

Qualitative and Reflective Analysis of Student  
Reflective Journals of Professional  
Placements in Radiation Therapy

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GradCert HEd , BApSc (MRS) Radiation Therapy,

Thesis by publication submitted of the degree

**Doctor of Philosophy**

## **STATEMENT OF ORIGINALITY**

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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## **ACKNOWLEDGEMENT OF AUTHORSHIP**

I hereby certify that this thesis is in the form of a series of published papers of which I am the first author. The co-authors of the published papers were supervisors of the thesis and provided direction and support for each of the publications.

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## **ABSTRACT**

A radiation therapist is an important member of the multidisciplinary treatment approach to cancer. The complex and diverse role of a radiation therapist necessitates that practitioners are highly skilled, patient focused and reflective.

This research employed a Qualitative Analysis to explore issues that radiation therapy students documented in their freeform unguided writing in personal journals. This allowed for the changing focus of students' 'workplace learning' as they progress through the program to be mapped and compared with the actual curriculum of the program. After reading and analysing the student's personal journals it was evident that there was a need for the development and validation of a tool to assess written journals for evidence of reflection.

This research has developed and validated a tool Newcastle Reflective Analysis Tool (NRAT). Subsequent analysis of a cohort of radiation therapy student's freeform journals using the NRAT for evidence of reflection identified that, students find it difficult to reach the higher critical levels of reflection that can transform learning. This finding prompted the development and validation of short form guided reflective inventories called the Newcastle Reflective Inventories (NRIs). These inventories can be used in the undergraduate and practitioner setting to support and develop reflective writing and thinking skills. The NRIs guide and support students in higher levels of reflective writing, allowing insights into workplace experience.

The findings and tools developed from this research have been implemented within the RT program and other allied health programs at the University of Newcastle. There has also been international interest and support for the research and its findings from a spectrum of health profession disciplines.

## Peer Reviewed Publications

**Findlay N**, Dempsey S, Warren-Forward H, A qualitative analysis of radiation therapy students professional placement journals. (Submitted).

**Findlay N**, Dempsey S, Warren-Forward H, Developing a qualitative framework for analysis of student journals. *The Radiographer*. Vol 57 (2) pp 34-39, 2010

**Findlay N**, Dempsey S, Warren-Forward H, Development and validation of reflective inventories: assisting radiation therapists with reflective practice. *Journal of Radiotherapy in Practice*. Vol 10, pp 1-10, 2010

**Findlay N**, Dempsey S, Warren-Forward H, Validation and use of the Newcastle Reflective Analysis Tool: a three year longitudinal study of RT students' reflective journals. *Reflective Practice*. Vol 11 (1), pp 83-94, 2010

**Findlay N**, Dempsey S, Warren-Forward H, Development of the Newcastle Reflective Analysis Tool. *Focus on Health Professional Education: A Multi-Disciplinary Journal*. Vol 11 (1), pp 32-40, 2009

**Chapman N**, Dempsey S, Warren-Forward H, Workplace diaries promoting reflective practice in radiation therapy, *Radiography*, Vol 15 (2), pp 166-170, 2009

**Chapman N**, Dempsey S, Warren-Forward H, Theory of reflection in learning for radiation therapists. *The Radiographer*, Vol 55 (2), pp 29-32, 2008

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**Findlay N**, Dempsey S, Warren-Forward H, Validation and use of the Newcastle Reflective Analysis Tool, RANZCR/AIR/FRO/ACPSEM 2009 Combined Scientific Meeting, Brisbane, Australia, October 2009.

**Findlay N**, Dempsey S, Warren-Forward H, Development and integration of the Newcastle Reflective Inventories into all three disciplines of the University of Newcastle MRS program, 11<sup>th</sup> Australasian Association of Educators in Medical Radiation Science conference, Brisbane, Australia, July 2009

**Chapman N**, Dempsey S, Warren-Forward H, Validating the Newcastle Reflective Analysis Tool – for guided assessment of reflective writing in health care, ANZAME The Association for Health Professional Education conference, Sydney, Australia, July 2008

**Chapman N**, Dempsey S, Warren-Forward H, Theory of Reflection in Learning for Radiation Therapists, Australian Institute of Radiography Annual Scientific Meeting of Medical Imaging and Radiation Therapy conference, Melbourne, Australia, March 2008

**Chapman N**, Dempsey S, Warren-Forward H, Reflective Inventories - Assisting health professional with reflective practice, ANZAME The Association for Health Professional Education conference, September 2007

**Chapman N**, Dempsey S, Warren-Forward H, Assessing student journals for evidence of reflection, 10<sup>th</sup> Australasian Association of Educators in Medical Radiation Science conference, Newcastle, Australia, July 2007

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**LIST OF ABBREVIATED TERMS**

