the assessments of staff who had spent time working with the student, and incorporating feedback from their colleagues, when writing the assessment. An assessment constructed through dialogue with colleagues may well be more representative of a student’s overall performance than one based purely on the observations of one person. However, in the quote, there is no indication that the student tried to understand the methodology used by the supervisor, but rather just assumed that the assessment was made up. It is also evident that the supervisor did not take the trouble to tell the student who had been consulted in preparing the assessment.

What is apparent from this student’s statement is the perception that supervisors do not always have quality control procedures in place for their assessments. Student participants appear to have lost confidence in the current WPL assessment processes, but they did not show any recognition of the role of self-assessment and reflection on their own performance. They appeared to have little respect for such supervisor assessment practices. This student did not trust assessments that are based on what is perceived to be second-hand opinions, nor those they feel are subject to bias or prejudice.

4.4 BINARY VERSUS GRADED WPL ASSESSMENT

Closely related to issues of non-standards-based WPL assessment is the consideration of whether assessments should have a grade attached or result in a binary pass/fail grade. The majority opinion of the GEM focus group was that some aspects of assessment should be graded, while others were better represented as pass/fail.

   Student 1: For example, even on the presentation, [she wrote] neatly—I always wore my uniform fine and she puts me—like why wouldn’t I have gotten right on the excellent [mark]? Like what more do you want me to do?

   Student 2: They don’t know.

   Student 3: Like on time as well.

   Student 4: You get there 15 minutes early every day and ...

   Student 2: And they still put you halfway. Yeah that always bugs me.

   Student 1: Like just say yes, they were punctual, that’s a good characteristic. Yes, they did present themselves well. Yeah, maybe ...

   Researcher: In other words, those things should be yes, no. But perhaps ...

   Student 1: Yeah, more a yes, no.

   Researcher: … have grades for other things?

   Student 1: Yes, I think so.
These students perceived that there are some aspects of students’ WPL experience that need to be commented on for compliance, but which don’t contribute to their professional capability. These aspects lend themselves to using a binary response approach. Examples include wearing of uniform and punctuality. Either the student is (usually) wearing a clean, neat, correct uniform, or they are not. Either the student is (usually) punctual, or they are not. The binary responses from which the assessing supervisor can choose are not necessarily only pass or fail. Terms such as “appropriate” and “inappropriate”, or “acceptable” and “unacceptable” can also be used if a binary response to an assessment question is required.

Students, however, felt that there was merit in the aspects of WPL performance that contributed to professional capability being graded. Contributors to the GEM focus group expressed their thoughts on this:

Student 3:  I think pass and fail is good but then you’re—like people who maybe just pass at 51% are getting the same as someone who’s ...

Student 7:  How do you just pass at 51—like how would they know if there’s no mark?

Student 3: I know but like ifyou’re putting—then you can’t distinguish between people. You’ve got to go for a job, people who aren’t really as good as you still get it because they’ve got the pass.

What this interaction implies is that students want recognition for their effort, and a form of student assessment during WPL which discriminates high performing students from those who do just enough to obtain a pass. A pass/fail binary grading system for the entire WPL assessment does not meet those student aspirations, and nor does it provide information on the level of capability of the student in question. Students value acknowledgement of their efforts and prefer grades on their transcript.

Academic staff participants from the UK, however, were mostly in favour of a binary approach to WPL assessment. Many had tried a graded approach in the past but had rejected it in favour of the pass/fail approach. The thoughts expressed by Participant UK12 were typical of those expressed by other participants:

I think grading is for the lecturers, but pass/fail for the radiographers. (UK12)

Participant UK12 implied with this quote that academic achievement can be graded but how it is operationalised in situated practice needs contextual judgement which is more appropriately assessed with pass/fail. Participant UK11 agreed with UK12’s position:

I won’t discredit our clinical colleagues but I just feel that with the issues that we have and the responsibility on us to ensure they’re competent, that’s the way we’ve pushed it really. (UK11)
This statement from Participant UK11 blurs the previously established distinction between competence and capability; however, taking this variation in definitions into account, implies that the whole concept of competence is binary—either one is competent or not. Participant UK11 admits to having pushed towards the concept of binary assessment for WPL because of the responsibility felt for ensuring the competence of graduates. However, the statement made does not describe the basis for believing that competence can be viewed as a binary attribute.

Participant UK1 was also of this opinion, expressing that past history with trying to implement other paradigms had failed:

*The first one we did like that was with clinical students in the workshop and they again came up with this, which kind of took us in the wrong direction in that there should be three standards. They might be unsuccessful, and they should be working to the expected level and working above the expected level. And that was the first iteration that we used for 12 months before we decided that was completely silly and went back to pass/fail. And if a student wants to get good marks, then there are assessments within the course that allow them to excel. But I am firmly of the same opinion [as UK2] that they passed or failed. (UK1)*

This academic addressed the issue of students wanting recognition of their efforts by way of marks, implying that there were many other opportunities within the course to acquire marks. However, this does not address the fact that potential employers look at WPL results as the most important part of students’ transcripts, and frequently ask to see actual WPL assessments in employment applications and at interviews. A pass/fail result does not allow potential employers to compare new graduate applicants unless meaningful comments on performance are included.

Despite the strong statement above, Participant UK1 did appear to make a contradiction in the following statement:

*Probably from a personal perspective, I quite like grading and marks. It was for our first course. I mean when someone has really put something special or extra in, I think it’s a shame to think that you’re going to come out with something the same as somebody who’s scraped through. I don’t think that’s … I think when people make that extra effort we should be rewarding them for it really. You know that there are different standards, some of it’s down to things like noting ... things like engagement becomes quite important in a person’s big professionalism. I guess the profession makes a list ... but how will you grade professionalism? (UK1)*

In this statement, Participant UK1 appears to acknowledge the legitimacy of students’ stated wish for seeing reward for their efforts, despite previously strongly favouring pass/fail grading of student assessment during WPL. However, Participant UK1 raises the point that there are some aspects of WPL which are hard to assess, citing professionalism as an example. Professionalism is an example of the complex human skills that contribute to the interactional, dynamic and contextual nature of professional practice but that are difficult to describe and
assess. Participant UK1 is acknowledging that in order to grade student performance, these aspects of professional practice need to be assessible and assessed. The idea contained in Participant UK1’s statement is a belief that awarding grades to students for demonstrated professionalism is too difficult for such grades to be meaningful. This perceived difficulty may arise from the fact that professional practice cannot easily be measured using psychometric assessment methods. It is interesting to note that other methods of quantifying professional practice performance have not been considered by this participant.

Participant UK3 described a different approach to the topic of measuring professional practice in their university’s course:

> All of our clinical assessments are linked to academic modules. On practice placement when they undertake a clinical assessment, they do the practical skills element and the discussion element that is marked. So, they get a number, they’ll get a grade. We have a minimum pass of 70%. But that then transposes, if you like, just into a pass for the module. So, the module of that will be linked to various elements. They’re all linked to the portfolio modules that we run through the program. So that’ll be depending on which module it is, part of it would be compilation of the portfolio, which involves various elements, and the other part would be the clinical assessment and that is a pass/fail. (UK3)

The approach described here is that WPL assessment is one part of a learning module within the overall course. The module itself has a grade attached, but the WPL component is assessed as either pass/fail. The grade for the module is determined by assessment tasks other than just the WPL assessment. These tasks are incorporated into a portfolio which is graded by academic staff. It could be considered that this type of module is an integrated WPL assessment strategy, where the WPL pass/fail performance, assessed by the clinical supervisor, is integrated with a larger framework of assessments marked by academic staff. This participant is advocating the portfolio as a means of grading students’ WPL capability, while still maintaining a pass/fail strategy for supervisor assessment. The portfolio is seen by this participant as having the best of both graded and pass/fail strategies, with the grades determined by academic staff based on evidence of capability gathered by students.

While this approach to WPL assessment addresses the issue of students wanting a grade for their assessed WPL capability, it does not provide that distinction between students’ capability in professional practice that is sought by potential employers. A student who just scrapes a pass in WPL placement might excel at portfolio construction, while a student who excels in professional practice might not be so skilled in preparing their portfolio. Thus, it is conceivable that under this system, the grade obtained does not represent the professional judgement of the supervisor regarding students’ actual capability.
Participant UK9 addressed an aspect of the pass/fail paradigm that none of the other participants did—the feedback to students that is attached to the WPL assessment.

One of the things that we do try to do with our assessment tool is that although the students are told pass or fail, they’re also given quite a lot of feedback as to why that decision’s been made. So, they might get a pass, but they’re also told that they have done exceptionally well by the written feedback that they receive. Or conversely if they fail why they’ve failed and I think that needs to go with it. You can’t just say you’ve passed or you’ve failed—you need to give a reason why that decision was made. (UK9)

Students’ main objections to WPL assessment being pass/fail is that it does not give feedback on their performance, including strategies to improve their professional practice. Participant UK9 acknowledged that comprehensive feedback was a necessity if an assessment was to provide any further information than a simple binary response regarding competence. Capability in professional practice cannot be detailed in a binary response, but it can be described in written feedback. What is not addressed, however, is the connection between the written feedback and the WPL assessment outcome. While under this system the written feedback describes the reason for the pass/fail decision, there is no stated or implied mechanism within the assessment to ensure that this has actually taken place. Written feedback and assessment outcomes are sometimes contradictory, especially if they are not specifically linked in the assessment strategy.

A succinct summary of the pass/fail paradigm for student assessment during WPL as described in this section was provided by Participant UK7, who implied that the issues it raises for students were “out of sight, out of mind”, so it was no longer a concern. Participant UK7 stated that their university had experimented with many different iterations of WPL assessment, transitioning gradually from graded to pass/fail:

We’ve gone full circle. Whether we’ll go back full circle again, I wouldn’t like to say. So, we’ve tried both and I do think, ... it can be demotivating for students, but they actually seem to be used to it now. They don’t seem to comment so much on it. It’s when we first changed that we noticed it. But we just had so much inconsistency between the centres, even just eight.

It is widely acknowledged that graded WPL assessment currently is inconsistent between clinical centres. The university [which UK7 worked for] only sent students to one of eight different clinical centres, and even with that few [number of] centres, the inconsistency was noticed across them all. This highlighted that achieving consistency is almost impossible with current assessment practices, taking into account the context of practice. The challenge of consistency is magnified exponentially in the Australian setting where each university sends students to hundreds of different clinical centres. It makes it all the more important that a solution is found, rather than continuing to ignore students’ concerns.
While the pass/fail paradigm is widely accepted amongst radiography academics, their reasons for accepting it seem to be based on the belief that a worthwhile, useful and consistent graded WPL assessment does not necessarily provide a consistent picture of students’ capability in professional practice. Therefore, they are happy to accept a compromise.

Students, on the other hand, are all too aware of the issues that the pass/fail paradigm presents for them. They want effort on their part to be acknowledged in their grades, and they want clear distinctions between students whose work is just sufficient to pass, and those who excel in developing their professional practice skills. This distinction is believed by students to be the difference between applicants when it comes to potential employers making decisions regarding who to employ, and students are very aware of this reality. (UK7)

4.5 THE ROLE OF WORKPLACE SUPERVISORS’ PROFESSIONAL JUDGEMENT

The analysis of student data in the GEM focus group showed that WPL assessment contained elements of personal opinion. Student participants did not seem to discern a difference between personal opinion based on indeterminate factors, and professional judgement based on the supervisor’s knowledge and experience. The concept of professional judgement did not seem to be a familiar concept to students, as indicated by their silence on the topic. It was apparent that any aspect of student WPL assessment which was not measurable against a prescribed standard was perceived by student participants as being ill-informed, or prejudicial in some way. There was no assent by student participants to the judgement ability that years of experience afforded clinical supervisors.

What is missing from student participants’ perceptions of WPL assessment is that professional judgement is an integral part of any assessment paradigm. This highlights the importance of introducing students to the concept of a judgement-based approach in practice assessment. Even with a psychometric assessment, which is considered by some to be purely objective, there is an element of assessor subjectivity in deciding which number or which statement best describes student performance against the pre-determined criteria. While some people assert that an assessment is either purely objective or subjective, in fact most assessment strategies have elements of both. However, psychometric assessment strategies lack the capacity to determine the subtle, often tacit, nuances which delineate between an average practitioner and one who strives for excellence in all aspects of their professional practice.

Student participants saw objectivity (and fairness) in their WPL assessment as being of primary importance, although they did not problematise this and they seemed to have no uniform concept of what such objectivity actually was. As stated by one of the GEM focus group participants:
Maybe I was thinking if [a] specific supervisor, that was my supervisor—if he had to—was actually forced to give comments why he decided to reduce my mark on this or on other criteria, then I’m sort of forcing him to think twice, only if he gives an objective reason. Okay, so you didn’t do this and this and that and I’m expecting and that’s why I’m reducing your mark. Only—I think this is circumstances that can force them a little bit to ignore your personality … Because we really can’t control it but … we can sort of navigate them a little bit. (GEM)

It appears that this student had no assessment conversation with their supervisor. It is then not surprising that this participant felt that their supervisor was not at all objective in their assessment, which unfairly affected the assessment of the student’s capability. Because of this assessment experience, this student was particularly sensitive to the role of personal opinion in their WPL assessment. It is also evident that the student, on receiving results without comments or justification, felt that this meant lack of objectivity, not just lack of explicit information.

However, as shown in the deconstruction of the literature in Chapter 3, there is a difference between personal opinion and professional judgement. Personal opinion involves the individual ideas and biases of the person expressing the opinion. Professional judgement is an observation about students’ actual capability, using the professional knowledge and experience of the assessor to compare the capability to accepted standards in the profession. The identification of this type of judgement as “professional” judgement implies that the judgement is made based on the student’s capability, rather than personality issues being incorporated into the assessment as would happen with an opinion-based assessment.

As discussed in Chapter 3 there is an abundance of evidence that professional judgement is an essential component in assessing WPL professional practice capability and gives a better contextual description of student weaknesses and strengths than a “tick-box” assessment. The quote above reveals the student participant was resistant to accepting any assessment of their capability for which a clear reason was not given. Given the previous statements from the student focus group which have been discussed, it appears that constructive or potentially useful feedback would only be considered beneficial by these student participants if it was in support of an alpha-numeric grade. The above quote revealed that grades by themselves, or comments by themselves, were not considered acceptable by student participants. What was missing in the student data was a discussion about the role of communication and conducting dialogical assessments where supervisors can justify their grades and students can question them with a shared goal to reach fair assessment results.

Interviews and focus groups with UK academic staff referred to the role of professional judgement in the current WPL assessment paradigm. Participant UK2 made the following statement:
We have got some guidelines displayed in all the departments. Although to be honest, because it’s the sort of thing that you get out of validation, but people don’t look at them. Radiographers know, they know somebody is progressing and that is what you have to capture. What we have to do is start to trust the professional judgement of the radiographers because they are professional people. You know they do know if someone is up to speed or not. (UK2)

Participant UK2 is saying here that in their experience, regardless of what standards or rubrics are provided by universities to guide student assessment by clinical supervisors, the supervisors will not always use them. The statement implies that the participant believed the professional judgement of radiographer supervisors should be trusted more than is currently the case. A deeper implication is that the participant believes that no matter how universities try to squeeze supervisors into a psychometric WPL assessment framework, the supervisors will find a way to apply their professional judgement to it. A practising radiographer knows what makes a good radiographer better than anyone else does, and it is this tacit professional knowledge which might yet provide the most reliable indication of student capability. Participant UK2 believed that academics need to learn to trust the professional judgement of practitioners, and then (by implication) to encourage students to also trust it. What Participant UK2 did not specify is how to learn to deliver professional judgements. The missing factor from Participant UK2’s perceptions is what makes professional judgement different from basing student assessment during WPL on attributes that may or may not be relevant to student capability.

Participant UK1 also commented on using professional judgement of supervisors to assess WPL capability of students:

I think the other important aspect that I like, is if it’s based on the professional opinion of the radiographer. That’s not something the university can question. So far, we’ve never had an appeal by the students for a failed clinical assessment based on the judgement of the radiographer. I think previously when you’ve got an objective form where you add up the points and you said ‘OK, it’s 60 they’re unsafe and at 61 they’re safe’. You can then question that form of assessment. Whereas this is based on their professional standards and their professional opinion. And I don’t think it’s something you can judge. We haven’t been challenged on it yet. But I think if we are, I think it will fail. (UK1)

Participant UK1 made a very important point in this statement. It is not meaningful, nor necessarily accurate, to set an arbitrary number as a pass mark for WPL capability. The interactional, dynamic and contextual nature of professional practice is not truthfully represented by allocating numbers against a checklist. The fact that Participant UK1 said that in their experience, students had not appealed a fail decision based on the professional judgement of a supervisor, demonstrates that students recognise the accuracy of such an assessment, provided it is backed up by suitable, comprehensive feedback regarding the reasons for failure, and areas that need improvement.
The above is an important point for designers of WPL assessment frameworks to consider because all assessments should be defensible under moderation. A professional judgement which a student cannot find grounds to challenge, despite a desire to do so, provides a robust and sound basis for making decisions about students’ practice capability. The proviso is that supervisors must also provide the context for their professional judgements in assessment. For the most part, academic staff will not have been present when the performances under consideration were carried out, therefore a narrative around the context of the student performances will add to the defensibility of the assessment. As discussed by Paterson and Higgs (2013), professional judgement artistry needs to pervade not only practice, but also assessment of practice and student learning.

Participant UK2 further referred to the role of professional judgement in the following statement:

> At the end of the day, despite all this paperwork, the student would get through it all and at the end of the course they would have passed everything. And then about 2–3 months before they are due to graduate, someone would turn around and stick their hands up and say ‘well actually, this person is not competent to progress’. I don’t know whether or not you’ve had that? So, we thought, stop that. What we wanted to do was to capture that, that person who sticks their hands up and says ‘you know, this person shouldn’t be graduating’. Because if they’re not skilled, they’re not proficient, what we need to do is capture that. (UK2)

The points raised in the above quote will resonate with radiography academics who have been responsible for managing WPL assessments and applying the results to student progression through a course of study. Participant UK2 is saying here that when a WPL assessment is not honest in describing student capability, and particularly when it overrates student performance, it is challenging for academic staff to delay student progression through the course. However, sooner or later, a practitioner will notice that a student is not performing at the expected standard for the level of study, and the university or academic staff will be criticised for allowing the student to progress. To summarise Participant UK2’s point here, a WPL assessment strategy should enable supervisors to determine whether a student is fit to progress to the next stage of their studies, or indeed, to graduate.

Participant UK2 captures the essence of what Royce Sadler (2009b) wrote about checklist assessments not representing a holistic picture of overall capability at a certain stage of professional education. If a student is able to pass all the checklist assessments, and still be deemed not capable in the professional judgement of supervisors, it does not present checklist approaches to WPL assessment in a favourable light. It does, however, point to the value of utilising professional judgement to assess WPL capability.
The fact that Participants UK1 and UK2 were academics from the same university, and that no other academic participant referred to professional judgement being involved in WPL assessment, points to the importance of professional judgement being under-recognised, and therefore under-represented, in current practice. The factors involved in current WPL assessment practice, in lieu of professional judgement, will now be explored.

4.6 PERCEPTIONS OF CURRENT WPL ASSESSMENT METHODOLOGY

As discussed previously, student participants in this research perceived that personal opinion was a major factor in current WPL assessment practice. This perception was supported by academic participants. Participant UK10 stated:

I’ve actually said to my students … and I’m sure others have said the same, ‘don’t always go to the person that you know will always give you 20 out of 20 in a particular procedure that you’re going to carry out because if you know they’re an easy target and they’ll give you the good marks, you’re not really getting any feedback about what you need to improve on’. At the end of the day that one assessment is not going to make a massive difference to your overall classification at the end of three years. But as time moves on, you’re not getting the feedback that you need to actually progress when you get into Year 2 and to Year 3. Then your classification may well drop anyway because where there’s a higher rating, because at the moment we have Year 1 we’re changing it because we think it’s a bit too severe, Year 1 is worth 10%, Year 2 is worth 30%, Year 3 is worth 60% classification. We’ve tweaked that a little bit so it’s slightly more in the first year because of all that delivery of all that academic content and more exams and things, we thought we needed to change that rating but there’s still greater rating in Year 3 compared to Years 1 and 2. You need to make sure that you do get people that you consider to be a little bit more objective because otherwise you get no help whatsoever. (UK10)

Participant UK10 makes several important points here. Firstly, students tend to target supervisors who they feel will give them a glowing assessment, rather than those who will give them constructive feedback on their performance. Many large radiology departments have multiple staff responsible for supervising and assessing students, and often students are given the freedom to choose who they want to work with and be supervised by. It is generally human nature for a student to choose a radiographer who they like, a radiographer who has a personality which makes them easy to get on with, to work with and be supervised by. However, this chosen supervisor is often not the best role model for professional practice, nor the best teacher. The phenomenon described above can have long-term implications, not only for students’ actual development of capability, but ultimately for graduate employability.

Secondly, students need to be encouraged to seek feedback and opportunities to improve their capability, rather than to only seek high marks. The above quote implies that the participant believes that clinical supervisors need to be educated in giving constructive feedback and in the skill of making professional judgements that will help develop students’ capability.
Thirdly, students tend not to realise the minimal significance of one lower than average mark in the context of their capability development. Current WPL assessment practices, which tend towards numerical ranking of individual competencies, rather than holistic contextual professional feedback on student performance, lead to this numerical-mark-driven-mentality, which does very little to progress actual capability. The aim in radiography students’ education is to prepare them to become capable, safe and employable practitioners.

Current assessment practices, as described by participants, tend to compartmentalise assessment of practice and assessment for professional practice, rather than viewing it holistically. This philosophy of WPL assessment assumes that professional practice consists of fragmented competencies that can be atomistically described, which is an assumption that recent research into the topic refutes. This compartmentalisation was described by Participant UK1:

> Well the form has four aspects: the preparation for the [patient] examination, the undertaking of the examination, the management of the patient and the image and the equipment post-examination. And then undertaking this into the professional capacity. So, how they introduce themselves, how they dress, how they behave—those kinds of attitudes are measured as well. And it’s a one-page assessment form. (UK1)

The short and open assessment form described by Participant UK1 provides opportunity for WPL supervisors to implement a professional judgement-based assessment which incorporates the soft skills that are integral to professional practice. The type of assessment Participant UK1 spoke about does not attempt to specify every facet of student performance that could be graded but provides four broad categories to guide the written assessment of student capability.

Participant UK1 also seems to imply that the brevity of the assessment form is an advantage. While clinical supervisors prefer assessment paperwork to be as brief as possible, that does not mean that assessment is necessarily easier. The primary concern regarding the format of WPL assessment should be whether it represents student capability, not whether it is quick to complete. This points to a need for education of clinical educators, a topic that will be covered later in this chapter.