AA	Absolute Agreement
AIR	Australian Institute of Radiography
ASRT	American Society of Radiation Technologists
BMRS	Bachelor Medical Radiation Science
BSRT	Breathing Synchronised Radiation Therapy
CA	Consensus Agreement
CBS	Competency Based Standards
CPD	Continual Professional Development
CR	Critical Reflector
CRT	Conformal Radiation Therapy
CT	Computed Tomography
DR	Diagnostic Radiography
EDW	Enhanced Dynamic Wedge
FTE	Full Time Equivalent
IMRT	Intensity Modulated Radiation Therapy
K	Kappa Coefficient
LLL	Lifelong Learning
MLC	Multi Leaf Collimator
MRI	Magnetic Resonance Imaging
MRS	Medical Radiation Science
NM	Nuclear Medicine
NR	Non Reflector
NRAT	Newcastle Reflective Analysis Tools
NRI	Newcastle Reflective Inventories
NSW	New South Wales
OT	Occupational Therapy
PDY	Professional Development Year
PET	Positron Emission Tomography
PT	Physical Therapy
QDA	Qualitative Descriptive Analysis
R	Reflector
RO	Radiation Oncologist
ROTC	Radiation Oncology Treatment Centre

RT	Radiation Therapy
RTAP	Radiation Therapy Advisory Panel
SOR	Society of Radiographers
TAFE	Technical and Further Education

# Chapter One

## Introduction

## 1.1 OVERVIEW AND OUTLINE

### 1.1.1 OVERVIEW

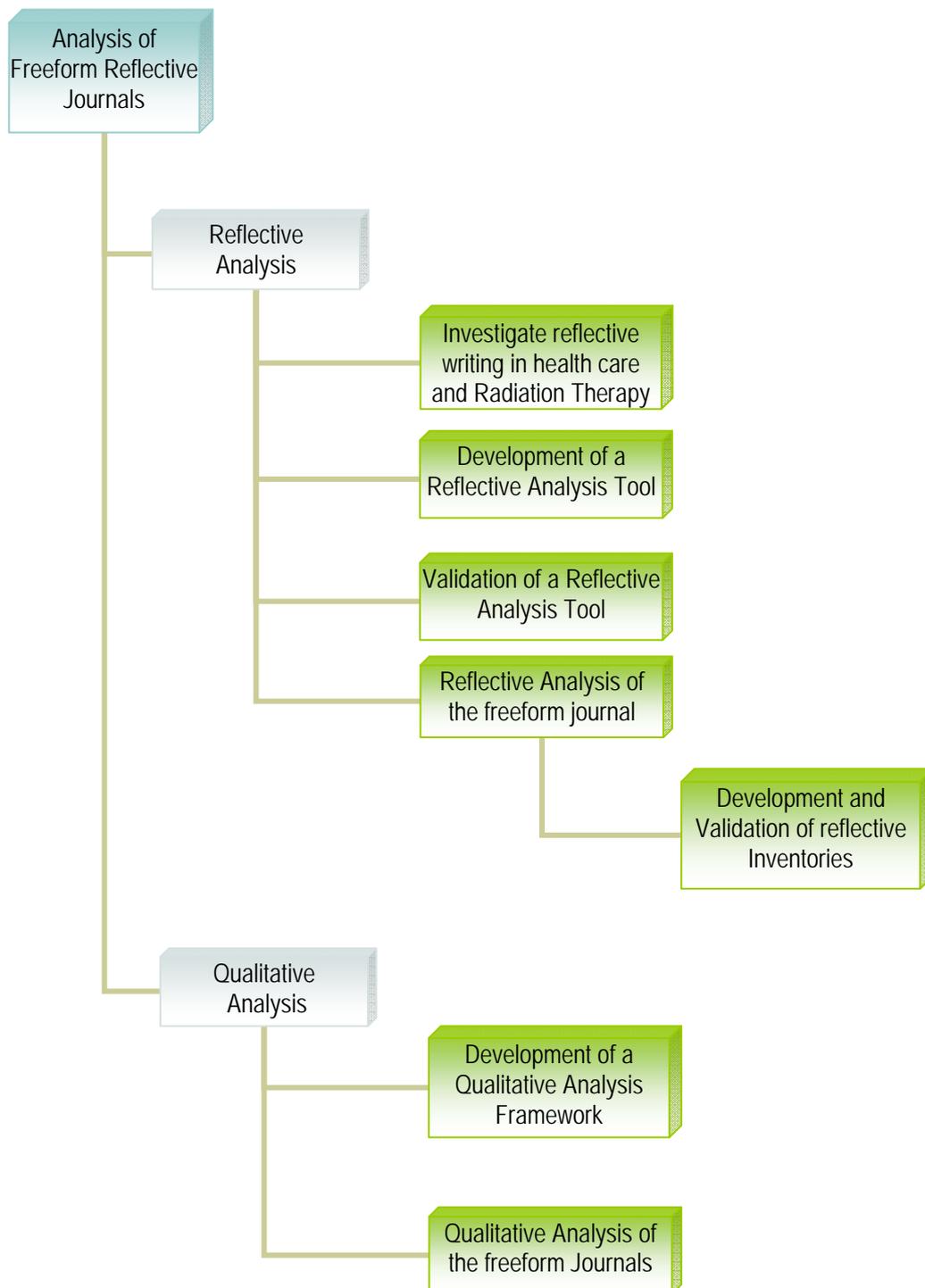
This thesis by publication begins by describing the investigation of student freeform reflective journals completed by Medical Radiation Science radiation therapy students at the University of Newcastle between 2003 and 2005. These journals were completed at the conclusion of semester based blocks of professional placements and aimed to encourage students to invest in self reflective learning about their time or development during their professional placement. It was hoped that the freeform reflective journal would assist students to develop the skills necessary to become reflective practitioners by completion of the degree program.