Participants commented on aspects of professional practice that were not covered by current WPL assessment strategies. UK13 was one participant who did so:

> Once you’ve got an appreciation of what you produce, not just technically but being able to critique, possibly make a diagnosis depending on—but cautiously, because obviously that role is I suppose still under-discriminated in undergraduates. That’s skill that’s developed over postgraduate. (UK13)
The skill referred to here that is not covered in current WPL assessment is “image critiquing”—that is, the ability to determine the adherence of the images produced to diagnostic standards. The inference here is that image critique is currently considered a postgraduate skill. However, this is confusing the definitions of image critique and image interpretation. While all radiographers must be able to determine the technical acceptability of the images they produce, they are not expected nor required to offer a diagnosis. Any radiography WPL assessment strategy must be careful to only assess aspects of capability that are within a novice radiographer’s scope of practice. Image critique is considered within the domain of radiographers’ practice, but image interpretation is not.

When discussing assessment of student radiographers’ capability, the point at which a supervisor determines a student to not be of passing standard needs to be decided. Particularly if the WPL assessment falls into the pass/fail paradigm, the point at which the assessment of student performance moves from “capable” to “not capable” is critical to define. The expected standards for each progressive clinical block should be appropriate for that particular block. There may be multiple definitions that are considered to constitute a fail; or using Sadler’s concept of “latent criteria” (Sadler, 1989), a fail might be invoked by criteria that have not previously been observed, but when observed by the supervisor, are considered serious enough to warrant a fail grade for the placement. Latent criteria are those by which student performance can be judged but have not been pre-set. That is to say, they emerge when the assessor is reflecting on student overall (or global) performance.

The situation described above was identified by Participant UK13:

But going back to the overall judgement. I suppose that’s an interesting one because you might’ve come across this in ... the exam boards where everything’s chucked into it as it is now with modules and compartments and you could get in it and say I want to let students pass. And somebody would say ‘they’re not very good. Should they have passed? They’re probably not good radiographers’. The judgement is often made by people ... they’re making that overall judgement, about a range of things, not just part of their personality, their enthusiasm, their willingness to stay on and contribute, they’re not looking at the clock all the time—‘5 o’clock, I’m off now’—you know they can deal with the patients. So that’s a number of things that may constitute professionalism, commitment, things like that, providing the other factors are there to actually do the job I suppose. (UK13)

It is interesting that the latent criteria described here by Participant UK13 do not include technical aspects of radiography. This participant identified some of the attributes that constitute the interactional, dynamic and contextual nature of professional practice, which are poorly addressed in current psychometric WPL assessments. Some of these attributes are attitudinal, and therefore are not accurately represented in current psychometric assessment practice.
The “… professionalism, commitment …” and other related factors mentioned here are the factors that the UK exam boards want assessed when deciding whether to grant the right to practise to a graduate of a radiography undergraduate degree.

Participant UK14 took this train of thought further, arguing that current WPL assessment does not include patient management and patient communication. Participant UK14 saw this as a disturbing trend in WPL assessment:

*I think one element that is constantly under assessed, in fact there is no room for it—no assessment schedule, is patient management and patient communication. That is fundamental to the role of a radiographer. It’s a huge part of it, but it’s something that we don’t assess. I think that’s a huge hole. We used to many, many years ago apparently, but it’s something we don’t do now.* (UK14)

Participant UK14 then went on to describe a disconnect between what academic staff believe should be assessed, and what clinical supervisors actually do assess. An “academic utopia” was described, where academic staff have clear concepts of what should be assessed, and clinical supervisors assess to the guidelines given. However, Participant UK14 was realistic enough to acknowledge that there is a gulf between this scenario and reality:

*I do think there is a difference between reality and this ideal world. So, in reality I certainly don’t think that in clinical practice those standards are necessarily measured. We don’t really measure it against them. In fact, I’d go so far as to say we put great faith in our clinical colleagues to assess competence but we don’t really have any clear idea of what’s being taught, how it’s being taught, or how it’s being assessed.* (UK14)

Participant UK14 alluded to what are fundamental issues in Australian radiography courses. The numbers of students enrolled in courses is a major issue for the quality of their education. While universities can enrol ever-increasing numbers of students in radiography courses, and academic staff can keep teaching more and more students in lecture theatres, the limitations of this policy are apparent in the WPL domain. Assuming clinical placements can be found for all these students, the ability of academic staff to monitor and interact with all these WPL sites is restricted by time, workload and resources. This situation leads to the disconnect between academic staff and WPL supervisors described by Participant UK14, and which is exponentially worse in the Australian context.

Participant UK14 described a disconnect between universities and clinical departments, where the level of mutual understanding is not where they believed it should be. This participant described students building a portfolio of evidence of their progression in capability, which is assessed at the conclusion of each placement block. This portfolio is then signed off as a pass or a fail, with students either being deemed capable or not capable, to the standard expected for their level of experience. The philosophy behind this was explained by Participant UK14:
I think there’s a danger in grading competence as such, because then for me you are getting this several tiered system where you’re saying that ‘this individual can perform this task much, much better than this individual’. It might be we’re producing practitioners that all have a … possibly use the term competence because I’m not sure students, when they qualify, are competent. I’d say they’re able, rather than competent. (UK14)

The term “able” used here by Participant UK14 reflects a baseline level of performance that does not meet a confident level of competence. Neither is it as strong as the broad and advanced term of “capability” to act in unknown situations, which is what this research is studying in assessing the “capability” of radiography students. This capability is often best assessed by the latent criteria that have been referred to previously. Participant UK15 summarised this concept succinctly:

I think the supervising radiographers have got more to say than what we’re asking. But we are, as you say, giving them definite categories and if there’s something else, perhaps it’s not coming through. (UK15)

Participant UK4 made a similar statement:

Because the list [of assessable categories] is endless so it’s really down to that good instinct of … the assessor. And they often come and say ‘there’s something and I can’t put my finger on that at the moment’. (UK4)

These statements are very telling and support the theme that is consistently arising in this research, that is, restricting clinical supervisors to pre-determined criteria when asking them to assess students’ WPL performance does not and cannot provide a complete picture of students’ capability. This incomplete assessment, combined with the inability of academic staff to interact with all departments, supervisors and students during the course of a WPL placement, means that student assessment during WPL is largely incomplete in its ability to discriminate capable practice from incapable practice.

One of the areas essential for professional practice raised by participants as not being assessed in the current WPL assessment paradigm, is understanding of the student. This refers to understanding what students are doing in the clinical environment, not just going through the motions based on rote learning. This is higher order assessment, and very difficult to incorporate in a tick-box style assessment strategy. This was acknowledged by Participant UK4:

… the assessment [has] to reflect not just the actual seeing and doing of something but that understanding as well of it, which you can’t always see through the action. It’s basically to fit in the assessment to get what you want from it. (UK4)

According to this participant, a WPL assessment regime should incorporate some form of assessing student understanding. Simply observing students and noting that they appear to have the knowledge to safely undertake a radiographic examination does not adequately assess their
background understanding and professional reasoning. In addition, passing the assessment in
one observed examination does not demonstrate the ability to adapt to changing circumstances,
including more difficult patient presentations. It does not adequately assess the interactional,
dynamic and contextual dimensions of professional practice. Because of current assessment
practice, it is apparent that students are being passed as capable in their WPL assessments when
they may not be capable at all. This leads to the next area of current WPL assessment practice
to be examined—the failure of WPL supervisors to fail students who are not demonstrating
capable and safe professional practice.

4.7 FAILURE TO FAIL STUDENTS

One purpose of assessing student WPL performance is to identify those students who are not fit
to practise—those who are not deemed capable of functioning independently as professional
radiographers. Fundamental to assessing WPL capability is the determination of achievement of
student capability, and an assessment regime which serves to identify poor performance in any
area of practice that is below the standard for that performance area.

Failing students who have not met the required standards of capability is not a simple process,
however. There are several issues which contribute to the difficulties of failing students based
on assessment of WPL performance.

The first issue arises from the very nature of the health professions. Professional practice in a
health profession involves caring for the needs of vulnerable people, and thus these professions
attract people who are typically caring people. Clinical supervisors tend to have an internal
conflict when they deem a student to not be at a passing standard; the concept of failing
someone feels to them as a burden and an act of not caring. The second issue is that students
see clinical practice as the very core of their studies; that is, their WPL performance is a reflection
of whether they capably can do what they are training to do. Failure is often seen as a shattering
blow to their career aspirations, and thus is a very serious and emotionally charged set of
circumstances. Thirdly, assessing WPL is by its very nature open to interpretation. A moderated
multiple-choice examination, for example, has discrete and specific answers, and thus it is
difficult for students to challenge a poor grade. However, because student assessment during
WPL involves assessing a series of situated interactions between students and patients, the
judgements made by clinical supervisors are seen to be much more open to challenge from
disaffected students. Clinical supervisors know this, and often will pass students who in their
professional judgement should not pass, simply because defending their decisions in the face of
appeal is seen to be too onerous.
However, unless these poorly performing students are identified, WPL assessment is not doing the job it is intended to do. Therefore, it is important to ascertain why clinical supervisors are passing students in their WPL assessments when those students do not demonstrate professional capability.

Participant UK2 made it clear that it was a priority to identify students who were not meeting capability requirements:

> What you want to do, what the most important thing to do is to pick up the ones that aren’t fine and do it quickly. And we just do not want this situation where you get to the end of the course and somebody says ‘I think this person isn’t good enough’. I think having jumped through all the Likert scales where people put students in the middle saying ‘well I didn’t want to give them …’. Either they are or they aren’t. And radiographers tend to be very clear when somebody isn’t up to scratch. (UK2)

Even though the supervisor participants in this research were unsure about how to assess capability, they agreed that it was essential to do so. Participant UK2 was quite clear that in their opinion a pass/fail paradigm removed ambiguity in WPL capability assessment and lessened the occurrences of clinical supervisors passing students who should fail. This statement also acknowledged that academic staff are dependent on clinical supervisors to assess the capability of students. This was also reflected in the thoughts of Participant UK14:

> We’ve qualified students and then we’ve had criticism from our clinical colleagues saying that these people are useless and our obvious response is ‘well, you’ve said they were competent’. (UK14)

In radiography it is always universities that make the decision about whether students pass their WPL assessment, or indeed the course as a whole. However, in the WPL context, those decisions made by academic staff are informed by assessments provided by clinical supervisors. Therefore, even though academic staff are responsible for the decisions and student progression, they are frustrated by clinical supervisor assessments which don’t give them the evidence they need to support their grades.

Unlike Participant UK2, who felt that clinical supervisors were generally willing to honestly appraise and assess student capability, Participant UK4 had the opposite opinion:

> They just thought ‘oh lovely, we’ll just have a lovely tick’. People tend to be generous maybe, rather than the other way. So we were finding everybody passed. We picked this up because of the discussion element. Absolutely mirrored that. And when we got it, it was like two different people. So, we realised we have to tighten this up particularly with the advent of this module. (UK4)

Participant UK4’s experience resonates well with my own in the Australian radiography WPL context. In Australia, clinical supervisors appear very reluctant to fail students unless their
performance is so unsafe that it is simply not able to be passed. This applies whether the
assessment is graded or pass/fail. The implication is that radiography WPL assessment should
ideally make it clear that clinical supervisors are writing a report on students, not passing or
failing them. Then, academic staff can use the information provided by clinical supervisors to
determine the outcome of the placement assessment. Because this report writing by supervisors
is so important in assessing student capability, it is essential that clinical supervisors are trained
in the assessment process.

4.8 PROFESSIONAL DEVELOPMENT FOR CLINICAL SUPERVISORS

The discussion about the challenges of current assessment practices points to the need to
provide professional development of assessment practices. Participant UK11 addressed the
connection between clinical supervisors giving honest feedback on student capability, and
education of clinical supervisors:

> You know as lecturers and academic staff we tend to be very happy to give
constructive but sometimes quite critical feedback where it’s required. But we do
find in clinical [practicums] that’s often not the case. They really don’t like giving
critical feedback face-to-face and get comments like ‘well I don’t like giving the form
back to the students with my critical comments on it’. They’d rather fill it in critically
and then give it to us so the students never see it, but that’s the whole point of
feedback isn’t it? (UK11)

This statement reveals that education about assessment is the key to clinical supervisors
completing WPL assessment documentation in the manner that is required. Clinical supervisors
need to understand the methods of assessment, the principles behind these methods, the role
of feedback and how to give it, and the implications of unreliable or inappropriate assessment.
They also should understand and practice self-critique and self-insight, so they can be sure that
their motivation is to help students grow in capability. Participant UK5 agreed that educating
clinical supervisors was the key to useful student assessment during WPL:

> I think some of it is down to the fact that they’re trained. We do train the assessors,
they’re not just any old radiographer off the shop floor sort of thing. It’s certain
people from within the department that are designated as supervisors. I’ve got a
maintained list of all the ones and when they’re due for their refresh and that.
They’re the ones that do the clinical assessments. So it wouldn’t be somebody who’s
newly qualified a year or just started. The staff know the system, know the
assessment scheme and are trained in it, so they understand. I think that helps.
You’re not just expecting everybody to do it. But you’ve got a certain group of staff
to do it. (UK5)

In this statement, Participant UK5 says that it is an academic responsibility to organise education
and professional development for the clinical supervisors they work with, and to keep track of
who is up to date and who needs further opportunity to develop. This quote also states that
supervisors are experienced radiographers, not those who are newly qualified. This relates to
the concept of professional judgement being an integral part of student assessment during WPL, as supervisors need time post qualification to develop this judgement before they can be given the responsibility of assessing student capability.

The education of clinical supervisors is an integral part of the whole assessment paradigm for giving honest and reliable feedback on student capability. Training of clinical supervisors is integral and essential to the success of assessment of student capability during WPL. Assessment education should not be ad hoc, but should be structured, planned in advance, and seen as ongoing professional development that is essential for all clinical supervisors involved in radiography student assessment.

4.9 CONCLUSION

Standards which are agreed on by the profession, by educators, and by regulating bodies such as the Australian Health Practitioner Regulation Agency (AHPRA), set the foundations regarding what student capabilities should be assessed. In order for students to know what standards they are being assessed against, these standards should be made publicly available and be demonstrably credible. However, as my findings have demonstrated, knowing about assessment standards is no guarantee that they are understood and that there is shared agreement about how to assess these standards.

From my findings about what is currently assessed and how, there seems to be a lack of sufficient and relevant dialogue between supervisors, academics and students. To reach shared understanding of assessment standards is an important initial step in improving good assessment practices.

Assessment approaches that reflect WPL capability as being binary may not do justice to the complex mix of professional practice attributes. Furthermore, students perceive that a pass or fail mark is not accurate enough. Providing scope for a more nuanced assessment seems more desirable from my participant groups’ perspectives. Capability might be more appropriately assessed through the lens of supervisors’ professional judgement. This judgement needs to align well with the assessment standards. Professional development for clinical supervisors, especially when it is interactive and allows the supervisor voice to be heard, will enable supervisors to be more competent and confident to fail students who have not reached required standards of clinical capability. Furthermore, clinical supervisors will be better equipped to credibly assess students’ fitness to practise.
CHAPTER 5
RECONSTRUCTION OF WPL ASSESSMENT PRACTICES FROM STAKEHOLDER OPINIONS

INTRODUCTION

This chapter addresses the research sub-question What should be assessed in radiography workplace learning (WPL)? The sources of data for this section include a focus group with Graduate Entry Master (GEM) radiography students from the University of Sydney (coded GEM), and interviews and focus groups with academics from six different universities in the United Kingdom (as outlined in Chapter 2). In addition to these sources, data for this section was drawn from an interview with a prominent professor of education from an Australian university (coded PE), and a national online survey of radiographers (coded NS) who are members of the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT), previously known as the Australian Institute of Radiography (AIR). The survey purpose was to elicit feedback and evaluation for the revised assessment strategy which is the goal of this research. The sample size of participants in the national survey provided a snapshot of the perceptions (about assessment) of practitioners interested in radiography student education. The survey data largely provided confirmation of the findings from interviews and focus groups with academic and student participants.

Participants in interviews and focus groups were asked what aspects of student radiographers’ performance in WPL placement needed to be assessed, and to consider the importance of each of the aspects of students’ performance that they felt should be assessed. They were also asked about the application of standards to assessing student performance in a WPL placement. Participants in the national survey (the results of which are also included in the discussion of this chapter), were asked about what they saw as the key aspects in assessing student radiographers’ performance in WPL placements, and also about what they saw as the relative importance of these aspects of assessment practice. All of the questions asked were geared towards answering the research sub-question as stated above.

Participants described many aspects of professional practice that went beyond discipline specific aspects of assessment. Most of the aspects of professional practice emerging from the data that were seen as assessment requirements were generic to professional practice in most health-related disciplines. While there emerged from the data specific aspects of professional practice that participants felt should be assessed, there was some overlap between the assessment categories that emerged. Each category of the aspects of practice discussed below is considered on its own merit; however, the reader should be aware of this overlap.
The overlap between aspects of students’ practice performance that participants felt needed to be assessed implies that to assess overall student radiographers’ capability, an integrative approach is required. Because professional radiography is a complex practice, it is not realistic to use an atomistic approach to its assessment, focusing on isolated practice knowledge and abilities. Rather, the aspects of practice which apply to each assessment situation observed by clinical supervisors are contextual, and supervisors should use their professional judgement to decide which aspects of capability are applicable to each assessment situation.

Analysing the data collected from these sources led to the following assessment categories that participants identified as being important for assessment of radiography students’ performance during WPL. I ordered these assessment categories commencing with those that had a narrow, radiography-based focus, moving to those with a broader practice-based focus. These categories were:

- technical and care skills: It should be noted that the “care” here refers to the provision of professional services in a health-related setting, and does not relate to interpersonal or emotional caring;
- communication and interpersonal skills;
- teamwork and overall competence;
- initiative and attitude, professionalism; and
- research skills.

The discussion that follows illustrates how participants considered these broad categories should be assessed.

### 5.1 TECHNICAL AND CARE SKILLS

Radiography has a strong technical component which I have linked to the notion of “caring skills” since the provision of radiography services requires both technical capacity and performance as well as professional care, meaning both duty of care (in an ethical sense) as well as professional caring for another human being (e.g., being considerate of a patient’s modesty, anxieties) during the performance of technical procedures. The interpersonal care element was mentioned by some respondents and so it is included here, despite the greater focus on technical skills.

Many participants rated students’ technical capability as very important in any WPL student assessment. Participant UK14 summarised the comments from a number of participants:

*Obvious things that [your] question [regarding what should be assessed] brings to mind would be the technical aspects, so radiographer positioning, recognising anatomy, recognising clinical indications so you can take that forward perhaps to do more appropriate views. (UK14)*
Obviously safe practice is the most important of the ... [assessment categories]. Otherwise there’s just no point. You could be fantastic at communicating but you wouldn’t want me to come near you. (UK4)

A significant number of participants made statements that included the term “obviously”. It would seem that radiographers in general do not deeply analyse their practice, but rather assess it in terms of what they see as being taken-for-granted.

Participant UK4, when referring to safe practice, is referring to a much wider scope than just technical skill. While technical skill is a part of safe practice—including equipment use, choosing radiation exposure factors and other such skills—there is more to patient safety. Aspects of radiography practice such as manual handling, the ability to adapt examinations to patient presentation, how to manage patients with dementia, and many other adaptations, are incorporated in patient safety, and intersect with patient care. As UK4 points out, people who are pleasant and converse well are not capable practitioners unless they can maintain the safety of their patients throughout the entire clinical interaction. Assessment of students’ performance needs to incorporate technical skills, but also needs to encompass how students implement these skills in relation to the people they are working with. This is where professional care and duty of care merge. It is important to consider interpersonal, professional caring within the generic and abstract concept of healthcare.

UK13 reinforced UK4’s viewpoint:

   I suppose patient care is absolutely critically important. Our objective is to produce appropriate [radiographic] images. But not under circumstances of nailing patients to the table. (UK13)

The point is made by UK13 that obtaining appropriate images at the cost of patient safety and personal care is inappropriate and not professional. A radiologic examination should be conducted by a practitioner who can function as a holistic practitioner—one who sees the patient as more than just “the chest” or “the ankle”. Consideration of the whole person is necessary, not just examination of the area to be imaged. UK13 acknowledges this by stating in very strong terms that patient care is fundamental to radiographer capability.

The professorial consultant, PE, added another dimension to the discussion regarding patient safety:

   Above all, we want them [the students] to practise safety. If we look at this and say this is really good stuff, this is passing [i.e., a pass grade]—this person would be a safe practitioner, but there’s [still] a lot to learn. (PE)

The dimension introduced by the professorial consultant, PE, in this comment is that capability is a progressively developed attribute. New graduates are not at the point where their capability
has no room for progression, and neither are they experienced practitioners. Therefore, it is inappropriate for students at different levels of study and experience to be assessed by the same standards or guidelines as new or experienced graduates. What should be assessed, according to PE, is the capacity for students to be safe practitioners when they have reached the required level of education and experience. On face value, this appears to be predicting the future capability of students. However, when WPL supervisors use their professional judgement and past experience of patterns of behaviour that led to success, they can make informed judgements about their students’ capability. Such judgement does not take away from the fact that students are likely to have room for improvement in their overall capability. It simply identifies that they are on a pathway of capability development, and students can be helped to identify those areas that they need to work on to reach their goals.

5.2 COMMUNICATION

Communication is the assessment category (apart from technical skills) that was referred to by participants more than any other. It was seen as being integral to the capability of a radiographer in many different facets of practice. One of the GEM focus group participants made the following observation:

*Communication’s number one. If you can’t speak to a patient there’s no point trying to build [a relationship]. (GEM)*

This participant discussed communication issues between patients and radiographers, which is one of many communication aspects in radiography practice. A practice scenario is a complex interaction between the referring practitioner (e.g., doctor requesting the radiograph), patient, radiographer, administrative staff, radiologist and ancillary staff. Many different means of communication can be involved, including written, oral, face-to-face and via digital technology (emails, SMS and others). The most immediate and personal of these, and the one which perhaps has the greatest immediate impact, is the face-to-face conversation between patients and radiographers. This was recognised by this participant in rating “speaking with patients” as the number one communication aspect of successful radiographic examination, and therefore of radiography student assessment during WPL.