The investigation of these freeform journals contained two primary components, a reflective analysis and a qualitative analysis. Each of these primary components contained secondary elements. This document then extends the reflective analysis arm of the project with the development and validation methods of Reflective Inventories to assist health professional in their reflective writing and thinking development (Figure 1.1). The reflective inventories are tools that aim to provide undergraduate radiation therapy students and professionals working in the clinical setting a simple and efficient way to support and promote reflective writing and practice.

The series of seven papers that form the body of this work are associated with one or more of the secondary elements of this research (Table 1.1).

### 1.1.2 THESIS OUTLINE

Chapter 1: Introduces the background and rationale of the research project, before discussion of the aims. The objectives necessary to complete the research are then detailed. The author also outlines the projects significance, limitations and assumptions, including possible biases and the effect they may have on the research findings.



**Figure 1.1 Overview of the primary components and secondary elements to the analysis of the students' freeform reflective journals.**

**Table 1.1 Illustration of how each of the seven peer reviewed publications is associated with each of the secondary elements of this research**

Secondary Element	Associated Peer Reviewed Publication
Investigate reflective writing in health care and Radiation Therapy	<p><b>Chapman N</b>, Dempsey S, Warren-Forward H, Workplace diaries promoting reflective practice in radiation therapy, <i>Radiography</i>, Vol 15 (2), pp166-170, 2009</p> <p><b>Chapman N</b>, Dempsey S, Warren-Forward H, Theory of reflection in learning for radiation therapists. <i>The Radiographer</i>, Vol 55 (2), pp 29-32, 2008</p>
Development of a Reflective Analysis Tool	<b>Findlay N</b> , Dempsey S, Warren-Forward H, Development of the Newcastle Reflective Analysis Tool. <i>Focus on Health Professional Education: A Multi-Disciplinary Journal</i> . Vol 11 (1), pp 32-40, 2009
Validation of a Reflective Analysis Tool	<b>Findlay N</b> , Dempsey S, Warren-Forward H, Validation and use of the Newcastle Reflective Analysis Tool: a three year longitudinal study of RT students' reflective journals. <i>Reflective Practice</i> . Vol 11 (1), pp 83-94, 2010
Reflective Analysis of the freeform journal	
Development and Validation of reflective Inventories	<b>Findlay N</b> , Dempsey S, Warren-Forward H, Development and validation of reflective inventories: assisting radiation therapists with reflective practice. <i>Journal of Radiotherapy in Practice</i> . Vol 10, pp 1-10, 2010
Development of a Qualitative Analysis Framework	<b>Findlay N</b> , Dempsey S, Warren-Forward H, Developing a qualitative framework for analysis of student journals. <i>The Radiographer</i> . Vol 57 (2) pp 34-39, 2010
Qualitative Analysis of the freeform Journals	<b>Findlay N</b> , Dempsey S, Warren-Forward H, A qualitative analysis of radiation therapy students professional placement journals. (Submitted).

Chapter 2: This chapter begins with an overview of cancer care and the role of radiation therapist's it details the development and growth of radiation therapy technology and techniques over the past three decades. The principles of reflection, reflective practice and reflective journaling are discussed. Finally various models designed to assess reflective writing and frameworks to complete qualitative content analysis are outlined. This review of the literature is supported by three published papers.

Chapters 3-6: These chapters present the series of papers published and these form the main body of this thesis by publication.

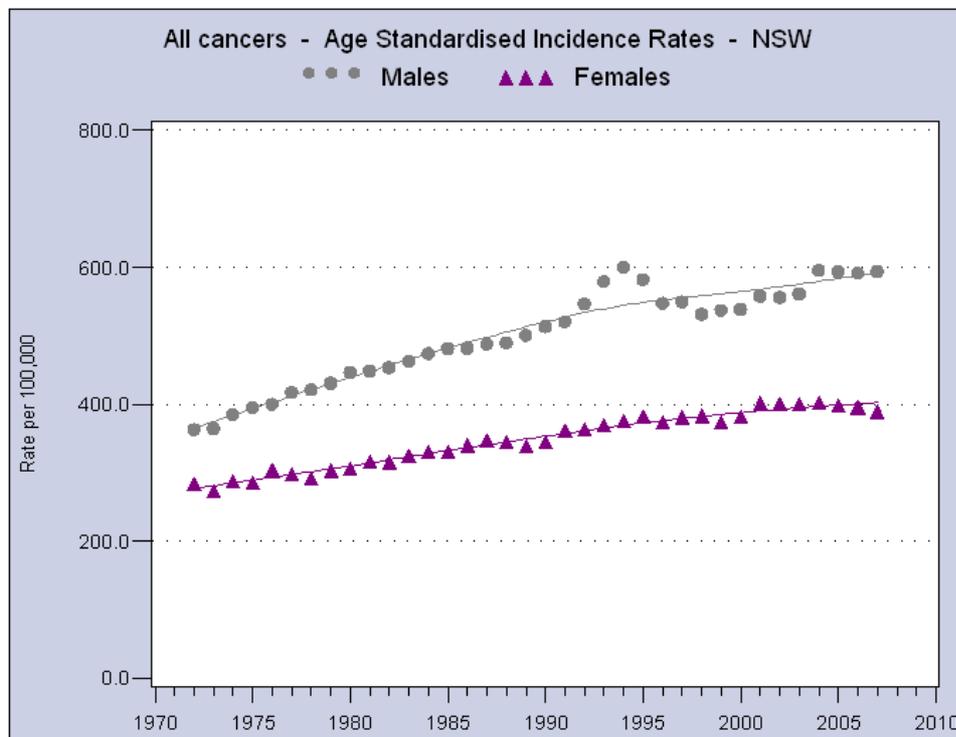
Chapter 7: Contains a summary of the research of both the reflective and qualitative components. It also discusses the impact of the research and future directions

## 1.2 BACKGROUND

According to the most recent figures available there were over 100,000 new cases of cancer documented in Australia in 2005, and 39,200 cancer related deaths ("Cancer in Australia 2008," 2008). In New South Wales (NSW) there were 34,227 new cases of cancer diagnosed in 2005, with this number increasing to 37,550 in 2007 (Tracey, Li, Baker, Dobrovic, & Bishop, 2009). Figure 1.2 illustrates the strong growth in rates over the last 30 years, by the steady increase of age standardised incidence rates of cancer.

The complex and varied nature of cancer requires that an adaptive approach be employed for its treatment. Combinations of medical, surgical and radiation oncology are the primary modalities of treatment. This multidisciplinary radiation therapy (RT) team includes radiation oncologists (RO), medical physicists and radiation therapists. The role of RT is well established in this multidisciplinary approach and in some cases is the primary modality of curative treatment, such as prostate cancer Radiation therapy (RT) involves the use of ionising radiation to damage and cause cell death to cancerous tumour cells, whilst attempting to minimising damage to normal healthy tissue in the surrounding region. RT aims to maximise the injury caused to the tumour site and minimise the side effects

experienced by the patient ("Introduction to Radiation Therapy Practice Standards," 2004).



**Figure 1.2 Trends in incidence of cancer in NSW 1970-2009 (Tracey, et al., 2009).**

The radiation therapist is an integral member of the health care team that provides treatment in a RT department. Radiation therapists are responsible for the implementation of a radiation prescription as authorised by a RO. The radiation therapist plays a key role in the localisation of the disease to be treated, development of the treatment plan and delivery of the radiation therapy treatment. In addition, the radiation therapist needs to consider patient care, radiation safety, quality assurance, as well as, legal and professional responsibilities ("Competency Based Standards for the Accredited Practitioner," 2005). The American Society of Radiation Technologists (ASRT) outlines how "professional judgment and critical thinking" ("Introduction to Radiation Therapy Practice Standards," 2004, p1) are imperative in daily practice for a radiation therapist when assessing accuracy and appropriateness of treatment delivery, anticipating patient needs and being a valuable member of the interdisciplinary team. The role of the radiation therapist is rapidly evolving as technology and

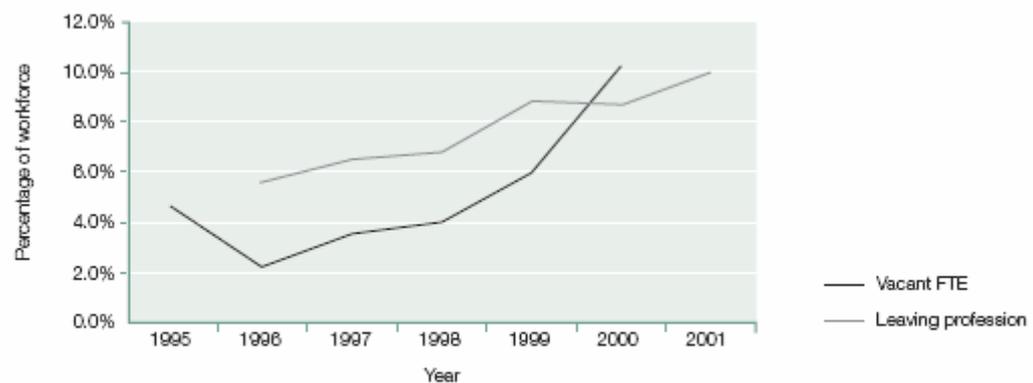
techniques advance. Development over the past decade have been considerable and there are strong indications that the coming years will see this trend continue (Svensson & Moller, 2003). In order to stay current with changing techniques and emerging technology, as well as manage the varied and demanding role that is required of a radiation therapist, it is important that radiation therapist incorporate reflection into their everyday practice. Practising reflectively assists the radiation therapist to monitor their practices, it encourages professional growth and currency of skills.