Participant UK9 agreed with this perception, stating:

*Communication’s fairly important, actually, because you can’t do the rest without communicating. (UK9)*

Participant UK9 implies here that communication is a reciprocal activity that needs to include patients as part of radiographic examinations. Participant UK14 concurred:
Obviously, there’s the other factor of communication and integrating with the patient—probably not a very good word to use—but that’s obviously pretty important, appropriate communication in order to achieve the imaging [required]. (UK14)

These statements highlight the importance of communication in a radiographer’s skillset. Unless radiographers can communicate with patients, the rest of the examination is unlikely to be successful. Participants UK9 and UK14 see communication as being of foremost importance, due to the fundamental nature of its role in the whole process of radiographic examination. Despite this fundamental aspect of radiographers’ practice, some participants felt that communication was not given the importance that it warranted when WPL student assessment was considered. Participant UK5 reflected this:

…and communication. Which I think sometimes we don’t pay enough attention to… (UK5)

This statement implies that despite the importance of communication skills for successful radiographers, it is somewhat neglected in assessment of radiography students during WPL. This leads to the question of why such an important aspect of radiography capability would be often neglected in assessment. Participant UK9 added to a previous statement (in the context of what should be assessed):

I think communication skills are something that are very difficult to assess. But I think it’s very important. (UK9)

Participant UK9’s assertion that communication skills are very difficult to assess is hinting at why it is a criterion often neglected in student assessment during WPL (i.e., its difficulty in assessment). As well as being interactive, the nature of communicating is also contextual. What is appropriate communication in one practice setting is not necessarily appropriate communication in another practice setting. An example of this would be communicating with a paediatric patient, as opposed to a mature adult patient. Another example would be a patient who is a native English speaker, compared with one who is an English as a Second Language (ESL) speaker, compared with one who has no comprehension of English at all (assuming the practitioner is an English-only speaker).

Another contextual factor that can affect communication style includes the nature of the presenting problem. For example, you would not communicate with a distressed victim of a serious road trauma in the same way that you would with an ambulant patient who has a chronic cough.

This contextual nature of appropriate communication in a radiography setting is one reason why it is challenging to assess. Participant UK15 made an insightful comment on this issue:
I think it’s important for communication to be assessed and [also] the mode of communication. I think it’s a case of raising issues if they’re not achieving [successful communication, compared] to what you’re expecting at a communication level. So rather than a ticked box of ‘yes, can they speak English properly’, I think perhaps a student’s reflection could be a good way of looking at how they’ve dealt with difficult communication systems such as when they had a patient that is deaf, or a patient that is of another culture and how they dealt with it. (UK15)

In analysing Participant UK15’s statement, there are several points to consider. Firstly, the point is made that simple assessment formats have limitations when assessing communication in context. Communication is such a complex interaction, it is not possible to generalise about it or comment on its suitability for the situation using “pre-set criteria” (Sadler, 2009b). Secondly, the standard Participant UK15 implies should be used to measure achievement of capability in communication is “what you’re expecting”. It would seem from the statement that Participant UK15 was expecting students to critique their own communication skills. As a teaching strategy to promote the development of critical self-evaluation, clinical educators could ask students to do a written reflection on their performance in difficult communication settings; this would not only prompt reflection but also ascertain if students have actually learned from the clinical situation they have experienced.

The deeper implication of this discussion is that professional judgement is the most credible approach to use in assessing skills such as communication. Thirdly, the context of the communication should be taken into account when making an assessment judgement about its suitability. This is aligned to the contextual nature of professional practice.

The examples provided in the quotes accentuate communication problems due to physical or language barriers. These are explicit examples that do not relate to cultural issues or power relationships which often remain hidden. There was little evidence in my data that indicated how communications are typically interpreted. For example, how do supervisors know that what was said in practice situations has been understood? Communication can be seen as an umbrella term for a complex phenomenon linked to dialogue and the goal of reaching shared understanding and agreement. So what aspects of communication should be assessed?

Several participants in the national survey (NS) referred to the importance of communication skills being included in radiography student assessment during WPL. One participant mentioned it in the context of increasing numbers of international students enrolling in Australian radiography programs:

With the influx of international students … [a key issue in assessment is whether students’] clinical communication skills [are] appropriate or inappropriate. (NS)
This participant points to an increasing trend in Australian radiography courses (reflective of Australian tertiary education in general) to increase enrolments of international students. The Australian universities which offer radiography courses have a range of international student percentages, for instance in 2014 this ranged from a low of 15.2% at Charles Sturt University, to a high of 46.3% at RMIT University (Australian Education Network, n.d.). While this trend brings many positives to the universities and the courses, it does present communication challenges, both for the students themselves, and for the WPL sites they are allocated to. It should also be noted, in multicultural Australia, that local students may be multilingual or monolingual and that both limited English and a limited capacity to communicate with people from other language cultures, occurs with locally enrolled as well as international students.

The lack of adequate English language skills in the increasing numbers of international (and sometimes, local) radiography students makes the inclusion of communication skill assessment in radiography WPL imperative as well as challenging. This imperative is implied in another NS comment in response to the question of what should be included in student assessment during WPL:

*Communication with patients including correct identification, [and] pregnancy. Did the student ask a question when unsure of what to do? i.e., [they were] prepared to admit a lack of knowledge in all areas. (NS)*

As Chapter 3 discusses, there are many different types of communication. This quote refers to communication that only requires a closed yes or no answer and relates also to patient safety and reaching a shared understanding with patients. Radiographers are trained to be precise and uncompromising in patient identification, and checking for possible patient pregnancy, because of the possible consequences of using radiation incorrectly or inappropriately. This participant is reflecting the radiographer mindset of radiation safety, by implying the necessity of adequate communication skills for safe radiography practice. This statement also implies that communication is more than just knowing how to express thoughts clearly. It involves having the understanding of social skills and norms of behaviour needed to be able to interact professionally with patients, colleagues and supervisors. Professionalism goes far beyond sound technical performance to encompass the importance of the interactional nature of professional practice.

Professional interaction of radiography students also deals with working appropriately with those people supervising them and involves knowing when to take the initiative in carrying out examinations, and when to seek guidance. Students from some cultural and educational backgrounds may believe that asking questions when following the direction of a supervisor is showing disrespect. However, students not asking questions when they are uncertain can cause
problems in a clinical situation. Knowing how to ask appropriate questions and ask questions in an appropriate manner when required, and admitting to knowledge gaps, are key understandings that should underpin communication required by students and graduates in professional radiography contexts.

Another NS participant reflected the wider view of communication which embraces patients as well as staff:

*Communication—with patients and staff. Extremely important. (NS)*

The fact that radiography practice has a communicative dimension on many different levels is noted in this statement. Not only do radiographers need to communicate with patients adequately to be able to carry out a (radiographic) examination safely and correctly, they also need to be able to communicate with colleagues, as many different circumstances encountered in day-to-day practice require team understanding and cooperation.

Participants in this study indicated that communication is one of the primary aspects of radiography students’ performance which significantly influences assessors’ judgement of student capability. Communication is essential when working in a team, as radiographers do, particularly when employed in a hospital environment. Participants in this research, however, limited their discussion around communication to the more technical factors, and specifically to patient safety. Participants offered limited discussion about patient education; that is, they mentioned little about communicating with patients to help them understand the procedures they were about to undergo, and why they were to undergo them. This again points to a somewhat narrow idea of what radiography professional practice entails, particularly in relation to educating students to be prepared for practice and assessing their performance to ascertain this level of preparation and readiness.

### 5.3 TEAMWORK

Teamwork was considered to be another important aspect of capability in radiography student assessment during WPL. Teamwork is a further example of the contextual nature of radiography practice. In a hospital context, radiographers work in a diverse array of settings where interdisciplinary teamwork is more visible and part of day-to-day practice. These settings include operating theatres, mobile radiography in hospital wards, management of serious trauma cases and interventional radiology cases. Thus, a radiographer’s ability to work as an integral part of a team is very important for functioning in the range of situations encountered in a hospital setting. This was acknowledged by students in the GEM focus group, illustrated in the following remark:
So, shouldn’t that be part of our assessment then, that we’re able to work with each other regardless of different people that you have to work with? (GEM)

Given that this remark is actually a question, it is likely that this student, in reflecting on his/her clinical experiences, had just realised the importance of teamwork. Other students also commented that teamwork was an important aspect of practice that needed to be included in radiography student assessment during WPL. This statement demonstrates that the student participant understood the importance of working as part of a diverse team. This diversity can be manifested in the range of occupations and personalities of people whom participants work with, cultural and language variations, and many other aspects. All of these aspects are represented in the above participant statement regarding “different people”. The statement also alludes to the interactional nature of radiography practice, reflected in the following statement from Participant UK13:

Communication with the multidisciplinary team becomes critical. (UK13)

While this statement focuses on a narrow aspect of teamwork, namely multidisciplinary interactions, it is reflective of the wider range of teamwork that is integral to professional practice. It is noteworthy that Participant UK13 used strong language to describe the importance of teamwork, referring to it as “critical”. If teamwork is indeed critical to radiography practice, its inclusion in the assessment of radiography student capability should be of key importance. Several of the NS participants also commented on the importance of teamwork as a characteristic of radiography practice. Three examples are given below:

[Students need the] ability to work as part of a team. Lack of teamwork can impact on clinical competency and patient outcomes. (NS)

This participant, in mentioning that teamwork is something that should form part of student assessment during WPL, takes the thought further, giving reasons why he/she considers that teamwork should be assessed. The statement that lack of teamwork can affect clinical competence and patient outcomes emphasises the interactional nature of professional practice in radiography. Inherent in teamwork is working together in many aspects of the task being undertaken. Practitioners may need to work together to manually handle the patient into position. One radiographer may wear a lead apron to help immobilise a difficult patient, while another exposes the patient to radiation. One practitioner may select imaging protocols while a colleague positions the patient. These are just some of the many examples of teamwork in radiography practice. If there is a failure in the team interactions in any scenario, it can lead to actual mistakes, or at best, a sub-optimal clinical examination. The consequence of poor teamwork is compromised patient outcomes. The quote also demonstrates understanding of the nature of practice, and of teamwork as a part of that nature.
Many [new graduates] lack initiative and teamwork skills. (NS)

This statement is a generalisation, with little effort to give it context or explain it. Yet it highlights a recurring weakness in graduate practice capability. Lacking teamwork skills has serious implication for quality outcomes for all involved. This statement raises the question of who is responsible for fostering teamwork and points to the need to evaluate this in future assessment strategies.

Sensitivity to variations in team dynamics [is important]. [It involves] being continually receptive to learning opportunities, rather than 'case counting' and progressing self-directed maturity, rather than dependency. (NS)

The statements of the last two NS participants do not contain the insight of the first one but are worthy of comment nonetheless. This statement mentions that some radiography students lack an awareness of team dynamics, and its effect on teamwork. Without being aware of what teamwork is, and what and how teamwork is shaped and shapes the way professionals practise, it is difficult to further develop teamwork skills. Both these statements affirm that teamwork should be assessed as part of the assessment of radiography student performance in WPL.

The above discussion has focused on hospital-based radiography. Radiographers working in private practice contexts are more likely to work independently of colleagues in their day-to-day work, because patients attend such sites as outpatients. Outpatients are generally mobile and independent enough to not need a second radiographer to assist in the performance of their radiographic examination. Radiographers in private practice also do not work in settings outside of their own practice. However, teamwork is not only about physical handling skills and joint performance of procedures. Other aspects of team work include collaboration with the wider healthcare team such as communication with other professionals in a number of ways, including receiving referrals and discussing these with referring practitioners.

Participants in this study believed that teamwork is necessary for overall practice capability which participants saw as requiring assessment during radiography WPL.

5.4 COMPETENCE

In Chapter 3 I identified that the pertinent literature does not always make a clear and consistent distinction between the concepts of competence and capability and the terms are often used interchangeably. However, Fraser and Greenhalgh (2001, p. 799) do provide this clarification: competence refers to “what individuals know or are able to do in terms of knowledge, skills, attitude” while capability also entails the “extent to which individuals can adapt to change, generate new knowledge, and continue to improve their performance”.

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Participants in this study did not explicitly make distinctions between competence and capability. Analysis of participants’ comments indicated that they did not have a clear understanding of the differences between the concepts of competence and capability. They seemed to use these two terms interchangeably. I choose to use the heading competence to stay true to my participants’ use of language. In my discussion I am considering the difference between these in the course of my argument. For the purpose of analysing the data I now explore how my participants use these terms.

Participant UK15 saw overall competence as a yes/no item comprising individual competencies:

> As for the actual competencies, I suppose that’s something more number driven. You can state they’re either competent or not—in the opinion of that radiographer of course. I think that’s much more easily driven by people who were ticking [students’ competencies off on a list]. I think it’s important for the students to demonstrate they are competent. (UK15)

The implication of this statement is that competence can be defined by the sum of discreet competencies or skills. Although Participant UK15 leaves the assessment of competence to the assessor, his/her view of competence does not explicitly address the embedded nature of competencies within the entirety of radiography practice, but sees technical skill as something which can be practised and assessed in isolation from professional practice as a whole.

Participant UK13 had a very technically oriented, straightforward view of competence:

> Obviously, it’s a range of the actual clinical competency, the actual undertaking of radiography in terms of achieving—should we say achieving the right projections, producing the right imaging. I think that’s pretty much paramount in many lights. So, it’s that interface between fully operating equipment appropriately and safely, and producing appropriate images. (UK13)

The view of competence reflected here takes on some of Fraser and Greenhalgh’s (2001) ideas of knowledge and skill but does not reflect the complex nature of capability they write about. An example of this is the situated nature of professional practice that was shown to be an important aspect of practice capability in the literature (e.g., Yorke, 2011b) discussed in Chapter 3. For instance, the model of professional practice in radiography proposed in Chapter 3 sees such technical competence as just one part of the overall set of skills that constitute clinical capability. It is clear that technical ability is an important part of radiography practice, but it is one part of the interactional, dynamic and contextual nature of radiography practice.

When asked about what should be assessed, Participant UK4 shared a definition of competence that falls short of what is required to demonstrate practice capability:

> Competency [is about] understanding the actual [radiography] request, so [it includes] the justification and all the legal things that go with it. Critique. (UK4)
This is a broader view. Participant UK4 saw competence in a broader way that included understanding the purposes of a radiography request, considering legal issues as well as critiquing the request. Critiquing here can be seen as a capability to independently think about the request and its appropriateness rather than simply following requests including clinical decision making in a radiography examination and critiquing the resulting images. It also recognised the importance of context, in that radiography performance and outcomes have ethical and legal dimensions. For instance, radiographers need to consider the consequences to the patient and themselves if errors are made.

Considering the overall data collected from participants, it would seem that many of the radiography academic staff participants did not consider the complexities and situated nature of radiography practice when describing what they thought was important to assess during WPL. They concentrated on the direct task performance and measuring (even just ticking off the presence) of individual technical competencies.

The professorial consultant, PE, took a more holistic view of competence:

> The more I looked at it the more I thought well, this is constantly producing for me assessments of a person’s overall ability, competence, achievement, proficiency or whatever term, that doesn’t agree with my real holistic view of what they can do. One of the reasons is that there’s some things that I want to include which are not on this pre-set list and other things which are on this pre-set list which I don’t know what to do with because all students exhibit them and well, they’re not worth talking about. (PE)

With this quote the professorial consultant, PE, was referring to the concept of discrete competencies. Together they added up to describe a picture of overall competence. This participant noted that adding up discrete competencies produced an overall assessment of a student’s competence that did not necessarily equate with his overall professional judgement.

The holistic view of competence described by PE is not bound by specific criteria (although it may have a place in it), but rather looks at what criteria are relevant to each opportunity to make an assessment decision about the particular student’s performance. These criteria will vary depending on the setting of the assessment opportunity. One aspect that is not clear in PE’s comment is the terminology he uses. He states “…overall ability, competence, achievement, proficiency or whatever term…”, implying that these terms are interchangeable. As stated above, Fraser and Greenhalgh (2001) point out that competence and capability (overall and potential ability) are different concepts. It is suggested that in the above quote from PE, the concept he was referring to was the same as Fraser and Greenhalgh’s capability. This is the goal of student assessment during WPL—to gauge the overall capability of students, so recommendations can be made regarding clinical progression, and eventually, graduation.
The professorial consultant, PE, further made the following statement:

> What I tried to do was shift them [i.e., curriculum designers] away from competencies towards a big picture of competence. I said there’s two reasons for that: one is that it’s [overall] competence that matters not a thousand competencies. I said the second thing is that if you don’t do that then you will be railroaded into a thousand competencies because that’s the TAFE way. I said for lots of things that works tolerably well. But there’s a huge amount of knowledge that we all pick up about know-how and lots of other things which can’t be captured because they’re situationally determined and that’s where it should remain, situationally determined. (PE)

When the professorial consultant, PE, writes “competence”, the concept he is outlining is closer to Fraser and Greenhalgh’s (2001) “capability”. Assuming then, that PE is referring to capability above, the main point that comes across is that knowledge about professional practice, which to a degree includes a tacit aspect, is “situationally determined”. PE’s comments reflect a deep understanding of the nature of professional practice, and the fact that it is difficult to describe in a meaningful way by using an atomistic “competency” approach.

While the UK participants failed to mention that capability is what should be assessed, and concentrated on technical skills in their responses, it may be that they had not considered the professional judgement approach to assessment of capability in radiography students during WPL and answered in the context of current assessment practices.

5.5 INITIATIVE AND ATTITUDE

One of the purposes for reconstructing assessment practices in this research was to consider aspects of professional practice capability to be assessed during WPL that are not covered in a competency-based assessment regime. One of these aspects is student initiative, and how students apply it in their professional practice.

In this discussion, the term *initiative* is considered to mean students being proactive in their practice during WPL. Initiative is about taking action and asking for help and advice. It is underpinned by showing interest and aptitude in the students’ chosen field of practice. Initiative is an integral part of professional practice. It enables the development of practice skills and capabilities. Because practice is interactional, practitioners need initiative to develop their skills in interacting with patients and staff so that interpersonal relationships are well developed as part of their overall capability. Because practice is dynamic, practitioners need to take the initiative in adapting to changing work environments, and equipment and procedure advances. Because practice is contextual, practitioners are required to show initiative in considering the context of examinations in their clinical decision making. These types of initiatives require students to be motivated, show interest, ask questions and have a constructive attitude to their practice.
Initiative and a positive attitude was highlighted by one of the student participants when asked what should be assessed:

*I think initiative. Like if you show that you’re willing to work, you work hard. You might not have the best radiographic skills compared to other students—they’re fantastic but they don’t want to do the work. Like you’re showing that you’re willing to learn, you’re willing to practise, you’re willing to work hard. So, I think that’s an important thing that people should look out for.* (GEM)

This student rates willingness to learn and improve as more important attributes to be assessed than technical skills achievement. The point made is that highly developed technical skills alone do not comprise good practice, and the attitude to use them to provide high quality radiographic examinations is also important. The attitude discussed by this student is defined by willingness to learn, practise and work hard. The suggestion is that if these attributes can be assessed somehow, it will reflect students’ actual capability. The kind of attribute described by this participant is likely to be reflected in the interactional, dynamic and contextual domains of professional practice capability.

The NS yielded a comment by a participant that initiative was lacking in new graduates:

*Many [new graduates] lack initiative.* (NS)

Initiative can be seen as taking the lead in solving problems, attempting challenging tasks and generally putting oneself forward to take advantage of learning and practice opportunities. This is in contrast to sitting back and waiting to be instructed about every move that students are expected to make in the workplace. This observation from this current practitioner is telling because an extension of this thought is that if graduates typically lack a particular attribute, it has not been effectively fostered during their course. One aspect of fostering attributes and capabilities is assessment and feedback. It is feasible that initiative was not assessed, or at least was not assessed adequately, during WPL. The ability to show initiative and to work as part of a team is reflected in the interactional, dynamic and contextual nature of professional practice. Taking the initiative to adapt teamwork skills to the current practice context, contributes to the practice capability of students.

### 5.6 PROFESSIONALISM

Professionalism is a significant aspect of professional practice. Despite this, it is often a poorly defined term which can lead to assessment problems. Determining what the participants meant by the ideas they expressed regarding professionalism was an important aspect of this research, despite them having different perspectives on the kind of professionalism they expect a student or new graduate to possess. For some professions, evidence-based practice is seen as a requisite for professional practice in healthcare.
A subset of professionalism is (having a professional) attitude, and participants identified important attitudes as including being a team player, and adapting to the changing nature of radiography practice both in terms of the tasks they performed and the way they interacted with others. Taking initiative, as discussed above, relates closely to professionalism.

One NS participant commented on this aspect, referring to what needed to be assessed during radiography WPL:

*Attitude and professionalism ... Student attitude to practice. (NS)*

Participant UK15 was the only academic participant with a radiography background who commented directly on professionalism as an aspect of radiography practice that should be assessed in WPL:

*I think their professionalism, professional attitude/behaviour, communication [need to be assessed] ... Well, thinking about professionalism, very difficult to assess isn’t it? However, I do think that if students are not professional that they are much more easily assessed than if they are proficient. (UK15)*

This participant links professionalism with attitude, behaviour and communication. The participant’s view of professionalism is that it is an overarching concept, of which a positive professional attitude is a part. Like other “soft” skills, professionalism is difficult to assess, as pointed out by Participant UK15. However, Participant UK15 makes the point that it is relatively easy to identify poor professionalism, compared to identifying the expected level of professional behaviour. This may be because appropriate professional behaviour doesn’t stand out in the professional world, whereas substandard professionalism is evident in poor behaviour.

When discussing professionalism as an aspect of student assessment during WPL, its definition needs to be made clear in order for its assessment to examine the desired attribute. Some aspects of professionalism are simple to assess, such as punctuality. However, other aspects of professionalism are more contextual. An example of this is cultural sensitivity.

The point is made by Participant UK15 that assessing professionalism is difficult. Given that most radiography student assessment during WPL is currently based on a psychometric paradigm (as discussed in Chapter 4), it is not surprising that clinical supervisors find it difficult to assess the more variable, complex, contextual and hard to precisely define behaviour of professionalism, and academic staff find it difficult to set assessment criteria for it. Professionalism is an attribute and behaviour that has different meanings depending on the context of the practice situation, so it requires assessment based on the professional judgement of assessors. A narrative approach that considers context and professional reasoning processes, rather than a psychometric approach, may assuage the difficulty identified by Participant UK15.
These concepts were discussed in greater depth by the professorial consultant, PE:

_I think we focus too much on getting people to pass with marks than we do on equipping them as professionals. In terms of professional growth, the kinds of experiences you get don’t matter too much, so long as they’re rich and productive. So, your aim as a student is to—you’re largely responsible for making sure that you’ve got everything you can out of the workplace that you’re in and here’s how you do it and here’s what to look for._ (PE)

The reference to pass[ing] with marks is an allusion to the psychometric assessments currently used in many fields of knowledge to assess students’ suitability for entry to professional practice. The professorial consultant, PE, suggests that a preoccupation with marks is the focus of many assessment strategies, rather than working with students to build the skills required to be a capable practitioner: skills whose achievement is difficult to represent with marks.