When considering the internationally accepted standard which describes that, 50% of patients diagnosed with cancer should receive RT at some stage of their treatment (Baume, 2002), every year in Australia it is estimated that 22% of patients do not receive radiotherapy, who may have benefited from it (Barton, Peters, & Kenny, 2004). Although the RT workforce has increased over the past 10 years, radiation therapist, medical physicist and radiation oncologist staff shortages have still been a prominent problem. The percentage of vacant fulltime equivalent (FTE) positions and the number of radiation therapists leaving the profession has increased over the past decade (Figure 1.3). The most recently available figures indicate that from June 2005 to July 2006 the radiation therapist attrition rate was 10.5%, with a vacancy rate of 6.6% nationwide (RTAP, 2008). Shortages of radiation therapists is one of the primary factors that influence both long patient waiting times and decreased access to radiation therapy services. The following factors have been identified as contributors to the RT workforce problems that have been experienced:

- Lack of fulfilling career
- Lack of professional development opportunities
- Dissatisfaction with job role
- Increased workload
- Dissatisfaction with remuneration and working conditions
- Ability to fit work with family needs (Baume, 2002, pg. 59).
- 

To address this workforce shortage, nationwide intakes into the undergraduate training programs were increased (Table 1.2). Further investigation highlighted student attrition from the undergraduate program as a strong contributing factor to staff shortages, with the reasons for this needing to be investigated (Barton,

Peters, & Kenny, 2004). The lack of ability to retain students has been attributed to, students not having a clear idea of what would be expected of them on entry into the clinical environment and their poor experiences in a clinical facility during their undergraduate program (Baume, 2002). As a result of the increased intake the workforce vacancy rate has decreased considerably from 10.3% in 2000 to 6.6% in 2006 (RTAP, 2008). Student attrition is still a problem although its impact is less due to the large numbers being enrolled in the RT programs.



Note: Data was not available on the vacancy rate in 2001 or the attrition rate in 1994

Source: Radiation Oncology Tripartite Committee Survey 2000, Australian Institute of Radiography Surveys 1994-1999

**Figure 1.3 Radiation therapist vacancy and attrition rates 1994-2001 (Baume, 2002, pg.58)**

Currently in Australia, radiation therapists are expected to complete a three year Bachelor degree, followed by a Professional Development Year (PDY) completed in an accredited clinical centre or a Graduate entry level masters degree in Medical Radiation Science (MRS), with or without a PDY. The undergraduate degree program consists of two primary components; academic and clinical (professional). Professional placement assists to bridge the theory practice gap that exists between professional knowledge or theory, and multifaceted clinical practice (Winnie and Palmer, 2004). Nationally the clinical component consists of a total of 21- 26 weeks, broken down into 4-6 placements in a clinical radiation oncology department under the direct supervision of qualified radiation therapists. Table 1.3 details the professional placement schedule for students completing the MRS RT undergraduate degree program at the University of Newcastle.

**Table 1.2 Increase in the number of undergraduate places (adapted from Baume, 2002, pg.71)**

University	RT Places							
	2001	2002	2003	2006 *	2007 *	2008 *	2009 *	2010 *
Royal Melbourne Institute of Technology	19	34	34	-	-	28	27	40
University of South Australia	15	22	22	24	23	20	18	27
Queensland University of Technology	18	33	33	-	-	-	-	-
Newcastle University	20	35	35	54	74	72	55	61
Monash University	-	-	-	28G	24G	26G	21G	37G
University of Sydney	40	45	45	56	44	41 4G	70 10G	9G

\* Data gathered from contact with each University.

G = Graduate entry programs

Utilising reflective practice has been seen to minimise the effect of the theory practice gap by facilitating connection between these two poles in MRS training as it currently exists. The introduction of reflective journals into the clinical curriculum has also been highlighted as a method that may bridge this theory/practice gap, as well as being an effective tool for the development of critical thinking (Winnie & Palmer, 2004).

The University of Newcastle have incorporated the use of clinical reflective journals or personal critiques into their undergraduate program since 1995. The journals are completed by all students undertaking the professional placement course in five semesters of the degree. The journals are not graded as part of summative assessment; however completion of the journal is mandatory. The concept of reflection, reflective practice and reflective journaling are introduced to the students prior to the first clinical placement via a group information session. The journals attempt to encourage the student to invest in self reflective learning, assisting in the development of the skills necessary to become a reflective practitioner in the clinical world.

**Table 1.3 Number of weeks on each professional placement during the MRS undergraduate degree program, at the University of Newcastle before and after the program changes to first year in 2006**

	Semester 1	Semester 2	Total / Year
Year 1 pre 2007	2 weeks	5 weeks	7 weeks
Year 1 2007 onwards	No placement	4 weeks	4 weeks
Year 2	5 weeks	5 weeks	10 weeks
Year 3	5 weeks	4 weeks	9 weeks

As a tool to facilitate the development of reflective practice the effectiveness of the reflective clinical journals have not been assessed within the University of Newcastle curriculum. Additionally the journals have not been systematically audited for the insight they may hold into the experience of a student during clinical experience and how these compare with radiation therapists from around Australia. Nor how students experience and reflective ability varies with progression through the undergraduate program. To date assessment of the personal journals has been on a satisfactory or non satisfactory basis, if a journal was completed by the student it was deemed a satisfactory submission. They were collected with written consent and copied to de-identify them for the purpose of quality assurance and evaluation in relation to improvement of the program by the course coordinator.