The professorial consultant, PE, further suggests that the specifics of students’ learning opportunities and experiences are less important than the quality of learning from those experiences. Practice experiences will vary depending on the context of the situation, and learning from experiences will enhance students’ ability to adapt to contextual changes in their professional practice. Students will benefit from effective mentoring and supervision from WPL supervisors and academic staff to make the most from any professional practice situation they encounter.

Participants referred to professionalism as a behaviour in a given context of professional practice. However, they seemed to have a limited concept of a topic as broad as professionalism, seeing it as just being associated with technical practice. They did not demonstrate a deeper understanding of its place in every aspect of professional practice.

5.7 RESEARCH

Indirectly related to professional practice capability is research. Research allows practitioners to question their practice and develop evidence to inform their practice. Research relates to critical thinking skills that help students develop understanding of and adapt to the practice unknowns and uncertainties. Research skills can add to practice capability and practice knowledge.

The question that was asked of participants was: _Do you see a role in assessing students’ research skills as part of clinical assessment?_ Participants found the idea of students undertaking research to be a new concept and had mixed reactions to it. Participant UK15 was positive:

_I think it’s very relevant. I think you’re right. You don’t think about it because you don’t think of the students doing research in the university and then think about the radiographers doing research. But I haven’t thought of the research as part of the students’ arena as within the department. I don’t see why it shouldn’t be actually. Might be difficult, but doesn’t mean it’s not relevant. Interesting._ (UK15)
While Participant UK15’s statement is mostly thinking out loud about a concept new to him, he does acknowledge its potential relevance to capability. This participant also commented that incorporating research into assessment might be difficult, without stating why. Research is a very broad term, with many varied facets. Specifying its incorporation into an assessment framework would need guidelines in order to ensure transparency in assessment of students’ performance during WPL, qualities that are being sought by this research. However, should research skills be incorporated into the framework of assessment of performance during WPL, there are clear benefits to be achieved in terms of developing and measuring practice capability. This is because the concept of capability incorporates the ability to adapt to changes in practice. These changes are the result of effective research being carried out in the relevant fields of learning.

Participant UK10 had a different perspective on the question of whether research should be part of student radiographers’ training:

*I think there are essential skills that I think you would still be a good radiographer without having done very much research, as long as you have that knowledge base and the ability to do the job.* (UK10)

Participant UK10 was not able to see the connection between research as a formal activity to be included in assessment of performance during WPL, and the development and assessment of practice capability. This is perhaps due to the common technical focus among radiographers. Whatever the reason for his/her attitude to this topic, UK10 seemed to be closed to the idea of incorporating research into undergraduate radiography curricula.

The question for reconstructing an assessment model is whether aspects of research should be an integral part of student assessment during WPL or left to be covered in the academic campus curricula. Given that participant opinions were divided on its merit, it is not possible to draw conclusions based on what they said. What is apparent is that incorporating research into an undergraduate program somewhere is important for future radiographers to cultivate an inquiring mind and implement evidence-based practice.

The term research (activities) is a broad one and covers many different aspects of inquiry. It could be a specific research project, it could be research skills such as the use of statistics or searching databases, it could be how to gain ethics approval, or any combination of these or other aspects. In terms of incorporating research into a curriculum, whether it should be incorporated at all, and if so, where it would be placed, depends on what aspect of inquiry is referred to. In order to answer this question in the context of WPL and assessing student performance during WPL, it should be determined if any of these aspects of inquiry contribute to student capability. It is clear that a specific research project, while valuable to background
knowledge, does not directly contribute to student capability. Isolated knowledge on one topic has limited relevance to clinical capability. A student may be very skilled at self-directed garnering of theoretical knowledge, yet unable to apply that knowledge in a clinical environment.

I suggest that student capability, while somewhat influenced by student knowledge based on previous student self-directed inquiry, cannot reasonably be assessed by attempting to assess research skills in any of these aspects. This research points to student capability being assessed by direct observation of actual student performance in a clinical context. This is independent of student ability to undertake a formal research inquiry but relates more to development of critical inquiry ability and critical self-appraisal which is definitely a key factor in good clinical practice and should be assessed during WPL.

5.8 PRIORITISATION OF ASPECTS OF PROFESSIONAL PRACTICES IN PLANNING AND PERFORMING ASSESSMENT

A question asked of the participants in my research was about the degree of importance of aspects of professional practice that should be assessed in radiography students during WPL. Some participants felt that no hierarchy of importance could or should be determined. An example of this was Participant UK7, who remarked:

...you asked us to rank things ... [but] ... it [is] impossible to grade, because some people will rank technical ability very high, some people communication, some people problem solving, some people something else. (UK7)

This comment implies that professional judgement by the clinical supervisors is a vital ingredient in assessing radiography students’ performance during WPL. In the professional judgement of different assessors, different practice capabilities take pre-eminence. Judgements are influenced by factors that most significantly contribute to sound professional practice and factors that most significantly contribute to enhancing students’ learning (and their development of practice capabilities) during WPL. For instance, WPL supervisors can be influenced by the demonstration of these skills, or the lack of them, in different students. For example, if a student has excellent technical skills, but is very poor at communicating with patients, the importance of communications skills will be highlighted to the assessor. However, if a student has effective communication and people skills, but doesn’t know the fundamentals of radiographic positioning, the importance of technical ability will be highlighted. To summarise this thought, an assessor does not know what key aspects of students’ overall performance will contribute to the assessment of their capability until they have seen them in practice. This concept of assessment was highlighted by the professorial consultant, PE:
You started with a blank sheet of paper... So, draw a line, right, and put A, B there, right. Okay, listen to a person and then say okay, how good was this? A's abominable, B's brilliant, right? Where would I put this, where would I locate it? So, you make a decision, there, that's where I'd locate it, and I located it without numbers—just this is fixed, this is awful and this is really good.

Okay, the next question is why did you locate it there? The third question is what advice would you give the person to improve it? (PE)

The fundamental concept contained in this quote is that the professional judgement of assessors is used to make an overall decision regarding the capability of students based on their observations of student performance. Assessors then retrospectively decide what the criteria are that have led them to make that judgement.

The concept of determining assessment criteria after a global judgement has been made is an important one, as it reverses the typical process of using criteria to assess students' performance during WPL. The widely accepted method for assessment in most fields is to set assessment criteria, and then identify an approach (psychometrically or some alternative method) to measure students' performance against those criteria. This approach does not allow for criteria that the constructors of the assessment paperwork may not have thought of when designing it, and it restricts assessment to those criteria. The assessment paradigm suggested by the professorial consultant, however, proposes that the overall performance of students is assessed utilising the professional judgement of supervisors, and then supervisors retrospectively decide what criteria they used to come to their overall judgement of the performance. The suggested approach ranks the professional judgement of supervisors above criteria set by the constructors of the assessment paperwork. This assessment paradigm allows supervisors to adapt the assessment criteria used to the context of WPL performances being assessed.

5.9 CONCLUSION

The findings from my participant data demonstrate four core arguments:

- There is a need to help students learn to appreciate social, contextual and interactional dimensions of practice.
- Assessment requires understanding what capability means (by both students and assessors). A technically competent practitioner may not be capable in diverse practice situations. How this is incorporated into learning during WPL and assessment in WPL, both formative and summative, will be further examined in Chapter 6.
- Practice involves many invisible and implicit factors which should be assessed. Such factors are more difficult to assess than visible, measurable aspects of practice.
If we are aiming to move from competencies to capabilities as the focus of assessment, this has implications for how assessment strategies are designed and implemented. This will be discussed in Chapter 6.

The key areas that participants considered to be important to assess were:

- **Technical abilities**
  Data collected in this research suggests that many radiographers see technical skills as being the most important facet of radiography practice. It is well accepted that radiography technical skills are what makes the profession unique from other health professions, but it could also be argued that these competencies are the facet of professional practice that are easiest to assess, and currently are assessed satisfactorily in most cases. The challenge is in integrating these largely psychometric technical skills assessments with the more judgement-based skills assessments that describe radiography practice.

- **Patient care abilities**
  Patient safety and care are human aspects of practice that participants described as warranting a place in radiography student assessment during WPL. When talking about safety, participants were mostly referring to radiation safety, which is integral to technical skills. However, patient safety encompasses all aspects of radiography practice, including cultural safety and psychological safety.

- **Communication and interpersonal skills**
  Communication was considered by many participants to be an aspect of student capability that needed to be assessed. Communication overlaps with many aspects of professional practice, including patient communication, communicating with other health professionals in a multidisciplinary team, and working together with immediate professional colleagues.

- **Teamwork**
  Participants considered teamwork to be an important facet of professional practice to be included in student assessment during WPL. The ability to participate well in a team is an essential part of professional practice for radiographers. The team can vary in many ways, for instance, it can be intra or interprofessional, different in culture (e.g., dynamic, traditional) and is typically dependent on the current practice context.
• **Professional attitude**
  
  Professional attitude was considered by participants to be integral to radiographer capability. It is challenging to define, and participants saw it as being also difficult to assess. Professionalism was also mentioned and means different things to different people, and it overlaps with some of the other categories discussed. Participants saw it as a key skill in developing student capability in professional environments. It encompasses a range of aspects of professional practice.

• **Initiative**
  
  Students getting involved in all practice contexts and being prepared to attempt challenging examinations in complex contexts was considered to be important in assessing practice capability. Initiative is also challenging to define, and therefore difficult to assess. However, participants saw it as being an important aspect of practice capability.

• **Research**
  
  Students’ research ability was not uniformly agreed to be a capability that should be routinely assessed during WPL. The participants were divided on the role of research in radiography WPL practice, and therefore assessment.

Participants whose input was analysed in this chapter alluded to the interactional, dynamic and contextual nature of professional practice in describing what they felt needed to be assessed. However, they did not discuss these aspects of practice in great detail, implying that the nature of radiography practice requires further education and cultivating of discussions in developing strategies for the assessment of radiography students during WPL.
CHAPTER 6
RECONSTRUCTING WPL ASSESSMENT PRACTICES FROM TESTING A DRAFT ASSESSMENT MODEL

INTRODUCTION

This chapter comprises the reconstruction Phase 2 Stage 2 where I discuss the development and testing of the draft assessment strategies. I discuss the development of draft strategies for assessing clinical capability of radiography students, the pilot testing of the draft strategies, and the results of the survey with clinical assessors involved in the pilot testing. I also discuss the findings relevant to the development of the draft strategies from interviews and focus groups with stakeholders.

The research sub-question that guided this chapter was:

B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?

6.1 CONSOLIDATING RECONSTRUCTION

Planning, administering, grading and evaluating assessment of students’ academic achievements in the university campus setting can be a complex task with quality only being explained by reference to multiple criteria, including some that are abstract in nature (Sadler, 1983). Royce Sadler is an Emeritus Professor of Higher Education, with a background in Mathematics education. When the context is WPL and the focus is assessment of practice capability, an added set of factors further complicates meaningfulness of the process. Orrell, Cooper, and Bowden (2010) state that the assessment of student performance and workplace criteria is the most complex of all assessment modes. This was reflected in the findings of participants in this research, who suggested many factors that add to the complexity of assessing student performance during WPL when compared to academic achievements reviewed in on-campus assessment.

Kegan (1994), who is a psychologist, made the insightful observation that “... people grow best when they continuously experience an ingenious blend of support and challenge; the rest is commentary” (p. 42). This quote about student learning requiring support as well as challenge is particularly relevant in the WPL context. The assessment of how students perform in this environment is a commentary on the learning that has taken place. The challenge for WPL supervisors and university educators alike is how to ensure that this commentary accurately reflects the complex learning that has occurred.
Tertiary institutions usually require assessment of students’ performance in the WPL setting; this may be expected to be provided in a quantitative format. However, for many people this tension arises between the practice of grades being represented as quantitative data, and the contention that performance of professional practice is best judged qualitatively. Sadler (2009b) comments that determining the quality of complex performance requires skilled, qualitative judgements. Hager, Gonczi, and Athanasou (1994) refer to competence as being conceptualised in terms of “... knowledge, abilities, skills and attitudes displayed in the context of a carefully chosen set of realistic professional tasks” (p. 4). As has been discussed in previous chapters, a health professional requires practice capability, and practice capability is more than competence. Practice capability involves the ability to apply competence in a variety of settings, to adapt to change, and to appropriately and successfully interact with all stakeholders in the process. Ultimately, a meaningful framework for the assessment of students’ performance during WPL must be able to utilise assessors’ skilled qualitative judgements regarding the presence or absence of the attributes of professional practice, and interpret them in a way which offers feedback on student capability, as well as a means of recommending students for licensing and accreditation as qualified practitioners.

Professional practice capability is one of the main attributes that this research has identified as being valued by potential employers and colleagues. Orrell et al. (2010) have found that in choosing graduates to employ, employers prefer to rely on assessments that have occurred in real-world contexts, rather than abstract “pen and paper” assessments. While the aim of a WPL assessment framework is to assess student practice capability, the opinions of senior practitioners were an integral part of my research and need to be valued when discussing capabilities that are fundamental to radiography practice.

The message which came from radiography practitioner participants in this research was that a WPL assessment framework must provide consistent and useful information regarding student practice capability. This is consistent with key messages in the literature. Burchell, Higgs, and Murray (1999) argue that practice capability must be tested over a wide range of assessment strategies including examinations, practice techniques and working with patients across multiple working environments. And Smith and Wilson (1992) contend that to incorporate this into a WPL assessment framework, a comprehensive and systematic, yet flexible approach is required. This flexibility is to allow for the interactional, dynamic and contextual nature of practice to be incorporated into considering how to assess students’ capability.
6.2 PARTICIPANTS’ RECONSTRUCTION RECOMMENDATIONS

In the national survey of Australian radiographers, 95.8% of respondents favoured the introduction of a uniform WPL assessment framework across Australian universities. Commenting on the survey question “Do you support the introduction of a uniform national clinical assessment tool for radiography students?” respondents included such statements as the following:

*The use of a national assessment tool would allow one to be able to compare apples with apples when assessing prospective applicants for a new position.*

*At the present time there is no real comparison from one institution to another when presenting these assessments for employment applications.*

It is clear from these and other comments made in response to the survey that a well-researched, comprehensive, systematic and uniform approach to the assessment of students during radiography WPL will not only give radiography academics useful findings to provide students with feedback (formative assessment) to facilitate their learning and provide summative assessment and recommend student radiographers for graduation, but will also give radiology department managers more confidence in relying on assessment documents when choosing applicants to employ.

6.3 ASSESSMENT AND LEARNING

Traditionally, assessment has been used as a measure of what a student has learned (Baartman, Bastiaens, Kirschner, & van der Vleuten, 2007). However, assessment also plays a key role in fostering learning (Orrell et al., 2010). Assessment during WPL should help students to internalise their discipline’s standards and notions of quality (Price, 2005). The design of assessments should be focused around enhancing and facilitating student learning (Clements & Cord, 2011), not just measuring it. In particular, WPL assessment should not focus on a narrow competency-based approach but should be open to all student learning derived from the experience (Clements & Cord, 2011). This openness to all student learning transforms WPL assessment from a “tick-box” approach, to an assessment approach that can indicate student practice capability.

Learning involves changing the way that students think, so assessment processes, if they are to foster development in thinking and problem solving in practice situations, must evaluate a student’s shift in ways of thinking and doing (Orrell et al., 2010). However, shifting the WPL assessment focus away from a competency-based approach does not rule out assessing technical competence as an integral part of practice capability assessment. In the national radiographer survey undertaken during this research, 95.7% of respondents indicated that they
believed students should be assessed according to their competency in various imaging examinations. Figure 6.1 illustrates participant responses to the question asking how students should be assessed. Responses revealed that participants believed that competence in the many technical facets of radiography was an important part of assessing student radiographer performance during WPL. However, it was also clear that participants felt that a pass/fail approach was inadequate to describe the complexity of radiography practice.

Students need to be entrusted with their own learning in order to develop advanced abilities to learn and synthesise information (Brammer, 2006). This viewpoint is supported in my interview with a prominent academic, where he suggested students need to be entrusted with their own learning to some extent across their entire education. This academic also suggested that the main thing students need to learn, in any field of endeavour, is to recognise quality. Boud and Associates (2010), in their pivotal paper *Assessment 2020* echo these sentiments:
While marks and grades may provide a crude tracking measure of how well students are doing, they do not help students move beyond their present standards of performance. Specific and detailed information is needed to show students what has been done well, what has not, and how their work could be better. (p. 2)

All of the attributes listed in the above (learning and synthesising information, being entrusted with responsibility for their own learning, and recognition of quality) are essential for developing practice capability. In a dynamic and contextual practice environment, learning from new practice circumstances, and synthesising this learning with past experiences, enhances student ability to adapt practice to varying practice environments. Students taking responsibility for their own learning allows them to adapt the learning experiences to inform and overcome their areas of shortcoming. Quality of radiography practice is contextual. For example, image quality that is unacceptable for an ambulant outpatient is often acceptable for a seriously injured road trauma patient, due to the difficulty of obtaining the image. The outcomes obtained from the interviews and focus groups conducted as part of this research indicate that students need to be able to understand image quality in the context of the examination at hand in order to be considered practice capable.

Tekian and Yudkowsky (2009) suggest that learning portfolios are a valid means of assessing self-directed learning, and that they also comprise a means for longitudinal, multisource assessment of the actual achievements of learners, as reflected through their own eyes. This indicates that a form of portfolio of WPL learning achievements is an appropriate and necessary part of a WPL assessment framework.

Interviews and focus groups conducted as part of this research revealed that many of the UK-based radiography academic participants made effective use of learning portfolios in their courses, and in particular in their WPL assessment frameworks. Their comments, as discussed in Chapters 4 and 5 of this thesis, supported the findings of Tekian and Yudkowsky (2009). These portfolios, while useful for a number of purposes in practice capability assessment, were believed by many UK-based radiography academic participants to be particularly beneficial for recording student reflections of their learning in the WPL environment.

The reflective experience-based learning cycle of learning, described by Kolb (2014), enhances student learning, and is particularly applicable in the practice environment. In such settings, students reflect on practice situations, decide what changes they might make in future comparable circumstances, and implement these changes when similar circumstances arise. Students document these changes, and the associated practice circumstances, in a portfolio, which becomes a tool in future reflective practice and associated learning.
6.4 ASSESSMENT METHODS

Current radiography WPL assessment methods typically apply numbers or grades to specific criteria on an assessment form, and the sum of these numbers is the score used to denote students’ practice capability. However, Sadler (1989) states that when making a judgement about student capability, which is by nature qualitative, the final decision should refrain from exclusively counting things, making physical measurements, or adding numbers and looking at the magnitude of the result. Such a final decision cannot represent or describe student capability, as it is attempting to use quantitative measurement techniques for complex human performances. Many research participants noted that a score derived in this way, which is meant to represent student practice capability, is often different to their judgement of the overall student practice capability. This perception, supported by Sadler’s statement, points to the inadequacy of the current WPL assessment approach in attempting to provide a meaningful description of student practice capability.

Hager and Gonczi (1991) advance this viewpoint, warning that by concentrating on discrete skills or attributes, there is a danger of only addressing superficial aspects of professional practice, while ignoring complex capabilities and the holistic way in which knowledge and skills are integrated in actual, situated practices. Assessment of discrete skills and attributes cannot adequately reflect integral practice capability in the context of professional practice.

There are many different sources of differences in the assessment of WPL practice capability, so instigating multiple assessment methods is one way to improve the quality and meaningfulness of an assessment framework (McGill, van der Vleuten, & Clarke, 2011). Acceptable levels of consistency in implementation of an assessment framework between WPL assessors is not dependent on assessment format, provided that multiple assessment methods are employed (Baartman et al., 2007).

While participating in a focus group I conducted, academic participants from one UK university agreed that something as complex as a student’s clinical performance could not be reliably assessed by one assessment method only. The radiography course at this particular UK university involved increasingly complex assessment tasks as the student progressed through the course, reflecting the increasing complexity of decision making and task performance required of the students.

Other UK participants in this research described the use of multiple assessment methods that, when combined, make up an overarching assessment framework in their radiography courses. Specific assessment methods that were used varied between the courses, but the principle that the complexity of professional practice cannot be described adequately by one assessment
method was a common theme that arose from the research. Participants advocated for multiple methods for an integrated assessment framework.

As previously stated, extracting quantitative data from qualitative judgements is fraught at best (Sadler, 1989), and randomly allocating numbers to qualitative data will have limitations in providing the information regarding student practice capability that is necessary to describe their progress towards becoming professional, competent and capable practitioners. Thus, the evidence from both the literature and the participants in this research points towards using multiple assessment methods to give a holistic indication of a student’s clinical capability as the way forward in assessment during WPL.

6.5 GRADING VERSUS PASS-FAIL

One of the major functions of assessment is providing feedback to students on their performance (Sadler, 1989). In order to improve their performance, students need to know how they are progressing, and a pass-fail approach does not give them this feedback (Sadler, 1989). Grades have a substantial impact on learners and learning, and strongly influence students’ sense of achievement, and ultimately their motivation and level of engagement with learning (Sadler, 2009b).

The pass-fail approach does not allow specific strengths and weaknesses of students’ performance to be identified, and thus restricts the possible learning outcomes from the assessment process (Dijkstra, van der Vleuten, & Schuwirth, 2010). Indeed, the use of pass-fail, non-graded pass, and other non-graded systems of assessment in WPL is often symptomatic of a lack of articulation of learning outcomes, standards of performance, and alignment between these and program aims (Orrell et al., 2010).

In my interview with the prominent academic, the viewpoints addressed above were emphasised. One point made by the academic was that changing to a pass-fail system does not make unreliable assessors reliable; it just means that people who can’t make grading decisions reliably will not be able to make pass-fail decisions reliably either and will probably default to a pass grade for the vast majority of students.

In the national survey of radiographers, 64.8% of respondents disagreed or strongly disagreed that students should be assessed as pass-fail in all assessment categories, while 12.8% were neutral, and 22.3% agreed or strongly agreed. However, 72.4% of respondents agreed or strongly agreed that certain aspects such as appearance and punctuality could only reliably be assessed as pass-fail. The literature, experts and survey participants seem to be in agreement that assessment of practice capability during WPL should be graded.
Figure 6.1 demonstrates participant opinions regarding the pass-fail approach for assessing student radiographer capability.