### 1.3 AIMS

The initial aims of the research are to:

1. Complete a qualitative descriptive analysis (QDA) of the reflective clinical journals of radiation therapy students.
2. To assess the clinical journals for evidence of reflection and classification into reflective categories.
3. To assess any changes in the evidence of reflection and emergent themes as the students progress through the undergraduate program.

Results from aim 2 indicated a need for an intervention to assist students in their reflective writing ability. From these results a further aim of the study was developed:

4. Develop and validate a tool to facilitate reflective thinking for radiation therapists in the clinical setting.

## 1.4 OBJECTIVES

In order to achieve these aims, a series of objectives were set (Table 1.4)

**Table 1.4 Research objectives and associated aim.**

Objective	Associated Aim
Complete literature search and review	1 - 4
Define parameters for descriptive qualitative analysis	1
Define levels of reflectivity	2
Develop methodology for assessing levels of reflectivity	2
Complete purposeful sampling	1
Analysis journals for thematic detail	1
Develop reflective analysis tool	2
Analysis data for levels of reflectivity	2
Analyse results of coding for emergent trends	1 & 3
Develop reflective inventories	4
Validate reflective inventories	4
Test results for validity	1-4
Collate results	1-4
Develop discussion	1-4

## 1.5 SAMPLE AND SCOPE

### 1.5.1 QUALITATIVE AND REFLECTIVE ANALYSIS

This research seeks to complete a qualitative descriptive analysis and an investigation for evidence of reflection in personal journals, in three consecutive years of undergraduate MRS radiation therapy students, reflective journals. This study will only review data collected from a single cohort of MRS radiation therapy students from the University of Newcastle. These students enrolled in 2003, completed year 2 in 2004 and completed their final year in 2005 and provided a complete set of reflective journals from the each year of the program. The reflective journals were written by the students on completion of clinical

placements in radiation oncology departments across Australia. These journals were routinely collected and read for Quality Assurance purposes by the course coordinator, a total of 97 journals were completed in the above mentioned period and all of these were included in this component of the research.

### 1.5.2 TOOLS TO ASSESS AND ASSIST REFLECTION

The component of the research that aims to develop and validate reflective inventories or tools will require inclusion of data collected as part of a routine CPD program within a Radiation Oncology Treatment Centre (ROTC) within Australia. This CPD program was designed and utilised by PDY and qualified radiation therapists. Five radiation therapists participated in this research after being invited to participate at the commencement of the CPD program. A total of 14 inventories and 14 freeform journals were analysed. This data will be collected over a one year period during 2006.

### 1.6 LIMITATIONS

Since the data had been previously collected and was anonymous in nature the methodological frameworks suitable for the analysis of the journals was limited, as there was no opportunity to seek further insight into the findings from the original participants. If only poor quality data or data not rich in description of the student experience is available in the journals that form this research, there is no ability to gain additional information by approaching the cohort. Additionally, the anonymity of the data does not allow for validation of any themes that may be uncovered in the journals with the cohort, nor for these themes or changes in findings from the journals to be traced on an individual basis. Similarly any changes displayed as the students progress through the program can only be assessed as a cohort and not on an individual basis.

The task that the journals were originally produced for, formed part of the academic component of the clinical placement and this may affect the content of the journals, biasing them towards what the students feel the course co-ordinator wanted to see written in the journals (Paterson, 1995). Similarly experiential learning is an intentional process, although in many cases of formal education it

is mandated by the inclusion of assessment. Reflection and learning however, is a very private experience and under the control of the learner, and there needs to be a note made that the assessment involved in a learning situation can greatly affect the learners strategies during the process (Moon, 1999). For some students the element of assessment may impede their reflective writing ability whilst others may aim to write what is perceived as “reflective” whilst not undertaking the personal journey themselves.

The findings produced from the reflective analysis study are only relevant and applicable to students that graduated from the University of Newcastle, Medical Radiation Science, radiation therapy degree program in 2005, and not transferable or able to be generalised to other universities or health science degree programs.

The data collected for the validation of the Newcastle Reflective Inventories again is a small sample size due to the small number of therapists working within the ROTC and participating in the CPD program. Additionally the data and findings are only generalisable to radiation therapists.

## 1.7 ASSUMPTIONS

The assumptions made in the study can be grouped into those pertaining to the students and to the researcher. The primary assumption surrounds the production of the journals and inventories. It is assumed that all of these are written by the students in question and that the journals are written with no collaboration, hence the journals and inventories are the students own thoughts, written in an uninhibited manner. The assumption is made that regardless of the students ability to articulate their thoughts, their journals and inventories can all be assessed in the same manner for evidence of reflection. Not all students are able to articulate their thoughts in the same manner or to the same standard, while all students are exposed to the same external influences, such as teaching and resources to improve their writing at the same stage of their progression through the degree.

It is also assumed that the researcher has the potential to impose the following biases on the research being undertaken:

- The pre existing knowledge of the researcher may affect the interpretations of themes present in the journals. Emergent themes that are familiar to the researcher or align with the researchers own thoughts of the profession may be more readily recognised in the text. Whilst those not as easily aligned with the researcher may be less obvious to the researcher as the text is analysed.
- The bias associated with the knowledge of working with students on clinical placement within departments for many years. This could hinder a rigorous analysis as the researcher may have preconceived ideas of what experiences and thoughts are important to the students at different levels of their training and possibly affect the researcher ability to allow all themes to emerge from the text.
- The potential bias associated with the way the researcher may interpret findings or comments made in the journals, in relation to the profession. This may impact on the interpretation of the students journal in a more positive or negative manner, depending on how it aligns with the researchers views considering the dedication and passion of the researcher for both the profession and the research being undertaken.