Despite these opinions, many of the UK radiography academic participants pointed out that the practice capability assessments filled out by their affiliated clinical assessors were applying the pass-fail approach. One of the reasons given was that assessors do not like to give critical feedback, so if a graded system is used, the grades are almost universally 90–100%. Another reason given was that academic staff, who have educational experience, know how to discriminate between different levels of performance, and grade accordingly. On the other hand, clinical staff, who are the ones to generally fill out the assessment of practice capability, do not have that experience and might be better positioned to decide on pass or fail based on integrated capability, even if given a set of specific assessment criteria.

Another UK radiography academic participant raised the issue of what mark or grade represents clinical capability. The question was asked: “Can a student be 70% capable or 80% capable?”. In other words, either students are fit to practise, or they are not. When asked about a pass-fail approach being de-motivating for students, this academic replied that good students will be self-motivated to develop their practice capability, independent of any marks awarded. It was also stated that the pass-fail approach depends on trusting the professional judgement of the clinical assessors. Professional judgement is a topic that will be discussed in a subsequent section of this chapter.

A point raised by one UK radiography academic participant was that practice capability is a threshold concept. It is perceived as a continuum. When students reach the threshold, they are passed as being capable. Until they reach the threshold, they are not considered capable. The judgement regarding reaching the threshold is a holistic judgement, based on all aspects of student practice capability.

A colleague of the academic referred to in the previous paragraph suggested that a graded assessment of practice capability is restricted to passing a student who reaches the university pass mark. In the UK, this pass mark was universally 40% at the participating universities. In Australia, the nominal pass mark is generally 50%. What this means is that a student who only demonstrates understanding in half of the intended learning outcomes is considered capable. Alternatively, if a pass-fail approach is employed, academic staff can set the pass mark much higher, potentially 80% or 90%, as the same restrictions do not apply. Any score less than the determined pass mark is not considered capable. This does not answer the question of how the actual mark is determined, but it is a factor to consider when deciding what the best approach is to adopt.
It is apparent from the above discussion that there is conflict between stakeholder viewpoints regarding the graded versus pass-fail approaches. The pertinent literature and results from my survey participants align and state that a pass-fail approach is not appropriate for describing complex radiography practice capability. However, the interview and focus group participants were strongly supportive of the pass-fail approach. It is apparent that there are positive and negative aspects to both positions, so ideally a model that incorporates aspects of both should be developed. A WPL practice capability assessment model suggested by one UK radiography academic participant incorporates the previously discussed concept of multiple assessments contributing to an overarching assessment framework. Of the assessment components contributing to the framework, the components completed by WPL assessors are graded as pass-fail, whereas other learning outcomes components, which are graded by academic staff, are given a numerical score. The WPL assessment framework is composed of both graded and pass-fail components, with a pass in each component necessary for an overall pass in the associated university subject. The participant considers that this model for a practice capability assessment framework combines the advantages of both approaches and will give a meaningful picture of student practice capability. Findings from this research point to this being a credible, dependable and confirmable model to base the resulting assessment framework on.

6.6 PROFESSIONAL JUDGEMENT

Although at face value professional judgement may seem subjective, by necessity it plays an essential role in the assessment of practice capability and is no less reliable than so-called objective assessment (Hager et al., 1994). Paul Hager is an expert in assessing vocational education. It typically has a high degree of credibility, dependability, confirmability and transferability, and its validity is assured because a sample of a student’s work is the most direct basis for making a judgement about professional capability (Hager et al., 1994). Clinical assessors can almost universally identify good performance when they see it, but if one was to ask an experienced assessor exactly what they are looking for to classify performance as capable, they may have a deal of difficulty doing so (Sadler, 1989). Sadler (2009b) refers to the concept of holistic grading, where the primary influence is the supervisor’s emerging global judgement of the student’s performance. Of course, this judgement must be referenced to accepted standards for the relevant profession.

Contemporary assessment literature (Boud & Associates, 2010; Sadler, 2005) often refers to the role of standards in assessment. However, using pre-determined professional capability standards as the measure for assessment of professional capability does not prescribe that professionals’ actions should be the same as the next person in a given situation. Application of these standards should allow for professional discretion (Feuz, 2014). When assessing capability,
the context of the performance needs to be integrated into the considerations (Johnsson & Boud, 2010) Therefore, assessing WPL capability is not really a process of measurement, but rather the application of judgement, reasoning and decision making in a dynamic environment (Govaerts, Schuwirth, van der Vleuten, & Muijtjens, 2011).

In my interview with the prominent academic, the insightful observation was stated that the judgements made by supervisors are “more complicated than we think but on the other hand we can actually do them better than what we think”. One focus group with radiography academics at a UK university also reflected these thoughts with the following statement:

What we have to do is start to trust the professional judgement of the radiographers because they are professional people. You know they do know if someone is up to speed or not.

The conclusion I draw from this is that it is not constructive to try and force professional qualitative judgements into some type of artificial quantitative format. We should recognise and value these judgements for what they are—an accurate, professional reflection of students’ practice capability.

The application of professional judgement in assessing student practice capability was a common theme in interviews and focus groups. One radiography academic participant made the observation that determining an assessment of practice capability on observation of student performance is inherently an act of professional judgement, whether that judgement is reflected in a numerical scale (often thought to be a highly objective assessment strategy), a narrative describing student capability or any other means of assessment.

Another participant commented that they felt that professional judgement of clinical assessors should be trusted, as assessors are professionals who know what constitutes practice capability. The same participant, later in the focus group, commented that professional judgement was an integral part of the assessments at the university they were employed at, and that no student had ever appealed against a failed WPL placement where the assessment was based on the professional judgement of the assessor. The point was also made that this kind of professional judgement should not be made by one assessor based on a snapshot of student clinical practice, but rather by more than one assessor, based on the entirety of student practice over their time in the particular clinical centre.

I conclude from the literature and the interviews and focus groups carried out that professional judgement of clinical assessors provides not only the most meaningful information regarding student practice capability, but also a superior approach to assessment methods commonly thought to be objective. I conclude that at least one assessment component of the assessment
framework developed should be based on the professional judgement of clinical assessors.

From the discussion above the following propositions can be drawn:

1. A radiography WPL assessment framework should allow supervisors to exercise their professional judgement in assessing practice capability of student radiographers.
2. Technical competence should be assessed, but this is just one part of the skillset that affords practice capability.
3. A radiography WPL assessment framework should include actions that facilitate and enhance student learning, not just assessments that measure it—this is best attained with the use of a reflective portfolio.
4. There should be more than one method of assessment of WPL practice capability contributing to the developed assessment framework.

It should also be pointed out that assessment which is part of a tertiary qualification, and particularly assessment of practice capability during WPL, needs to align with professional and accreditation body standards. This is essential in order for graduates’ university qualifications to be recognised by the profession so they can gain professional registration. In the following section I discuss each of the four propositions and integrate them into a reconstructed draft assessment strategy, which forms part of the set of strategies that is a framework of assessment for radiography student capability during WPL.

6.7 DEVELOPMENT OF AN ASSESSMENT FRAMEWORK

In this section, I present the reconstruction process by which the draft assessment strategies were developed. The integration of the above four propositions into the development of the pilot assessment framework will now be discussed.

*Proposition 1: A radiography WPL assessment framework should allow supervisors to exercise their professional judgement in assessing practice capability of student radiographers.*

The model for assessing graduate practitioners developed by the Medical Radiation Practice Board of Australia (MRPBA) is known as the Supervised Practice Program (SPP). The SPP guide, developed for both SPP radiographers and their assessors, contains broad areas of capability, and the criteria for the pilot WPL assessment framework are based on these. A conventional grading rubric contains criteria, and varying standards of achievement against each of the criteria. I developed a grading rubric against the SPP-based criteria with the standards, instead of representing grades from fail to high distinction as per a conventional grading rubric, representing the level of performance expected in each criterion for a specific WPL placement block (see Table 6.1).
Table 6.1. Rubric Based on Supervised Practice Program Guide.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Year 1</th>
<th>Year 2A</th>
<th>Year 2B</th>
<th>Year 2C</th>
<th>Year 3A</th>
<th>Year 3B</th>
<th>Year 4 Sem 1</th>
<th>Year 4 Sem 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice knowledge</td>
<td>Understands basic facts and concepts</td>
<td>Beginning to understand more complex facts and concepts</td>
<td>Developing skills to analyse basic facts and concepts</td>
<td>Understand a broadening range of facts and can successfully analyse simple facts and concepts</td>
<td>Understands the majority of complex facts and beginning to analyse more complex facts and concepts</td>
<td>Understands breadth of complex facts and can analyse increasingly complex facts and concepts</td>
<td>Understands and integrates a breadth of complex concepts and principles</td>
<td>Understands and evaluates complex concepts and principles (limitations and strengths). Can justify principles, protocols and hypotheses</td>
</tr>
<tr>
<td>Degree of Independence</td>
<td>Consistently requires instruction</td>
<td>Dependent on instruction, but beginning to apply instruction to practice</td>
<td>Some dependence on instruction. Increasing application of instruction to practice</td>
<td>Often requires direction or correction. Applies direction to practice</td>
<td>Sometimes requires direction or correction, and intuitively applies it to practice</td>
<td>Occasionally requires direction or correction</td>
<td>Rarely requires direction or correction</td>
<td>Independent</td>
</tr>
<tr>
<td>Time efficiency</td>
<td>Consistently requires additional task time for a limited range of simple tasks</td>
<td>Consistently requires additional task time. Increasing number and complexity of tasks attempted</td>
<td>Often requires additional task time</td>
<td>Regularly requires additional task time</td>
<td>Sometimes requires additional task time</td>
<td>Occasionally requires additional task time to consider surrounding issues</td>
<td>Rarely requires additional task time to consider patient needs</td>
<td>Time efficient</td>
</tr>
<tr>
<td>Professional/clinical reasoning</td>
<td>Limited to comprehending fundamental professional considerations</td>
<td>Beginning to apply fundamental professional considerations to real situations with close supervision</td>
<td>Comprehends increasingly complex situations, but consistently requires assistance to handle them appropriately</td>
<td>Regularly requires assistance to identify and solve problems</td>
<td>Often requires assistance to identify and solve complex problems. Fundamental problems successfully solved</td>
<td>Sometimes requires assistance to identify and solve complex problems</td>
<td>Rarely requires assistance to identify and solve complex problems</td>
<td>Consistently identifies and solves most problems without assistance</td>
</tr>
<tr>
<td>Criteria</td>
<td>Year 1</td>
<td>Year 2A</td>
<td>Year 2B</td>
<td>Year 2C</td>
<td>Year 3A</td>
<td>Year 3B</td>
<td>Year 4 Sem 1</td>
<td>Year 4 Sem 2</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Task ability</td>
<td>Limited to performing simple tasks without consideration of other factors</td>
<td>Developing understanding of issues surrounding tasks</td>
<td>Sees issues surrounding tasks, but focuses on task achievement</td>
<td>Regularly focuses on performing tasks without consideration for surrounding issues</td>
<td>Sometimes takes surrounding issues into consideration</td>
<td>Focuses on performing tasks with increasing consideration for surrounding issues</td>
<td>Mostly integrates the complexity of surrounding tasks</td>
<td>Consistently integrates the complexity of surrounding tasks</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Shows capacity for working as a team member. Adequate and respectful communication in a limited range of settings</td>
<td>Developing team integration. Adequate communication in an expanding range of settings</td>
<td>Good team integration within limits of experience. Regularly demonstrates good communication skills in a variety of settings</td>
<td>Demonstrates effective contribution to a team. Awareness of professional behaviour such as adherence to code of conduct. Shows capacity for effective communication in a range of settings</td>
<td>Regularly demonstrates adherence to professional code of conduct, and effective communication in a widening range of settings</td>
<td>Consistently demonstrates commitment to professional values and effective communication in a range of settings</td>
<td>Takes on a professional identity and works as a member of the workplace. Demonstrates a culturally sensitive approach to all work interactions</td>
<td>Highly developed teamwork and communication ability in a breadth of settings. Shows ability to lead and to take initiative</td>
</tr>
</tbody>
</table>

**General description of attainment at each level**

- **Year 1**: Capable of interacting in the workplace in a professional manner. Demonstrates limited clinical skills under close supervision.
- **Year 2A**: Demonstrates beginner level professional patient interaction. Expanding range of clinical skills performed under close supervision.
- **Year 2B**: Demonstrates advancing professional patient interaction. Demonstrates limited independence in clinical skills, and rudimentary clinical decision making.
- **Year 2C**: Capable of safe practice under supervision. Work is rule based with limited or no translation and interpretation of concepts, skills and procedures, and limited adaptations to meet situational factors unless aided.
- **Year 3A**: Requires minimal supervision to demonstrate safe practice in basic procedures. Demonstrates functional clinical reasoning skills in simple situations. Aware of own limitations.
- **Year 3B**: Can function independently in a limited range of contexts, adapting concepts, skills and procedures to meet situational factors. Demonstrates an appreciation of own limitations and can set personal goals.
- **Year 4 Sem 1**: Exhibits independence in a breadth of contexts, adapting concepts, skills and procedures to meet situational factors. Can provide theoretical, defensible arguments for their own interpretations and adaptations. Can engage in productive critical reflection.
- **Year 4 Sem 2**: Exhibits a high level of independence, adapting concepts, skills and procedures to meet situational factors. Can use principles to generate new understanding and provide theoretical, defensible arguments for their own interpretations and adaptations. Can engage in productive critical reflection.
The purpose of this rubric is to take the criteria for measuring capability standards developed by the MRPBA and incorporate them into a strategy that is suited to assess each level of radiography student progression in clinical capability.

I added an extra section to the rubric, the “General description of attainment at each level” (see Table 6.1), providing a statement of the integrated performance expectation for each WPL placement block. These statements were developed in conjunction with academic colleagues at Charles Sturt University. This is used for supervisors to write global, holistic statements of a student’s performance in comparison to the expected standard for that level of progression.

In the national radiographers’ survey, the most popular scoring system was numerical rankings from 1–10. However, the second most popular system was choosing the best statement from a list (see Figure 6.2). I had already concluded that a numerical ranking, irrespective of the number scale used, was not appropriate for assessing the complexity of clinical capability. Therefore, the decision was made to adopt the second most popular system as revealed from the survey data.

Another finding arising from Figure 6.2 is that the visual analogue scale (VAS) is deeply unpopular with clinicians. This finding is consistent with verbal feedback I received from clinical assessors who used assessment tools employing a VAS.
Please indicate on the scale below your level of agreement with the following methods of assessing student clinical competence

The next step was to decide how many statements should be on the list. Downing and Yudkowsky (2009) state that no more than seven categories should be used, and Williams, Klamen, and McGaghie (2003) agree, stating that five to seven quality ratings are optimal. As students are being qualitatively assessed against the standards as defined in Figure 6.2, it was concluded that “At expected standard” should be the midpoint of the seven categories, with three above and three below. The final assessment tool developed has the same basic format, with differing standards transcribed directly from the rubric for each WPL placement block. There is also space included for supervisors to write comments describing the global performance of students against the expected standard. Table 6.2 shows the draft assessment tool used for the 2A WPL placement block.

Figure 6.2. Assessment methods.
Table 6.2. Example of Draft Assessment Tool.

<table>
<thead>
<tr>
<th>Categories of student WPL performance</th>
<th>Year 2A: Expected standards</th>
<th>Rubric</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice knowledge</td>
<td>Beginning to understand more complex facts and concepts</td>
<td>Unacceptable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well above expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exceptional</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Unacceptable</td>
<td></td>
</tr>
<tr>
<td>Degree of independence</td>
<td>Dependent on instruction, but beginning to apply instruction to practice</td>
<td>Well below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well above expected standard</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Exceptional</td>
<td></td>
</tr>
<tr>
<td>Time efficiency</td>
<td>Consistently requires additional task time Increasing number and complexity of tasks attempted</td>
<td>Unacceptable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well above expected standard</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Exceptional</td>
<td></td>
</tr>
<tr>
<td>Professional/clinical reasoning</td>
<td>Beginning to apply fundamental professional considerations to real situations with close supervision</td>
<td>Unacceptable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well below expected standard</td>
<td></td>
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<td></td>
<td></td>
<td>Below expected standard</td>
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<tr>
<td></td>
<td></td>
<td>At expected standard</td>
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<tr>
<td></td>
<td></td>
<td>Above expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well above expected standard</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Exceptional</td>
<td></td>
</tr>
<tr>
<td>Task ability</td>
<td>Developing understanding of issues surrounding tasks</td>
<td>Unacceptable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well below expected standard</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Below expected standard</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>At expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above expected standard</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Exceptional</td>
<td></td>
</tr>
<tr>
<td>Interpersonal capabilities</td>
<td>Developing team integration Adequate communication in an expanding range of settings</td>
<td>Unacceptable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Below expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above expected standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well above expected standard</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Exceptional</td>
<td></td>
</tr>
</tbody>
</table>
Global Description of Expected Performance for Year 2A Placement Block

Demonstrates beginner level professional patient interaction. Expanding range of clinical skills performed under close supervision.

Please write your comments regarding the student’s performance below:

End of table 6.2

The draft instrument in Table 6.2 is used for assessments of the first placement block in the second year of the degree. Subsequent blocks utilise the same format, but incorporate capability standards that are progressively higher, and are taken from the rubric in Table 6.1. The “Global Description of Expected Performance”, incorporated in Table 6.2, is an integral part of the draft assessment tool, and addresses the holistic capability of students.

Proposition 2: Technical competence should be assessed, but this is just one part of the skillset that affords practice capability.

To address Proposition 2, I developed the Radiographic Examination Assessment (REA). The REA assesses the technical competency of each student. Students are expected to complete REAs for every examination category, and for three levels of patient difficulty within those. By the completion of the third year of the degree, students should have completed all REAs. The REA is not just a record of student technical competence as determined by their assessor. It contains student reflections on the examination, an image critique by the student, as well as the radiologist’s report on the imaging obtained. These are returned to, and documented by, the university at the conclusion of the placement (see Table 6.3).
### Table 6.3. Technical Competency Assessment Tool.

**Radiographic Examination Assessment (REA)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Clinical block</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical centre</th>
<th>Patient age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examination performed</th>
<th>Patient category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Assessment by supervisor

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate patient identification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient consideration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-introduction, and identification of self as CSU student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding of clinical notes on request</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection of appropriate imaging protocol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient positioning with no assistance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate exposure factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic images obtained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critiquing of own work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absence of repeat images</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision making regarding additional projections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of and ability in post-processing of images obtained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consideration for privacy and comfort of patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adherence to safe WHS practices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety in infection control measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate submission of images for reporting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courteous and efficient patient discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Student must achieve "Yes" in every category above, and every section must be completed before REA is signed

* All responses must be justified and related to particular examination performed

Patient presentation and history as per request form.

Short description of suspected pathology/indication.
Examination Technique

<table>
<thead>
<tr>
<th>Projection</th>
<th>Imaging system (CR/DR)</th>
<th>kVp</th>
<th>mA</th>
<th>S</th>
<th>SID</th>
<th>Grid/Bucky</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Image Evaluation.** Choose one (1) image from the series you have produced and *critique fully* outlining to what extent the image meets the required criteria. You should discuss the image features relating to the *particular* image and/or examination.

Note: “Good” and “bad” are unacceptable descriptors, you must *justify* your answer by using terminology relating to the *particular* examination conducted.

**Provisional diagnosis.** (NAD is an inadequate response, if your answer is not substantiated as to why.) If there is NAD, *how would the queried pathology have appeared on the image?* From the series you have produced, determine the extent to which this series of images *answers the clinical question being asked*.

**Diagnosis as per radiologist’s report** (do not include a *copy* of the report but summarise here with sufficient detail).

**Critically appraise** all aspects of this examination and outline ways in which this examination could have been improved. You should consider from the request through to the report.

---

Supervising radiographer: please read the REA category description to confirm that this examination meets the required description.

2. Please do not sign this competency unless student has completed all sections and the responses have been evaluated.
Proposition 3: A radiography WPL assessment framework should include actions that facilitate and enhance student learning, not just assessments that measure it—this is best attained with the use of a reflective portfolio.

My research led me to the conclusion that reflective portfolios are only useful for assessment if they have a defined structure. Pinsky and Fryer-Edwards (2004) contend that portfolios are particularly useful for applying evidence of competency and capability achievement, especially when they represent skills that are difficult to directly observe. The required structure should replicate the process of achieving that competency or capability.

The portfolio that forms part of the new assessment framework is aligned with the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) Professional and Practice-Based Education Standards (P&PBE) in that students are required to reflect on their learning during WPL placement in each of the five major categories of the P&PBE. The categories are Communications and Interactions; Professional Judgement; Profession Competence and Work Readiness; Professionalism; and Citizenship and Information Literacy. Students are expected to submit an entry in every category for each week of WPL placement in Years 2 and 3 of the degree. Each entry is required to contain specific examples from WPL placement, and a description of how these examples have advanced student learning in the specific area of capability. A substantive grade is awarded to the reflective portfolio according to the rubric in Table 6.4.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>HD</th>
<th>DI</th>
<th>CR</th>
<th>PS</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement of defined learning outcomes (40%)</td>
<td>Student has achieved all learning outcomes, demonstrated by valid illustrations from their clinical experience.</td>
<td>Student has achieved all learning outcomes, demonstrated by valid illustrations from their clinical experience.</td>
<td>Student has attempted all learning outcomes, with achievement of three or four to the expected level. This achievement is demonstrated by illustrations from their clinical experience.</td>
<td>Student has not attempted all learning outcomes, or has not demonstrated achievement of attempted outcomes to any significant level.</td>
<td></td>
</tr>
<tr>
<td>Evidence of progression from week to week (10%)</td>
<td>Clear progression in understanding of learning outcomes evident from week to week, with advanced understanding demonstrated by conclusion of placement.</td>
<td>Clear progression in understanding of learning outcomes evident from week to week.</td>
<td>Overall progression in understanding of learning outcomes is evident from first week of placement to last week, but no clear progression from week to week.</td>
<td>Understanding of learning outcomes is at the same level from week to week during placement.</td>
<td>Understanding of learning outcomes declines over the course of the placement, or no understanding demonstrated.</td>
</tr>
<tr>
<td>Presentation (20%)</td>
<td>Spelling, punctuation and sentence and paragraph construction are faultless.</td>
<td>Spelling, punctuation and sentence and paragraph construction at an acceptable standard, with minor errors only.</td>
<td>Spelling, punctuation and sentence and paragraph construction is at a higher than beginner’s level, but still contains frequent errors.</td>
<td>Spelling, punctuation and sentence and paragraph construction is at such a poor standard that the meaning is virtually impossible to decipher.</td>
<td></td>
</tr>
<tr>
<td>Relevance of content to defined learning outcome categories (30%)</td>
<td>Journal entries in all categories demonstrate understanding of the topics under discussion to an advanced level, indicated by reasoning at the level of a qualified practitioner.</td>
<td>Journal entries in all categories demonstrate understanding of the topics under discussion.</td>
<td>Journal entries in three or four categories have credible relevance to the topics under discussion.</td>
<td>Journal entries under each heading have limited relevance to the topic under discussion.</td>
<td>Not all categories addressed, or journal entries show no relevance to the topics under discussion.</td>
</tr>
</tbody>
</table>
**Proposition 4:** There should be more than one method of assessment of WPL practice capability contributing to the developed assessment framework.

As can be seen with Propositions 1–3, there are three assessment strategies which make up the new assessment framework. These are the capability assessment filled out by clinical assessors; the REAs, filled out by students and checked by clinical assessors; and the reflective journal constructed by students. The way they fit together to create an overall picture of student practice capability is illustrated and described in Chapter 7. I propose that the combination of assessment strategies described in Chapter 7 provide a credible, dependable, confirmable and transferable assessment of the clinical capability of students on completion.

### 6.8 DRAFT ASSESSMENT STRATEGY TRIAL

In developing the draft strategy, a draft assessment tool was designed to be used by clinical supervisors, based on their observations of radiography student clinical performance (see Table 6.2). Its structure consists of seven broad categories, mapped to MRPBA requirements. Each category contains a section where the expected standard in that category is outlined. The expected standard of performance progressively increases in complexity for each successive clinical block, meaning that for each clinical block, supervisors have a clear idea of what level of performance they should expect from students under their supervision. There are seven levels of performance for each assessment category, with students rated “At expected standard”, or one of three levels below or above in each.

This draft assessment tool was trialled alongside the old CSU radiography WPL assessment tool for two successive clinical placement blocks (one second year block, and one third year block), and then participants in the trial were invited to complete an online survey (see Appendix E) based on their perceptions of the new versus the old WPL assessment tools. 28 participants responded to this survey.

The first question asked participants what they saw the purpose of WPL assessment being. It is important when deciding what should be assessed to first ascertain what the actual purpose of the specific assessment is. The individual attributes proposed to be subject to assessment should all map to the reason the assessment is carried out.

Respondents to the survey listed the following as the most important purposes of WPL assessment: 100% of respondents agreed or strongly agreed that WPL assessment existed to provide feedback to students on their performance; and 95% of respondents agreed or strongly agreed that WPL assessment identified students who did not reach the required level of performance, showed students how well they have learned discipline knowledge, and allowed student performance to be measured.
It can be noted that these purposes of WPL assessment as listed above, when compared to the categories that participants in the interviews and focus groups identified as those that should be assessed, map well to the assessment of practice capability. They map less well to the identified attributes of professional practice, such as communication and teamwork. This correlates with radiographers’ emphasis on the importance of technical skills, as opposed to the interactional, dynamic and contextual nature of radiography practice.

Participants were then asked “Which tool (i.e., old or new CSU WPL assessment tool) do you feel gives more reliable or more useful information regarding the student’s performance? Please give your reasons.” In response to this question, 87% of respondents felt that the new assessment tool gave more reliable or more useful information about student performance. One participant stated:

*I like the big section at the end for comments—this is the most useful part for feedback for the student. The rest of it is quite general which makes it easy to rank a student on their abilities, e.g., where they are now in terms of where we would expect them to be. While this is quite subjective it is a better system than the mark out of 10 as was previously used (some students get disappointed at say 7/10 but actually I class that as quite good). This is much easier to assess their level of competence on where we want them to be.*

This participant appears to have an understanding of the importance and value of individualised feedback on student performance. They seem to understand the concept of professional judgement. They identified the draft assessment tool as being somewhat subjective in a positive sense, and not as a disadvantage. The system used by some radiography WPL assessment tools (including the old CSU tool), where assessment categories are given a score out of 10, is identified by this participant as being somewhat meaningless. This is a finding consistent with the literature: Sadler (2011) referred to the meaninglessness of grades, and Govaerts et al. (2011) stated that the use of psychometric grading “... may limit more meaningful educational approaches towards workplace-based assessment” (p. 151).

Another participant also identified the lack of meaning attached to a numerical grade:

*The information is more reliable because tutor radiographers often have no official training in how to assign a grade to someone’s performance so tutor radiographers in different sites are susceptible to assigning a different grade for the same level of performance. For a student, a comment like ‘above expected standard’ clearly informs a student what level they are at.*

The insight provided by this participant is consistent with the findings from the literature on WPL assessment. They have identified that assessors (tutors) will use a numerical rating system to assign a grade according to what they think, rather than a consistent standard being used to assess against and without articulating their decisions in words. This is in opposition to the draft
WPL assessment tool which clearly states an expected standard, and then asks supervisors to indicate specifically where student performance against that criterion sits in relation to that expected standard. This participant agrees that the system of measurement used in the draft assessment tool gives students effective feedback on their performance in relation to set criteria. Another participant agreed that the new tool provided more specific criteria to assess against, and that the numerical performance rating of the old tool was more subjective than the rating system used in the draft tool, appearing to interpret that subjectivity as negative.

More specific criteria for assessment. Old form has numbers which is more subjective.

The concept of professional judgement is anecdotally considered to be subjective and open to interpretation by those making the judgement (Moore & Vaughan, 2016), but the concept of professional judgement has been shown to be appropriate for meaningfully assessing workplace learning (Yorke, 2011). Some survey participants were able to grasp this concept, considering that the draft assessment tool gave a more objective result than the previous system of numerical rating.

New form provides a strong indication of the students’ expected level of knowledge or performance. This then allows assessment with respect to that expected standard, allowing a more objective and meaningful assessment than the old form was capable of.

This participant observed that there was a connection between objectivity and meaningfulness, and stated this connection in such a way as to imply that they perceived a direct link between the proposed assessment tool and assessment against expected standards. This perception was agreed upon by another participant:

The new form seems to allow for more consistent grading, whereas the old form is more open to the interpretation of the assessor.

This participant appears to understand that applying numerical scores to WPL assessment is not as objective as some would suggest, in fact being quite variable as to how supervisors interpreted the meaning of the numerical scores awarded in each category. Not all participants were such strong supporters of the new format, however. There was one dissenter in answering this question, who stated:

I think they both [i.e., old and new tools] could be improved. Tedium write up for each area, don’t seem to be beneficial in clinical learning.

In a previously published study (Kilgour, Kilgour, Gerzina, & Christian, 2014), colleagues and I found that radiography supervisors were often reluctant to put effort into filling out WPL assessments, and many would avoid any attempts to ask them to give written feedback on
student performance. Filling out forms about students was seen to be an imposition on their time, and something that was not their responsibility. This attitude is reflected in this participant’s statement above, where they refer to writing about student performance against expected standards as “tedious”, and state that they cannot see the benefit to clinical learning. This was the only negative response to this question, with every other respondent being very supportive of the draft assessment tool.

The next question in the survey asked respondents to answer which assessment tool gave students better feedback on their clinical performance. 82.6% of respondents stated that the new assessment tool gave better feedback, while 17.4% stated that they felt the old tool did.

One respondent stated:

A comment like ‘above expected standard’ provides feedback such as ‘the student is very good but can aim even higher’ so the comment is both rewarding but also encouraging. If improvement is needed, the student would easily be able to identify the aspect they would need to practically focus on to perform better. The feedback would be more likely believed and understood knowing that the performance was ‘measured’ against the expected standards.

This participant was strongly supportive of the new assessment tool format and observed that a statement giving a description of student performance against the expected standard both rewarded and encouraged students in their WPL performance. It was also more likely to offer feedback which gave students direction for their clinical improvement. The above statement is supported by comments from other participants, with another stating:

A number system with sparse criteria leads to unreliable results, particularly between assessors. Does a mark of 10/10 mean that students’ performance is not able to be improved, is it at the level of a competent radiographer, or have they simply exceeded the expectations that assessor has of students at a given level of clinical experience? By providing well-defined criteria, the student has a tangible understanding of where their development is expected to be at and it allows the assessors to more objectively describe their degree of achievement of that expectation.

Again in this statement, the participant acknowledges that objectivity is not the exclusive domain of psychometric style assessment strategies, and that allowing supervisors to give ratings and comments against clearly defined criteria and standards is key to objectivity in WPL assessment. This statement re-asserts the meaninglessness of numerical scores, especially when the meanings of individual numbers are ill-defined, or not defined at all.

One of the key items that was mentioned by participants who preferred the new assessment tool was written feedback on student performance. One respondent expressed the following:

The old form only had limited space to provide this feedback while the new form appears to have ample room for a more involved reply.
The value of narrative feedback on student WPL performance is observed in this statement. When assessment is seen as simply a way of expressing student achievement or performance, it can be understood why those who hold this view do not see the value in such narratives. However, when assessment is considered to be part of the learning process, such feedback contributes to the reflective cycle of improvement (Kolb, 2014).

Not all feedback was in support of the draft assessment tool when considered in the context of student feedback. One participant made the following statement, which was an isolated comment, not in keeping with the thoughts of most respondents.

*The old form had a broader range of relevant clinical indicators for supervisors to comment on. Without prompting I think that the comments section will [be] less thought through by educators.*

The old form had more categories relating to technical performance than the draft assessment tool. However, this participant seems to consider the minutiae of technical performance the only relevant indicators for clinical performance, without considering the interactional, dynamic and contextual nature of practice, nor how these facets of practice could be assessed. This negative feedback was reiterated by another participant, who stated:

*The old form has more areas for the assessor to fill out, so the student receives definite feedback on more areas of their performance.*

These participants preferred to compartmentalise skill task assessments into isolated fragments. This approach does not ask assessors to judge integrated but fragmented skills. These participants preferred this approach restricting them to a list of pre-set criteria to a more open opportunity for assessors to provide verbal feedback and comments on any aspect of performance they see as being relevant (Sadler, 2009b). The fragmented approach reflects the technically based WPL assessment that is currently practised in radiography education (Kilgour et al., 2014), rather than assessing how well student radiographers understand and work within the nature of radiography practice.

The next question in the survey asked whether respondents preferred the draft assessment tool’s incorporation of differing standards for different levels of student study, compared to the old form which was the same for every year level of the course. 91.7% of respondents preferred the new assessment tool in this area. Positive comments in response to this question included the following:

*Students need to be assessed at a level relevant to their stage in the course. Having altered assessments for each stage reminds the clinical educator that expectations should be different.*
The provision of expected standards allows a more accurate assessment of a student’s development and performance. Assessments against well-defined criteria allow evidential support of a given assessment score.

Advancing skills sets must be assessed according to specific skills criteria. This newer form is quite capable of moving with students.

These comments strengthen the finding that these participants understood the dynamic nature of practice. Not only do practice situations vary, but student ability is also dynamic. The structure of the draft assessment tool is intended to reflect this dynamism, and these participant statements demonstrate that those who made them understand the tool.

The only negative statement in response to this question was the following:

Students should not need to be assessed for basic skills, as they progress through their course.

Without further explanation, it is difficult to ascertain what this participant means, and also the relevance of this comment to the question. Regardless, respondents were overwhelmingly in favour of the structure of the new assessment tool compared to the old one.

6.9 CONCLUSION

This chapter has discussed the reconstruction process of developing the draft assessment tool, the pilot study in which the draft was implemented, and also the results of a survey sent to participants in the pilot study. Respondents to the survey regarding the draft WPL assessment framework were largely supportive of its basic structure and felt that it was a significant improvement over the old assessment tool in many areas, making it more useful for not only assessing student performance, but also to provide student feedback to facilitate continual improvement. The comments which supported the previous assessment tool format had little evidence of being thought through, and demonstrated an appreciably limited consideration of the nature of radiography practice and more specifically the complexity of the assessment of student capability during WPL.
CHAPTER 7

CONCLUSION

INTRODUCTION

This research has examined contemporary practice in the assessment of radiography student capability during workplace learning (WPL). In this final chapter, I commence with a critical review of radiography practice generally, and the research phenomenon more specifically, to then provide the scope of the research. I then review the chapter structure and aims of the study. This is followed by answering the research questions, and then presenting the clinical assessment map as my product generated through this research. Limitations and implications of the research are considered, and I finish with final conclusions.

7.1 THE PROBLEM

The curriculum, pedagogies and assessment practices of radiography education have limitations when it comes to educating future professionals. Content and approaches of the education of radiography practitioners can lead to a perception by practitioners that the profession is fundamentally technical whilst neglecting the professional aspects of practice. There is a risk of limited understanding of the deep and broad nature of professional practice, and what transforms a technician into a professional. This lack of recognition of what constitutes a professional can be reflected in a lack of professionalism in the practice of radiography practitioners. I addressed this problem by rethinking the assessment of these professional capabilities in students during WPL.

Contemporary radiography education programs have an emphasis on teaching and assessing the requisite technical skills of students. This is evident, particularly, in current WPL performance assessment strategies. While technical skills are essential for radiographers and need to be assessed, they are fundamentally specific skills to those required for carrying out the entirety of professional practice. The nature of radiography practice necessitates an entirely different assessment regime to that employed for just assessing technical skills. Because radiography professional practice skills that focus on the non-technical aspects of practice are largely assessed inadequately in current radiography WPL performance assessment, a gap has existed for a strategy to be developed which recognises the broader nature of practice, and its range of assessment requirements. In essence, we need to assess (and teach) students in the context of this being a technically oriented profession practised by professional practitioners rather than simply a technical occupation conducted by technicians.
Radiography is a profession that by its very nature has a highly technical knowledge base. Radiographers are required to have deep understanding of principles of physics, information technology (IT) systems, specific user interfaces, and image critique. This combination of knowledge, along with the related technical skill set, is unique to the radiography profession. As a result of this unique set of knowledge and skills, the professional identity of most radiographers is deeply rooted in technical performance.

However, radiography is not simply a technical occupation; it is a health profession, and radiographers are expected to demonstrate the generic skills of health professionals including such capabilities as professional engagement with patients, ethical conduct, duty of care, professionalism in communication with patients and colleagues, critical self-appraisal, quality self-management and continued professional development. It is easy, and therefore common, for student radiographers to become so involved in developing their technical abilities and identity that they neglect the development of generic healthcare skills.

This neglect is largely fostered by contemporary radiography education. Radiography education has evolved from a technician focus, based in colleges of technical and further education (TAFE), to university degree status, where students are supposedly educated to be health professionals. Despite this transition, necessary changes in curricula have not occurred and the technical focus has remained dominant in the transition to degree courses in radiography, to the detriment of education in and assessment of professional practice. This is particularly reflected in contemporary assessment of student capability during WPL, where assessment strategies focus on technical skills, and have not evolved to take into account the wider nature of professional practice. Contemporary assessment strategies largely adhere to a fundamentally flawed paradigm—the notion that a phenomenon as complex as professional practice can be meaningfully and adequately assessed by numerical or similar scales.

A complex, dynamically evolving phenomenon (such as professional practice) which is poorly understood, taught and assessed, will clearly not be exhibited in practitioners graduating from such programs, due to limited shared understanding, role modelling and acceptance of responsibility for the capabilities inherent in this practice. Therefore, even though radiography education has superficially progressed from purely technical training to education within a professional degree, these very important aspects of professional practice are frequently neglected. This has led to a widespread limited awareness of the depths of professionalism amongst radiography practitioners.
7.2 SCOPE OF THIS RESEARCH

The scope of this study centred on assessment of radiography student performance during WPL as part of the educational process for beginning practitioners. This research addressed assessment of professional practice capability and its integration into assessment of radiography student performance in WPL. The broader assessment of professional practice requires assessment of aspects of practice beyond simply radiography specific technical skills, which is already done adequately.

In order for professional practice capability to be more fully assessed, a deep understanding and teaching of professional practice needs to be incorporated into radiography curricula. It is not within the scope of this research to re-write radiography curricula and specifically outline the details of what should be incorporated into curricula. This would be a useful topic to pursue in future research.

7.3 REVIEW OF CHAPTER STRUCTURE

In Chapter 1, I described the nature of the problem that led to the research questions being formulated. Chapter 2 outlined the methodology for the research, and the structure of the remaining chapters, correlating them with the stages of the research. The literature relevant to the research was examined in Chapter 3, with a specific focus on the nature of practice and its implications for assessment of student performance during WPL. The deconstruction phase of the research which commenced in Chapter 3 was continued in Chapter 4, with analysis of the input of participants with regard to current practice in radiography WPL performance assessment. Contemporary practice was deconstructed in the light of the pertinent assessment literature, consideration of the nature of professional practice, findings from interviews and focus groups with stakeholders and a recognised expert in assessment of higher education, and results from a national survey of radiography practitioners.

Chapters 5 and 6 comprised the reconstruction phase. Further data gathered from the same literature and stakeholders was used to rethink radiography practice and reconstruct a draft assessment strategy for radiography students undertaking WPL. The draft strategy was trialled alongside the then-current strategy, and participants in the trial were surveyed for their opinions regarding the draft strategy. In Chapter 5 participant opinions regarding what should be assessed in radiography WPL performance was examined, together with analyses of these opinions as part of the reconstruction process. The development of the draft assessment strategy, its dissemination to clinical practice and feedback from clinical practice, was the topic of Chapter 6.
The stated aim of this research was to demonstrate that assessment of professional practice capability was (at the time of the research, and in some areas remains) missing from contemporary radiography WPL capability assessment, and to recommend a strategy to incorporate its assessment.

7.4 ADDRESSING THE RESEARCH QUESTIONS

In Chapter 2, three research questions were defined. The answers to these questions, as obtained from analysis and interpretation of the research data, are included below.

A. What are the perceived challenges and issues in contemporary radiography WPL assessment?

The broad answers to this question are:

i. In relation to culture, radiography largely continues to operate as a technical occupation rather than a profession which is manifest in both practice and education.

Radiographers have typically been focused on technical excellence, which has often been to the exclusion of the professional practice expected of health practitioners. Education and assessment in undergraduate radiography courses has not moved with the movements in societal expectations of health practitioners, and as a result, student radiographers and graduate practitioners have not developed an understanding of the nature of practice. However, participants in my study indicated a readiness to rethink assessment practice cultures. They provided constructive contributions for future assessment practices. This research made it clear that many radiographer participants were ready to embrace the advance of the profession into the realm of contemporary healthcare practice. Practitioners in this realm see professional practice as being of at least equal importance to the unique technical skills that distinguish one profession from another.

ii. In relation to the content of student assessment, currently assessment of student performance during WPL is narrowly focused on technical performance and abilities and fails to adequately assess the broader and deeper capabilities and understandings required of professional rather than technical practice.

There is much more to radiography practice than the technical components involved in creating diagnostic images. However, current assessment practices do not acknowledge this, and focus almost exclusively on the technical aspects which are traditionally considered to be measurable.

iii. In relation to the process and standards of assessment, current assessment during WPL largely utilises measurement and quantitative scales rather than recognising the need for professional judgement in assessing complex practice capabilities in context.
Current assessment practices in radiography WPL focus on a psychometric style of competence checklist, and do not adequately assess student capability in professional practice. The interactional, dynamic and contextual nature of professional practice requires assessments which utilise the professional judgement of WPL supervisors to give a determination of student capability which takes context into account.

iv. In relation to WPL assessors, a number of challenges were identified, including lack of sufficient preparation/education for the role of assessor and lack of commitment to the task of (quality) assessment by some practitioners (who are taking on student supervision on top of their practice responsibilities).

Radiographers tend to be task focused, due to the patient-list driven nature of a typical working day. Student supervision and assessment is often not considered as integral to their roles, and thus becomes little more than one extra task to be completed. The lack of education and preparation for the role of assessor is a reflection on the lack of importance placed by managers on the student supervision and assessment role.

The issue of variability of marking standards is not unique to assessment of student performance in the context of radiography WPL but is common to WPL performance assessment in many health and allied health disciplines. As discussed above under iii) assessment standards and measurements have not reduced variability in marking standards. This variability can be due to the different nature of public versus private radiology settings, the lack of a standards-based assessment mindset amongst assessors (who often compare student performance to their own concepts of what is correct), cultural differences between students and assessors, and a widespread belief that professional judgement-based assessment is more subjective, and therefore less reliable, than tick-box competency assessments.

Another challenge in WPL performance assessment that aligns with Orrell, Cooper, and Bowden (2010) is related to the fact that professional practice is characterised by higher-order thinking. These authors point out that in clinical practice, surface learning is typified by knowing what to do in specific situations, but not having the reasoning ability to cope with the contextual, dynamic and interactional nature of professional practice. Thus, while isolated student performances may appear acceptable, they are in fact based on mimicking professionals, rather than being grounded in sound knowledge and contextualised reasoning. The challenge identified here is for assessors of student performance to be equipped to be able to discriminate between performance based on surface learning, and that which demonstrates the deep and higher-order thinking required of a professional practitioner. Of course, such assessment requires a dialogue between student and assessor to elicit reasoning skills, and assessors need to take into
consideration the students’ stage of progression during the course; students will not possess deep knowledge early in their course.

An issue for effective radiography student performance assessment during WPL is that some clinical assessors fail to understand the implications of not taking their role in student performance assessment seriously. This was highlighted by participant UK14:

*We’ve just got tutors that were just ticking, which meant nothing. At the end of the day, these students would just go like that ... no thoughts in it at all.* (UK14)

Most assessors of radiography student performance are clinicians first, and they undertake the student supervision and assessment role with limited or no formal education on top of their practice jobs (Kilgour, Kilgour, Gerzina, & Christian, 2014). Of the radiographer participants in the survey, only a very small percentage indicated that they had any educational qualifications. This is reflected in the way that some assessors fill out their assessments. Some do not provide a narrative or comments on student WPL performance, limiting their grading to ticks in boxes, or numbers in squares. Not only does this detract from the meaning of the resultant assessment, it also provides no feedback for students as to how they can improve their performance.

Participant UK2 added to the data around the issue of poorly filled out assessments of radiography student WPL performance:

*At the end of the day, despite all this paperwork, the student would get through it all and at the end of the course they would have passed everything. And then about 2–3 months before they are due to graduate, someone would turn around and stick their hands up and say ‘well actually, this person is not competent to progress’. I don’t know whether or not you’ve had that? So we thought, stop that. What we wanted to do was to capture that, that person who sticks their hands up and say ‘you know, this person shouldn’t be graduating’. Because if they’re not skilled, they’re not proficient, what we need to do is capture that.* (UK2)

The issue, as described by Participant UK2, is that assessments filled out without due care by assessors allow students to progress regardless of the standard of their actual performance in WPL. The assessment of radiography student WPL performance should determine those students who have the required practice capability to progress in the course, or to graduate. It should also identify those students who need remediation, and the areas of remediation required. This is part of the assessor’s (and the university’s) responsibility to the public to ensure the standard of graduates and their readiness to practise.