In an attempt to minimise the effect these biases may have on the research, bracketing/reflexivity in the form of a reflective journal was incorporated. This allowed the researcher to identify and develop any preconceived ideas they may hold, as well as develop strategies to place them in abeyance. The journals were also independently assessed for both emergent themes and levels of reflection by independent coders.

## 1.8 SIGNIFICANCE/IMPORTANCE

### 1.8.1 QUALITATIVE ANALYSIS

By providing insight into the events that, undergraduate radiation therapy students value and believe impact on the success and quality of their overall clinical experiences, the findings of this study could provide valuable information

that may result in education policy or syllabus change in the future. Additionally the research can provide essential generic feedback to clinical centres for improvement of any student programs functioning within their departments, via professional publications and conferences. Together these can help to create a positive long term impact on staff numbers and cancer care delivery services, through increasing the quality of student clinical experiences and decreasing undergraduate student attrition rates.

### 1.8.2 REFLECTIVE ANALYSIS

This study will assess the effectiveness of clinical reflective journals within a degree program as a valid tool in promoting reflective writing by, identifying evidence of reflection illustrated within journals from the cohort of students. The assessment of the clinical journals for evidence of reflection and classification into levels of reflectivity will allow the effectiveness of the clinical journal as a tool for fostering reflection to be investigated.

### 1.8.3 DEVELOPMENT AND VALIDATION OF TOOLS TO PROMOTE REFLECTION

Development and validation of the Reflective Inventories for use as tools to promote reflective writing in undergraduate radiation therapy students and health professionals, could provide therapists' with the ability to improve reflective writing skills and in turn reflective practice in clinical and academic environment without draining staff and educator resources.

## 1.9 ETHICS

QA ethics approval was obtained for activities relation to aims 1- 3 of this thesis. An application for ethics approval for aim 4 of this research was approved by the University of Newcastle Human Research Ethics Committee, approval number H-2008-0274.

## Chapter Two

### Literature Review

## 2.1 CHAPTER OVERVIEW

This chapter provides an overview of cancer care and the role RT plays in management of the disease. The focus then shifts to educational changes in RT training, the role reflection plays and the theories of reflection in learning.

Reflection and health profession and health professional education is explored, followed by the literature around developing and assessing reflective journals.

This section of the research is supported by the following publications:

**Chapman N, Dempsey S, Warren-Forward H, Theory of reflection in learning for radiation therapists. *The Radiographer*, Vol 55 (2), pp 29-32, 2008**

**Chapman N, Dempsey S, Warren-Forward H, Workplace diaries promoting reflective practice in radiation therapy, *Radiography*, Vol 15 (2), pp166-170, 2009**

This chapter then discusses the qualitative analysis of student journals and is supported by the following publication.

**Findlay N, Dempsey S, Warren-Forward H, Developing a qualitative framework for analysis of student journals. *The Radiographer*. Vol 57 (2) pp 34-39, 2010**

Please be aware that some of the data in this literature review appears to be outdated, however all data presented is the most current available at the time of submission.

## 2.2 CANCER CARE

### 2.2.1 CANCER

The disease process of cancer involves the proliferation of cells in an uncontrolled manner. Cancer can be both benign and malignant in nature; benign tumours characteristically do not invade other tissues nor spread to other sites within the body; malignant tumours are known to invade surrounding tissue as well as metastasise to distant sites, forming new tumours ("Cancer in Australia 2008," 2008).

Cancer is one of the leading causes of death in Australia; Table 2.1 shows disease of the circulatory system as the leading cause of death in Australia, followed by malignant neoplasms (cancer) causing 29.5% of all deaths in 2008. Between 2004 and 2008 the number of deaths due to cancer has slightly risen (28.4 - 29.5%), unlike the large decline number of deaths associated with ischemic heart disease (33.7 - 36.9%) ("Causes of Death Australia 2008," 2010).

Cancer has a large impact on society with 100,514 new incidences in Australia during 2005, rising from 65,966 cases in 1991 ("Cancer in Australia 2008," 2008). Over the past 30 years the incidence of cancer in New South Wales (NSW) alone has risen substantially (Figure 1.12).

Years of potential life lost (YPLL) is another measure that demonstrates the impact of cancer in Australia. Years of potential life quantifies in years premature mortality for deaths occurring between 1 and 78 years of age, taking into account the age of the person at death. In 2004 the proportion of YPLL for malignant neoplasm from all causes of death was 30.4% for men and 43.6% for women. If the YPLL for malignant neoplasms is compared with those from other leading causes of death (Figure 2.1) it is clear why cancer in Australia is a serious health concern.