Contemporary assessment of radiography student WPL performance largely consists of psychometric assessments of discrete competencies. Govaerts, Schuwirth, van der Vleuten, and Muijtjens (2011) assert that this assessment paradigm tends to focus exclusively on quantitative properties of the required performance outcomes, which limits more meaningful educational
approaches to assessment of WPL performance. These authors continue this line of reasoning, stating that meaningful WPL performance assessment is determined by cognitive outcomes similar to the clinical reasoning, judgement and decision making required of professional practitioners.

While psychometric assessments can measure discrete, repeatable skills and competencies, they do not accommodate assessment of the contextual, integral and social aspects of professional practice. Thus, they alone do not provide meaningful assessment of student capability in professional practice.

These issues are addressed by the product of this research, which allows for the professional judgement of clinical assessors to be used to determine the clinical capability of radiography students. It is necessary, however, when discussing clinical capability, to determine what actually constitutes clinical capability. This is the subject of the second research question.

B. What are the key student capabilities that should be assessed in radiography WPL to give a credible, dependable, confirmable and transferable overview of preparedness to practise?

My research findings support the argument that student capabilities, defined as the “extent to which individuals can adapt to change, generate new knowledge, and continue to improve their performance” (Fraser & Greeenhalgh, 2001), should include but not be restricted to technical abilities. Students should be assessed on a progressively maturing and graduate-ready set of capabilities that include contextualised practice knowledge; degree of independence; time efficiency; professional and clinical reasoning; task ability; and interpersonal capabilities.

Given that the majority of research participants were radiographers, radiography students or radiography educators, it was not surprising that technical skills, specifically those that relate to patient safety, were high on the list of capabilities that were considered important to assess. Participant UK4 made it very clear that this was a priority.

> Obviously safe practice is the most important of the … [assessment categories]. Otherwise there’s just no point. You could be fantastic at communicating but you wouldn’t want me to come near you. (UK4)

Safe practice encompasses many facets of practice. These include appropriate use of radiation, safety in manual handling and other workplace health and safety issues, and also safe physical use of equipment (for example, making sure patients don’t hit their head on the x-ray machine as they are getting off the examination table). These capabilities are clearly defined, and easily assessed using the existing assessment paradigm for radiography WPL performance.
Other aspects of capability in radiography WPL are less easily assessed. Radiography is a healthcare profession, and as such there is much more to being a capable practitioner than acquiring diagnostic radiographic images. This aspect was highlighted by Participant UK13 (the following quotes from UK13 and UK 14 have been used previously, and are repeated here to emphasise the points made):

*I suppose patient care is absolutely critically important. Our objective is to produce appropriate [radiographic] images. But not under circumstances of nailing patients to the table.* (UK13)

The particular facet of professional practice highlighted by Participant UK13 is patient care. Patient care is highly contextual. Radiographic examinations are carried out on patients with presentations ranging from ambulant outpatients, to severely traumatised patients with critical injuries. Patients may be newborn babies or elderly adults, cooperative or uncooperative, English speaking or non-English speaking, articulate or illiterate. A professional practitioner needs to be able to adapt their patient care skills to all patient presentations, and patients need to feel that the practitioner has their best interests at heart.

Being able to care for patients requires practitioners to have excellent communication skills. Participant UK14 made this clear.

*Obviously, there’s the other factor of communication and integrating with the patient—probably not a very good word to use—but that’s obviously pretty important, appropriate communication in order to achieve the imaging [required].* (UK14)

Communication involves more than verbal communication. It includes having appropriate body language and other non-verbal cues for the circumstance at hand. Patients generally will instinctively be able to determine if the practitioner whose care they are in is genuinely interested in helping them, or just going through the motions. It is a challenge for practitioners to demonstrate genuine care in all practice contexts, but this is a vital capability for healthcare practitioners.

Healthcare practitioners must be able to practise sound clinical reasoning and clinical decision making. Loftus (2009) defines clinical decision making as:

*the intellectual processes that clinicians undertake when confronted with the responsibility of making a diagnosis and management plan for a particular patient.* (p. 4)

While radiographers do not make diagnoses, professional practice in radiography does involve numerous other clinical decisions including developing management plans for each new situation encountered. The clinical reasoning and clinical decision making involved in developing patient management plans are intimately related to communication.
The cultural context of clinical reasoning is mediated by language (Loftus, 2009), and this renders language skills and the resultant communications skills an essential capability for practitioners in order to be adaptable to the contextual nature of practice.

Part of contemporary radiography practice is working as part of a multidisciplinary team, or at least part of an intradisciplinary team. Thus, the ability to work as part of a team is a vital skill for radiography practitioners. One of the national survey (NS) participants described the requirement for this capability as follows:

[Students need the] ability to work as part of a team. Lack of teamwork can impact on clinical competency and patient outcomes. (NS)

Teamwork is contextual, as different practice and patient presentation contexts affect the makeup of the team required, and also its function. Teamwork is also interactional, as for a team to function properly, there needs to be constructive and appropriate interactions between team members. Teamwork is a dynamic capability, as each team member must adapt to circumstances as they change around them. As such, teamwork is an example of the contextual, interactional and dynamic nature of professional practice. The importance and nature of teamwork was summarised by one of the national survey participants:

Sensitivity to variations in team dynamics [is important]. [It involves] being continually receptive to learning opportunities, rather than ‘case counting’ and progressing self-directed maturity, rather than dependency. (NS)

Again, this participant’s thoughts reflect the dynamic nature of teamwork. Students are required to demonstrate the ability to show initiative in taking advantage of learning opportunities as they arise. Part of capability in professional practice is being self-directed in personal professional development. This was recognised by one of the student participants:

I think initiative. Like if you show that you’re willing to work, you work hard. You might not have the best radiographic skills compared to other students—they’re fantastic but they don’t want to do the work. Like you’re showing that you’re willing to learn, you’re willing to practise, you’re willing to work hard. So I think that’s an important thing that people should look out for.

Assessment of student practice capability requires assessors to acknowledge the ability and motivation of students to take advantage of every learning situation, and to use them to improve personal capability. Initiative is an integral part of professionalism. This context for initiative was made clear by the Emeritus Professor of Higher Education (PE) who was a research participant.
I think we focus too much on getting people to pass with marks than we do on equipping them as professionals. In terms of professional growth, the kinds of experiences you get don’t matter too much, so long as they’re rich and productive. So your aim as a student is to—you’re largely responsible for making sure that you’ve got everything you can out of the workplace that you’re in and here’s how you do it and here’s what to look for. (PE)

It can be seen from the above quote that professionalism involves students taking personal responsibility for their development of professional practice capability, and thus is a key component of fitness to practise. Professionalism is far-reaching and has an influence on all the other capabilities thus far discussed. It is a key component to a meaningful assessment of professional capability.

Having discussed the components of professional capability that should be assessed, as derived from this research, the final research question is about the strategies for meaningfully assessing these capabilities.

C. What assessment approaches lend themselves to assessing the key capabilities in a meaningful way in the context of A and B?

The task of assessing student performance during WPL is firstly formative, to facilitate students’ learning by giving them an appraisal of their performance and feedback to help them take responsibility for their further learning and capability development. Secondly, the assessment during WIL is summative, ensuring that students’ capabilities and standards of performance (progressively) match the phase of their course in order to meet the responsibilities of the universities and the students, and the expectations of the public. To meet these goals, assessment needs to be relevant, valid, informed, situated and clearly communicated. Assessment approaches that match all of the above expectations and that help shift radiography students’ assessment from a largely technical focus to a wider professional focus have been found through this research to:

I. remove the focus on tick boxes, checklists, measurement of complex practices, lack of narrative and avoidance of assessor-informed judgement; and

II. incorporate a broader content of what it means to be a professional practitioner beyond technical matters, emphasise capabilities rather than skills, consider the sound and informed judgement of experienced practitioners (and educated assessors), and include a range of assessment approaches and students’ self-assessment.

There are different “lenses” through which professional practice may be viewed (Higgs, Loftus, & Trede, 2010). These lenses include features such as practice being collective and the work of more than one individual, practice being a transformative experience for those involved as they
participate in reflective practice, and practice being carried out to meet specific standards and regulations. A psychometric, or “checkbox”, approach to assessment of professional practice is not suitable for taking these contextualised and social lenses into account (Dijkstra, van der Vleuten, & Schuwirth, 2010; Yorke, 2011a). The diverse and multifaceted nature of professional practice means that it is too complex to be assessed within such a paradigm.

All assessment in a WPL context is situated. What constitutes practice capability varies from context to context, so a checklist approach to assessment of WPL performance can never do justice to student performance. Such a checklist cannot possibly cover the infinite number of contexts in which professional practice takes place. This means that such assessment must be based on informed professional judgement (Yorke, 2011d). Of course, technical skills are still an integral part of assessment of WPL performance in radiography, but it should be remembered that they are only one part of overall practice capability (Yorke, 2011d). As there are a variety of skills and competencies that make up overall capability, so there must be a variety of assessments to match the required learning outcomes (Sadler, 2015).

Professional capability cannot be satisfactorily assessed using scientific or psychometric measurement, and should be replaced by methods that use the professional judgement of experienced radiographers to inform assessment outcomes (Yorke, 2011b). In this way, the interactional, dynamic and contextual nature of professional practice can be taken into account when assessment decisions are being made. Professional practice cannot be meaningfully assessed out of context (Yorke, 2011b). Thus, the model proposed for assessing the interactional dimension of professional practice would include an element of reflective writing by students, and an assessment from clinical supervisors which allows supervisors’ professional judgement to inform the assessment outcomes.

7.5 LIMITATIONS OF THE RESEARCH

The limitations of this research include the following:

7.5.1 Sample sizes

The sample size was small; however, the interpretive paradigm chosen for the research methodology meant that the sample was sufficient to interpret meaning from the responses. Saturation, or repetition of findings, occurred with this number of participants. The self-selected nature of survey respondents meant that participants were those who had interest and opinions regarding the research topic.
7.5.2 Survey questions

In retrospect, not all questions asked in the national survey were helpful in providing relevant answers.

7.5.3 Limited testing of the draft assessment tool

It was not intended or feasible in this research to test the draft assessment tool widely after development, due to the amount of time and political “buy-in” by multiple institutions this would have required. The early use of the draft tool provided positive feedback (see Chapter 6). Ongoing testing and, as needed, revision of the tool is a desirable next step post completion of my PhD.

7.6 A MAP OF A CLINICAL ASSESSMENT MODEL

One of the products of this research was a clinical assessment map, which provides a visual representation of the overall structure of the proposed WPL capability assessment model. This clinical assessment map is illustrated in Figure 7.1. The answers determined to Research Question C informed the development of this assessment map:

C. What assessment approaches lend themselves to assessing the key capabilities in a meaningful way in the context of A and B?

The first point that arose in answering Research Question C was that there should be different, concurrent forms of assessment to cover all aspects of clinical radiography capability. The assessment framework illustrates three concurrent assessment strategies in the first three years of the degree.

The boxes marked Yr 1, Yr 2A, Yr 2B, Yr 2C, Yr 3A and Yr 3B represent the clinical blocks that students’ progress through in the first three years of the radiography degree. Students’ WPL performance in each of these clinical blocks is assessed by clinical supervisors, using their professional judgement to compare student performance to written standards in each of six areas of performance in professional practice capability. These written standards (see Table 6.1 in Chapter 6) progress in complexity and requirements for each successive clinical block. This assessment tool was illustrated in Table 6.2. Part of this assessment tool is an opportunity for supervisors to provide a summative assessment report of students’ overall performance, based on the assessor’s professional judgement.
In the clinical assessment map illustrated in Figure 7.1, the arrow marked "Reflective Journal" represents a journal which students are required to keep for every clinical placement. This journal is structured and students are required to write about their learning experiences and outcomes in set categories, which are mapped to the AHPRA capability standards for medical radiation science practitioners. Reflection was found in this research to be a vital part of student development in professional practice; that is, students critically reflecting on their own performance and writing about what they have learned from this reflection. Students broaden their understanding of contextual, interactional and dynamic dimensions of professional practice and develop strategies to improve their performance, and to ensure that the same mistakes are not repeated.

The other vertical arrow in the assessment map is the REAs, or radiographic examination assessments (see Table 6.3). These represent the assessment of student performance and their development in relation to the requisite technical skills inherent in radiography practice. Thus,
the REAs are somewhat more scientific in nature. However, the REAs also require students to reflect on and evaluate their own performance of the specific technical skill.

By the end of the third year of study, a student who has successfully completed all course requirements to this stage, including all REAs, will undergo a practical assessment which is a gateway into the fourth year of study. The fourth year of study is known as the clinical residency and is made up entirely of 36 weeks of full-time clinical placement. At the end of each semester in the fourth year, students are assessed directly against the AHPRA capability standards, with successful attainment of all standards by the end of the 4B clinical block required for graduation.

During the fourth year, students are also required to keep an e-portfolio, which is made up of their personal reflections on the learning journey. The e-portfolio can also be used as a resume when applying for jobs on graduation.

In Figure 7.1, the yellow sections represent completion of hurdles in student progression through the course. The practical assessment takes place when students have completed all REAs by the end of the third year of the degree. In this assessment, academic staff assess student clinical capability in a simulated examination. Students must pass this examination to progress to the fourth year. The yellow section at the top of Figure 7.1 marked “completion” represents academic staff compiling all student assessments from across the course and determining if students have met all course requirements.

The model of assessment of radiography student WPL performance will, I believe, ensure the overall capability development of graduates of radiography tertiary programs. Graduates will not just be technically competent but will understand and implement the core principles of professional practice in their work.

7.7 IMPLICATIONS OF THIS RESEARCH

7.7.1 Implications of this research for the profession

It is important to be mindful that the implications of revising the assessment of WPL will have implications for the whole profession, not just for students. While proposing a strategy for the incorporation of assessment of professional practice capability into radiography student WPL performance assessment was the aim of this research, the wider implications of adoption of this strategy to the radiography profession should be considered.

When radiographers consider themselves to be health professionals, rather than technicians, they will reflect on what being a health professional involves. Reflection will lead to the realisation that technical skills, while important, do not of themselves facilitate a satisfactory overall patient experience or acceptable images for diagnosis. Technical skills in isolation do not
provide radiographers with the range of capabilities needed to adapt to differing patient presentations, imaging contexts, and other changes to circumstances. A satisfactory patient experience when undergoing a radiologic examination is a result of holistic-oriented radiography practitioners, who are not only competent and efficient in the required technical skills, but also capable of and effective in dealing with the complexities of professional practice.

One widely accepted educational principle is that assessment drives learning (Dijkstra et al., 2010). According to this principle, when capability in professional practice is assessed as an integral part of radiography student education, skill in professional practice will be enhanced.

It can also be argued that assessment drives behaviour, in that students exhibit the behaviours they believe will allow them to pass assessment tasks, without necessarily obtaining the deep learning and understanding that develops the characteristics of a professional practitioner. Tennant, McMullen, and Kaczynski (2009) reflect that the tension between assessment for certification and assessment for learning traditionally has led academics to set assessment tasks that promote assessment of learning, rather than making their assessment a learning process in itself. They assert that the type of quality assessment which motivates students to engage with the task, and use it to learn for their future practice, needs to foster deep learning that can only be facilitated during WPL by dialogue, reflection and collaborative learning in the clinical environment.

Either way, incorporating assessment of professional practice capability into assessment of radiography student WPL performance will in time facilitate the dissemination of understanding the nature of professional practice throughout the profession. The recognition in the healthcare community of radiography as a profession will be enhanced as the principles of professional practice are inculcated in future practitioners.

The principles supporting quality professional practice include adaptability to varying practice circumstances, patient-centred care, developing the profession’s own body of knowledge through research, working interactively with other health professionals, and working within the dynamic nature of professional practice. This research challenges the profession to pursue these goals and standards as part of their role in educating the next generation, in their own self-development and in the professional standards they reflect in their practice communities. When these principles are evident in radiography practitioners, colleagues in other health and allied health professions might then recognise radiographers as integral to the wider healthcare community as they see progression in professional practice quality and capability.

The increasing acceptance of radiography as a maturing healthcare profession will open up opportunities for collaborative research with practitioners belonging to other healthcare
disciplines. One of the characteristics of a profession is that it develops its own body of knowledge by engaging in original research. Collaborating with other healthcare professions expands the areas especially of professional practice research that radiographers can engage in.

In order to appropriately assess capability in a profession as described above, it is important to have an assessment model that not only embraces technical competence, but also all the other requisite skills that go to make up practice capability. This kind of professional practice, as has been described earlier in this thesis, considers practice to be a judgement-based practice of care for the service receiver (Polkinghorne, 2012).

**7.7.2 Implications of this research for enhancing professional practice in radiography curricula**

In order for students to be assessed on their overall professional practice capability rather than just their technical ability, they must be educated in the nature of professional practice as a key and essential part of the university curriculum. A fundamental educational principle is that students should be assessed on professional practice capabilities that they have had opportunity to learn and be exposed to. The importance of and experience with practice capabilities and professional practice characteristics should be integrated into course curricula.

There are many concurrent requirements which need to be met in radiography courses (as with other professional degree programs). These include those of government appointed registration and accreditation bodies such as the Australian Health Practitioner Regulation Agency (AHPRA), and its Medical Radiation Science (MRS) specific board, the Medical Radiation Practice Board of Australia (MRPBA), internal university graduate learning outcomes (GLOs), professional bodies such as the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT), and external advisory committees (EACs). The complexity of curricula being mapped to these concurrent requirements means that important learning outcomes are often overlooked in curricula.

When the regulatory bodies such as those mentioned in the previous paragraph incorporate professional practice standards in their published standards for the professions they oversee, it is likely that they will be incorporated in curricula. Fortunately, the importance of professionalism (as well as technical ability) in practice is increasingly being recognised by these regulatory bodies. The first domain of the AHPRA capability standards for radiographers is Professional and Ethical Conduct, and this domain includes the following sub-points:

1.1 *Practise in an ethical and professional manner, consistent with relevant legislation and regulatory requirements*

1.2 *Provide each patient/client with an appropriate level of dignity and care*

1.3 *Assume responsibility, and accept accountability, for professional decisions (AHPRA, 2016)*
Regulatory bodies are acknowledging the importance of professionalism in practice in their published standards, and the opportunity and responsibility is now on radiography educators to ensure that professionalism in practice is incorporated into curricula as a core element, and also assessed in WPL placements.

It is important that the concept and implications of professionalism in practice are incorporated throughout curricula, not just taught as an isolated subject, which students pass and then forget. In the first year of study, students should be clearly taught that they have entered a healthcare profession (not a technical occupation), and what the implications of this are to them. Most students (as with other health professional courses’ entrants) enrol in a radiography degree without really understanding what is involved in being a healthcare practitioner and a professional practitioner. They are attracted to the technology involved in the profession, without considering that the technology is only of use when used to benefit fellow humans.

While the concepts of professionalism in practice can be incorporated in curricula as theoretical topics, it is far more effectively taught with techniques such as problem-based learning, role playing and other interactive methods to emphasise the situatedness of professional practice. It is not possible to present students with every permutation of circumstance they will encounter in professional practice, but they can be taught that the interactional, dynamic and contextual nature of practice means that they should learn to expect the unexpected and be able to adapt their personal practice to accommodate varying circumstances. WPL is an ideal place for such integrated learning.

7.7.3 Implications of this research for educating the educators

In order for this education in professional practice to be included in curricula, academics in the field must also be educated in the nature of practice and the meaning of professional practice to a deep level. Just as students cannot reasonably be assessed on something they have not learned, so academic staff cannot reasonably be expected to teach and assess concepts unfamiliar to them.

The technical nature of the radiography profession has led to the majority of research carried out by radiography academics mirroring the scientific and quantitative paradigm. Holistic, qualitative research in the radiography domain is scarce, and research into professionalism and professional judgement-based assessment practices in this field is even more scarce. This is not surprising because the majority of radiography academics are unfamiliar with concepts and the practical implementation of such phenomena as professional practice.

The absence of radiography academics with the educational and research background to teach professional practice and professionalism means that it is vital that current and new radiography
academic staff are educated in the relevant concepts and practices. When education for professional practice and its capabilities are incorporated in radiography curricula and assessment of student performance during WPL, a new generation of radiographers will emerge, some of whom will eventually enter academia and many of whom will become student WPL supervisors. This thesis can be the foundation for the generational transition towards educating radiography students for future professional practice. This would also open possibilities for interprofessional teaching within radiography curricula.

Other health professions are far more advanced in this generational transition than radiography is, so it makes sense for radiography courses to take advantage of the knowledge and research already carried out in other professional domains. Radiography curriculum designers who do not have the education or knowledge to teach and assess the principles of professional practice should consult with non-radiographer experts in the field. The required knowledge to be able to teach and assess this material can thus be learned to the required deep level by radiography academics through interprofessional learning.

7.7.4 Implications of this research for educating clinical supervisors

In conjunction with improving the educational system, attention must be turned to the professional development of WPL supervisors, who, in order to assess the non-technical as well as technical aspects of professional practice of students, must understand and exemplify this scope of capability and performance in their own practice. This will involve supervisors also being educated in the nature of professional practice and how to assess students (particularly in the use of their judgement during assessment), so they can identify good practice in the contexts where they observe student performance. Perhaps a renaming of WPL supervisor to WPL educator will help to signify their role as going beyond supervision.

Assessing students’ theoretical knowledge on the university campus, and also assessing students’ professional capability in the WPL setting, requires a deep understanding of the different purposes, concepts, practices and capabilities being assessed. This understanding is no less important than that required by curriculum designers and those who facilitate the learning of the content. Therefore, radiography student supervisors also need education in, and deep understanding of, the principles of professional practice if the assessment they carry out of students under their supervision is to be of use to students in developing skills as professional radiography practitioners.

The interactional, dynamic and contextual nature of professional practice renders it unsuitable to be assessed using the psychometric measurement scales used to assess radiography technical skills. Other researchers have demonstrated that professional judgement is the most suitable

In order to be effective in the use of professional judgement to assess students’ practice capability, supervising radiographers need to be educated regarding what professional judgement actually is, and how to use it. And, while this strategy recognises the value of supervisors’ judgement, it also requires educating them about what performance standards are to be expected of students at different stages of their development.

Professional judgement should not be confused with personal opinion. Personal opinion is often based on factors not related to student capability, factors which do not have a demonstrable effect on student performance. Sadler (2010) is very clear that the only factors assessed should be those that are directly related to student learning. Radiography supervisors need to be sure that they are able to separate personal biases from student performance, so that only factors relevant to student capability are included in their professional judgement-based assessments.

Radiography student supervisors are not only required to assess students’ professional practice capability. They are also required to teach it in the context of actual practice. Actual practice is something that is largely not available to radiography academics, meaning that WPL experience is where students will learn their essential practice capabilities—capabilities that they have heretofore only heard about and studied the theoretical basis of or at times practised in practical laboratories where patients were absent or simulated and patient consequences of performance errors were lacking. Supervisors are not expected, however, to hold formal classes for students under their supervision. If formal classes were suitable, they could be held on campus and taught by academic staff. Supervisors teach by role modelling, discussions and informal teaching.

It is imperative that supervisors exemplify good professional practice on a daily basis. When they consistently do this, students under their supervision will learn first-hand the principles, practices and realities of professional practice. Supervisors who exemplify good practice are well placed to recognise it in students under their supervision, as they have a deep understanding of what it entails.

In order to set this new paradigm of radiography student clinical capability assessment in motion, it is vital that student supervisors are educated in the wider scope and nature of professional practice. While many are already exemplifying professional practice in their own performance, without a theoretical underpinning to their practice they are unable to articulate the reasons for their professional judgement of student performance. Tertiary assessment practices based on “gut feelings” are indefensible should students challenge these assessment
decisions. Academic and supervisory staff also have a duty of care to students to ensure that all assessment decisions and the reasons behind them are understood, so that students can learn and grow their capability based on the assessment feedback provided. Supervisors need to be taught the theoretical underpinnings of professional practice so that they know how to demonstrate and articulate transparent and defensible professional judgement-based assessments of student practice capability based on those practice understandings. It is the responsibility of academics and course managers to provide this education to their student supervisor partners. However, workplace supervisors and their colleagues can be proactive and set up informal support groups where they share their student supervision experiences and practices.

7.8 FURTHER RESEARCH IN THIS FIELD OF STUDY

This chapter has discussed the outcomes of this research. I recommend that further study stemming from this research could extend to evaluating its effects in the workplace, including its culture and discourse of professionalism, and its effects on the radiography profession. Action research could be conducted to establish a learning community comprising WPL supervisors and assessors where they share their challenges, provide support and offer other ways of engaging with and assessing students. Challenges could include giving feedback, providing formative assessments and making judgements on students’ professional practice capabilities at the end of a placement. Indeed, an example of this is the Medical Imaging Clinical Educators (MICE), which was set up several years ago in Queensland, and has since spread interstate and become formally affiliated with ASMIRT. The new model of radiography student capability assessment developed in this study, and the concept of practice capability and its assessment, were presented at the last formal MICE conference, held in Cairns in October 2017. The value and impact of these formal and informal support groups in advancing the practice capability culture in the radiography profession is recommended for future research.

The findings of this study have potential to make a wide impact on not only radiography education in Australia, but also on the practice of radiography in Australia, and the professional identity of radiography in the universe of healthcare professions.

7.9 CONCLUSION

Assessment of radiography student WPL capability is not just ticking off a list of defined skills or competencies. In order for this assessment to be meaningful, it should address the nature of radiography practice, and then describe how this professional practice is best assessed. This research set out to examine the nature of radiography professional practice, determine how this practice is best assessed, and propose a new structure and professional judgement-based
strategy for its assessment. It produced a new, professional judgement-based framework for the assessment of radiography student WPL capability.

This new framework has the potential to significantly impact on students’ assessment by firstly acknowledging that radiography practice is more than rote performance of technical skills; secondly by providing a foundation for radiography supervisors to understand that student capability is more than the sum of a checklist of skills; and thirdly by allowing for the variabilities between WPL placement locations in determining equitable assessments.

With students being educated in professional practice as a broad and high quality, responsible phenomenon beyond technical performance, academics teaching this broader practice phenomenon, and workplace supervisors modelling and assessing it, the potential to reposition key aspects of the whole profession’s practice can be realised. By explicitly teaching, learning and assessing professional core elements, the radiography profession will continue to grow into a more mature profession.

Beyond the development of a professional judgement-based strategy for the assessment of student radiographer professional practice capability, the flow-on effect of this research cannot be under-estimated. Students being educated and assessed in the principles and application of professional practice will lead to a new generation of practitioners who have the practice skills to bring new credibility to the profession in the healthcare domain. Educators making efforts to understand, teach and assess the principles of professionalism as well as the technical scope of professional practice will elevate radiography courses’ professional profile. Student supervisors who exemplify professional practice lead by example and will be better supported to assess the professional practice capability of students under their supervision.

This paradigm shift in radiography student practice capability assessment has the potential to reposition the radiography profession with greater recognition within the healthcare professions’ arena and to complete the transition of radiographers from technicians to fully-fledged healthcare professionals. Changing the WPL assessment element of radiography education has the ability to make radiography more fully recognised as a profession into the middle of the 21st century.
REFERENCES


APPENDIX A: ETHICS APPROVAL FORMS

RESEARCH INTEGRITY
Human Research Ethics Committee
Web: http://sydney.edu.au/ethics/
Email: rc.humanethics@sydney.edu.au

Address for all correspondence:
Level 6, Jane Foss Russell Building - G02
The University of Sydney
NSW 2006 AUSTRALIA

Ref: IMPE
31 March 2011

Associate Professor Tania Gerzina
Institute of Teaching and Learning
Carslaw Building – F07
The University of Sydney
Email: tania.gerzina@sydney.edu.au

Dear Professor Gerzina

Thank you for your correspondence received 26 March 2011 addressing comments made to you by the Human Research Ethics Committee (HREC). The Executive of the HREC, on 30 March 2011, considered this information and approved the protocol entitled “Clinical Assessment Tool for students undertaking Diagnostic Radiography”.

Details of the approval are as follows:

Protocol No.: 13568
Approval Period: March 2011 to March 2012
Authorised Personnel: Associate Professor Tania Gerzina
Mr Andrew Kilgour
Professor Patrick Brennan

Approved documents:
Participant Information Statement Version 2 11 March 2011
Participant Consent Form Version 2 11 March 2011
Questions for Interviews Version 2 11 March 2011
Letter of Invitation Version 2 11 March 2011

The HREC is a fully constituted Ethics Committee in accordance with the National Statement on Ethical Conduct in Research Involving Humans-March 2007 under Section 8.1.20.

The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Research Involving Humans. A report on this research must be submitted every 12 months from the date of the approval or on completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Your report is due by 31 March 2012.

Chief Investigator / Supervisor’s responsibilities to ensure that:

1. All serious and unanticipated adverse events should be reported to the HREC within 72 hours for clinical trials/interventional research.
2. All unforseen events that might affect continued ethical acceptability of the project should be reported to the HREC as soon as possible.
3. Any changes to the protocol must be approved by the HREC before the research project can proceed.

Manager Human Ethics
Dr Margaret Paeto
T: +61 2 9385 8206
E: humanethics@sydney.edu.au

Human Ethics Secretary:
Ms Karen Gwer
T: +61 2 9385 8171
E: karen.gwer@sydney.edu.au

Ms Patricia Engelman
T: +61 2 9385 8172
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Ms Kate Rehn
T: +61 2 9385 8173
E: kate.rehn@sydney.edu.au

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12 May 2011

A/Professor Tania Gerzina
c/- Professor Greg Murray
Level 3
Westmead Centre for Oral Health
Westmead Hospital
Darcy Road
WESTMEAD NSW 2145.

Dear Professor Gerzina,

Re: HREC/11/CRGH/27
CH628/8/2011-022
Clinical assessment tool for students undertaking diagnostic radiography

Thank you for submitting the above multi-centre project for single ethical and scientific review. This project was first considered by the Sydney Local Health Network Human Research Ethics Committee – CRGH at its meeting held on 31 March 2011. This Human Research Ethics Committee (HREC) has been accredited by the NSW Department of Health as a lead HREC under the model for single ethical and scientific review.

This lead HREC is constituted and operates in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Human Research and the CPMP/ICH Note for Guidance on Good Clinical Practice.

I am pleased to advise that the Committee has granted ethical approval of this research project.

The documents reviewed and approved include:

- National Ethics Application Form (NEAF)
- Questions for Interviews
- Letter to Chief Radiographer
- Participant Information Statement – Master Version 2 dated 27 April 2011
- Participant Consent Form – Master Version 2 dated 11 March 2011

The HREC has provided ethical and scientific approval for the following sites:

1. Concord Repatriation General Hospital
2. Royal Prince Alfred Hospital
3. Royal North Shore Hospital
4. Westmead Hospital
5. Belmont Hospital
6. Canterbury Hospital
7. Wollongong Hospital
8. Fairfield Hospital
9. John Hunter Hospital

Final Approval 2011-022 (09/04/2010)
RESEARCH STUDY INTO CLINICAL ASSESSMENT IN DIAGNOSTIC RADIOPHGRAPHY

PARTICIPANT INFORMATION STATEMENT

You are invited to take part in a research study into clinical assessment in diagnostic radiography undergraduate and post graduate education. The object is to discover what students and practitioners in diagnostic radiography deem to be essential in a clinical assessment tool. The intention is to develop a clinical assessment tool that is valid, reliable, easy to use and understand, has low inter-rater variability, and reflects the skills and competencies necessary to be a diagnostic radiographer. The study is being conducted by Andrew Kilgour, Clinical Coordinator for Diagnostic Radiography at the University of Sydney, and will form the basis for the degree of Doctor of Philosophy at the University of Sydney, under the supervision of Associate Professor Tania Gerzina, Associate Professor, Jaw Function and Orofacial Pain Unit, Westmead Centre for Oral Health, Westmead Hospital.

If you agree to participate in this study, you will be requested to participate in a focus group discussion, or to fill out an online survey, where you will have the opportunity to express your opinions on clinical assessment in diagnostic radiography, and make suggestions as to what you deem necessary in a clinical assessment tool. There will be no risks, discomforts or side effects to participating in these focus groups. These discussions will be audio taped only; no videotaping will occur at any stage of the process. There will be no behavioural observations recorded at any stage. You will need to attend on campus meetings for one hour on three occasions.

All aspects of the study, including results, will be strictly confidential and only the investigators named above will have access to information on participants, except as required by law. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Research study into clinical assessment in Diagnostic Radiography  VERSION 3 13 MARCH 2012
While we intend that this research study furthers knowledge of clinical assessment in diagnostic radiography and may improve assessment of diagnostic radiography students in the future, it may not be of direct benefit to you.

Participation in this study is entirely voluntary: you are not obliged to participate and - if you do participate - you can withdraw at any time. Whatever your decision, it will not affect your university results or performance if you are a student, or your professional relationship with the university if you are a current practitioner.

You may stop the interview at any time if you do not wish to continue, the audio recording will be erased and the information provided will not be included in the study.

When you have read this information, Andrew Kilgour will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact Andrew Kilgour in one of the following ways:
- Email: andrew.kilgour@sydney.edu.au
- Mobile: 0411 231195
- Office phone: 02 9351 9518

Any person with concerns or complaints about the conduct of a research study can contact The Manager, Human Ethics Administration, University of Sydney on +61 2 8627 8176 (Telephone); +61 2 8627 8177 (Facsimile) or hr.humanethics@sydney.edu.au (Email).

This information sheet is for you to keep.
RESEARCH STUDY INTO CLINICAL ASSESSMENT IN DIAGNOSTIC RADIOGRAPHY

PARTICIPANT INFORMATION STATEMENT

You are invited to take part in a research study into clinical assessment in diagnostic radiography undergraduate and post graduate education. The object is to discover what students and practitioners in diagnostic radiography deem to be essential in a clinical assessment tool. The intention is to develop a clinical assessment tool that is valid, reliable, easy to use and understand, has low inter-rater variability, and reflects the skills and competencies necessary to be a diagnostic radiographer. There is evidence that different clinical supervisors in diverse clinical centres vary widely in how they assess radiography students. Many clinical centres accept students from multiple universities, each of which supplies a different assessment tool. With the imminent arrival of national registration for radiographers, and the directive from Health Workforce Australia that national assessment tools are a priority, it is felt that a standards-based assessment tool which is nationally accepted and utilised is essential. This project seeks to develop such a tool, thus promoting consistency of assessment which is commensurate with a push for national practitioner standards.

The study is being conducted by Andrew Kilgour, Clinical Coordinator for Diagnostic Radiography at the University of Sydney, and will form the basis for the degree of Doctor of Philosophy at the University of Sydney, under the supervision of Associate Professor Tania Gerzina, Coordinator of Teaching Development, Health Cluster, Institute of Teaching and Learning.

If you agree to participate in this study, you will be requested to participate in a focus group discussion lasting approximately 60-90 minutes, where you will have the opportunity to express your opinions on clinical assessment in diagnostic radiography, and make suggestions as to what you deem
necessary in a clinical assessment tool. These sessions will be digitally recorded (audio only).

All aspects of the study, including results, will be strictly confidential and only the investigators named above will have access to information on participants except as required by law. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

While we intend that this research study furthers knowledge of clinical assessment in diagnostic radiography and may improve assessment of diagnostic radiography students in the future, it may not be of direct benefit to you.

Participation in this study is entirely voluntary; you are not obliged to participate and - if you do participate - you can withdraw at any time. Whatever your decision, it will not affect your university results or performance if you are a student, or your professional relationship with the university if you are a current practitioner.

You may withdraw from the focus group at any time if you do not wish to continue, in which case your contributions will be deleted from the transcript of the focus group, and not included in the study in any way.

When you have read this information, Andrew Kilgour will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact Andrew Kilgour in one of the following ways:

- Email: andrew.kilgour@sydney.edu.au
- Mobile: 0411 231195
- Office phone: 02 9351 9518

This study has been approved by the Human Research Ethics Committee - CRGH Zone of the Sydney Local Health Network. If you have any concerns or complaints about the conduct of the research study, you may contact the secretary of the Concord Hospital Human Research Ethics Committee, on (02) 9767 5672

This information sheet is for you to keep.
APPENDIX C: CONSENT FORM

PARTICIPANT CONSENT FORM

I. [PRINT NAME], give consent to my participation in the research project

TITLE: Designing an Evidence Based and Peer Reviewed Assessment Tool for Diagnostic Radiography Clinical Units of Study

In giving my consent I acknowledge that:

1. The procedures required for the project and the time involved (including any inconvenience, risk, discomfort or side effect, and of their implications) have been explained to me, and any questions I have about the project have been answered to my satisfaction.

2. I have read the Participant Information Statement and have been given the opportunity to discuss the information and my involvement in the project with the researcher(s).

3. I understand that I can withdraw from the study at any time, without affecting my relationship with the researcher(s) or the University of Sydney now or in the future.

4. I understand that my involvement is strictly confidential and no information about me will be used in any way that reveals my identity.

5. I understand that being in this study is completely voluntary – I am not under any obligation to consent.

Designing an Evidence Based and Peer Reviewed Assessment Tool for Diagnostic Radiography Clinical Units of Study - VERSION 2, 11 MARCH 2011
6. I understand that I can stop the interview at any time if I do not wish to continue, the audio recording will be erased and the information provided will not be included in the study.

I understand that I can stop my participation in the focus group at any time if I do not wish to continue, however as it is a focus group discussion it will not be possible to erase my participation in the discussion to that point.

7. I consent to:

   i) Audio-taping YES ☐ NO ☐
   ii) Receiving Feedback YES ☐ NO ☐

   If you answered YES to the “Receiving Feedback Question (ii)”, please provide your details i.e. mailing address, email address.

Feedback Option

   Address:
   
   __________________________________________
   
   __________________________________________
   
   __________________________________________

   Email:
   
   __________________________________________
   
   __________________________________________

   Signed: .............................................................................................................
   
   Name: .............................................................................................................
   
   Date: .............................................................................................................
APPENDIX D:
ASSESSING CLINICAL COMPETENCY FOR RADIOGRAPHY STUDENTS (ONLINE SURVEY)

1. How many years of experience as a radiographer do you have?
2. What is the highest qualification you have achieved? Please choose the appropriate response, and add any relevant detail of your qualification in the box below.
3. Are you actively involved in student supervision? If your answer is “No”, please go to Question 6.
4. If your answer to Question 3 was “Yes”, in what way are you involved in student supervision?
5. If your answer to Question 3 was "Yes", how long have you been supervising students for?
6. Are you actively involved in student assessment? If your answer is "No", please go to Question 9.
7. If your answer to Question 6 was "Yes", in what way are you involved in student assessment?
8. If your answer to Question 6 was "Yes", how long have you been assessing students for?
9. In what category of radiology centre are you employed?
   a. Public Hospital
   b. Private Hospital
   c. Private Practice
   d. Private Practice within Public Hospital
   e. Academia
   f. Applications Specialist
   g. Other
10. In which state or territory are you employed?
11. From which universities are students accepted at your institution? Choose as many as are applicable.
   a. Central Queensland University
   b. Queensland University of Technology
   c. University of Newcastle
   d. University of Sydney
   e. Charles Sturt University
   f. Monash University
   g. RMIT University
   h. University of South Australia
   i. Curtin University
12. A national clinical assessment tool for radiography students is intended to address a number of issues that currently exist. Please rate the significance of each of the following issues (five-point Likert scale):
   a. Uniform standard for the same qualification
   b. Reliability (consistency between clinical centres)
   c. Validity (assessment measures what it is meant to measure)
   d. Same assessment tool for all universities will minimise confusion
   e. Other
13. Do you support the introduction of a uniform national clinical assessment tool for radiography students?
14. This question is asking your opinion on how radiography students should be assessed. Please choose the response that agrees the most closely with your opinion (five-point Likert scale).
a. Students should be assessed according to their competency in various imaging examinations (competency being defined as the ability to routinely perform the examinations with no assistance)
b. Students should be assessed as pass/fail only in each category
c. Students should be assessed as pass/fail in some categories such as punctuality, appearance etc, and graded in others
d. Areas to be assessed should be mapped to the scope of practice for radiographers

15. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student's knowledge and understanding (five-point Likert scale):
   a. Key knowledge concepts
   b. Clinical skills and practice

16. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student's critical thinking and evaluation skills (five-point Likert scale):
   a. Assess clinical situations and perform accordingly
   b. Application of clinical skills
   c. Analyse and respond to problems regarding operation and management
   d. Research and innovation
   e. Quality Assurance

17. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student's professional and ethical practice (five-point Likert scale):
   a. Autonomy and accountability
   b. Understanding of scope of practice for a radiographer
   c. Build and maintain professional relationships
   d. Patient advocacy
   e. Understanding of relevant legal issues
   f. Management of quality of care

18. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student's patient care and clinical management skills (five-point Likert scale):
   a. Patient welfare
   b. Empathy
   c. Cultural sensitivity
   d. Management of clinical presentation of patient

19. Please indicate the level of importance you place on the assessment of each of the following areas relating to a student's commitment to lifelong learning (five-point Likert scale):
   a. Professional development
   b. Mentoring/teaching
   c. Participation in research and investigation

20. Are there any other areas you think are necessary for inclusion in the assessment of a student radiographer's clinical competency?

21. Please indicate below what format you would like a national assessment tool to take:
   a. Paper-based
   b. Online
   c. Another format (please specify below)

22. What are your opinions regarding the use of peer assessment in a national assessment tool for radiography students? Please give reasons for your answer.

23. What are your opinions regarding 360-degree feedback? Do you believe that it should be incorporated into a national assessment tool for radiography students? Please answer in the space provided below. In human resources or industrial/organisational psychology, 360-degree feedback, also known as multi-rater feedback, multisource feedback, or
multisource assessment, is feedback that comes from all around an employee. "360" refers to the 360 degrees in a circle, with an individual figuratively in the centre of the circle. Feedback is provided by subordinates, peers, and supervisors. It also includes a self-assessment and, in some cases, feedback from external sources such as customers and suppliers or other interested stakeholders. It may be contrasted with "upward feedback", where managers are given feedback by their direct reports, or a "traditional performance appraisal", where the employees are most often reviewed only by their managers. The results from 360-degree feedback are often used by the person receiving the feedback to plan training and development. Results are also used by some organisations in making administrative decisions, such as pay or promotion. When this is the case, the 360 assessment is for evaluation purposes, and is sometimes called a "360-degree review". However, there is a great deal of controversy as to whether 360-degree feedback should be used exclusively for development purposes, or should be used for appraisal purposes as well (Waldman et al., 1998). There is also controversy regarding whether 360-degree feedback improves employee performance, and it has even been suggested that it may decrease shareholder value (Pfau & Kay, 2002). http://en.wikipedia.org/wiki/360-degree_feedback#

24. Please indicate on the scale below your level of agreement with the following methods of assessing student clinical competence (five-point Likert scale):
   a. A number from 1-10 for each graded category
   b. A number from 1-5 for each graded category
   c. Likert scale (such as used in this question)
   d. Visual analogue scale (VAS) i.e., draw a line in a box with no gradations
   e. Choose the best statement from a list (e.g., "Always performs at a high level"; "Sometimes performs at a a high level!", etc)

If you would like a copy of the findings of this survey, please include your email address in the box below.
APPENDIX E:
THE NEW CHARLES STURT UNIVERSITY RADIOGRAPHY
CLINICAL ASSESSMENT FORM (ONLINE SURVEY)

1. What is the purpose of clinical assessment? Please indicate your level of agreement with each statement (five-point Likert scale):
   a. Define good performance
   b. Rank students against each other
   c. Certify for professional accreditation
   d. Identify students who don’t reach the required standard
   e. Help employers decide who to employ
   f. Show students how well they have learned the discipline knowledge
   g. Indicate how well teaching has presented essential knowledge
   h. Provide feedback for students
   i. Allow student performance to be measured

2. How do you rank the following qualities of assessment in regard to importance? Please choose your level of agreement with each (five-point Likert scale):
   a. Good level of numerical validity and reliability
   b. Ease of use by the educator
   c. Based on essential criteria matched to levels of performance
   d. Allows matching of student performance to discipline academic standards
   e. High level of relevance of questions to the discipline
   f. Format easily used by students
   g. Provides data that the school can use to improve curriculum
   h. Questions used reflect "real" professional practice
   i. Target high order thinking like complex problem solving
   j. Assessment guides and encourages effective approaches to learning
   k. Levels of achievement for each assessment category are given

3. Are you familiar with the old and/or new Charles Sturt University radiography clinical assessment forms?
   a. Familiar only with old form
   b. Familiar only with new form
   c. Familiar with both old and new forms

4. What are the attributes of the new assessment form?

5. Which form do you feel gives more reliable or more useful information regarding the student's performance? Please give your reasons.
   a. Old form
   b. New form

6. Which form do you feel provides better feedback for students regarding their performance? Please give reasons.
   a. Old form
   b. New form

7. The new assessment form compares student performance to increasingly advanced standards for each subsequent clinical block. Do you feel that this provides for an accurate and fair assessment of student performance? Please provide reasons for your answer.
   a. Yes
   b. No