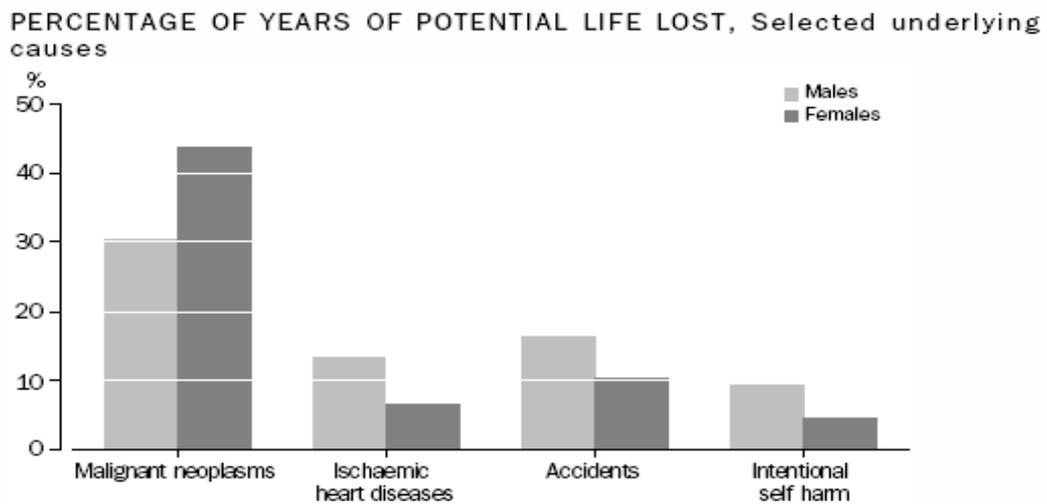
The modern treatment approach to cancer care is multidisciplinary, with medical, surgical and radiation oncology playing significant roles. Surgical oncology involves surgical resection or removal of the primary solid tumour with or without biopsy or removal of associated lymph nodes. Medical oncology utilises chemotherapeutic agents, hormone and biological therapies delivered to cancerous cells via a systemic platform (Rubin & Williams, 2001).

The complex nature of cancer requires an adaptive and evolving treatment approach be employed for each individual patient. RT involves the use of ionising radiation to cause irreparable damage to tumour cells, whilst minimising the dose to normal tissue of surrounding structures.

**Table 2.1 Summary table of causes of death in Australia 2008 ("Causes of Death Australia 2008," 2010p. 5)**

	Number	Proportion of total deaths	Median Age	Standardised Death Rates
	No.	%	Yrs.	rate
Certain infectious and parasitic diseases	1935	1.3	80.2	8.2
Neoplasms	42418	29.5	75.4	182.1
Diseases of blood and blood forming organs	503	0.3	80.7	2.1
Endocrine, nutritional and metabolic diseases	5900	4.1	81.1	24.7
Mental and behavioural disorders	6406	4.5	87.1	25.5
Diseases of the nervous system	5961	4.1	82.3	24.8
Diseases of the circulatory system	48456	33.7	84.6	197.6
Diseases of the respiratory system	11260	7.8	82.5	46.8
Diseases of the digestive system	4939	3.4	80.3	20.7
Disease of the skin and subcutaneous tissue	401	0.3	85.5	1.6
Diseases of the musculoskeletal system and connective tissue	1179	0.8	84.3	4.8
Diseases of the genitourinary system	3319	2.3	85.6	13.5
Certain conditions originating in the perinatal period	595	0.4	0.5	2.7
Congenital malformations, deformations and chromosomal abnormalities	609	0.4	1.0	2.8
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1243	0.9	63.9	5.4
External causes of morbidity and mortality	8804	6.1	52.3	39.2

This is to maximise the therapeutic effect and minimise treatment morbidities experienced by the patient ("Introduction to Radiation Therapy Practice Standards," 2004). The literature outlines that 50% of cancer sufferers should receive RT as either a primary modality or as an adjuvant combined approach, for treatments with both palliative and curative intent (Baume, 2002).



**Figure 2.1 Percentage of years of potential life lost, ("Causes of Death Australia 2004," 2006)**

### 2.2.2 DEVELOPMENTS IN RT

The development of RT techniques, and RT technology, over the past 35 years has evolved greatly (Table 2.2). The literature from 1978 describes the use of plain radiographs for treatment planning purposes and the use of simple lead shielding manually placed over areas of interest to reduce dose (Lokich, 1978). Similar simplicity is discussed by Edelstyn (1980) with the use of orthovoltage and cobalt units for the treatment of breast cancer and the dosimetric difficulties encountered with limited treatment and planning capabilities. In some cases reporting patients receiving 20% over the prescribed dose within the treatment area. In the 1970s the introduction of computed tomography (CT) had the potential to revolutionise the treatment planning process (Lichter, Fraass, Fredrickson, & Glatstein, 1983). Combining CT data and the clinical implementation of conventional planning computer systems in the 1980s enabled the optimisation of plans with beams of uniform dose or wedged dose beams

(Svensson & Moller, 2003). The decade to follow saw the emergence of Multi Leaf Collimators (MLCs) as a beam shaping tool, effectively individualising beam shapes, facilitating the emergence of Conformal RT (CRT) (Svensson & Moller, 2003). Techniques continued to evolve in the late 1990s with the introduction of the concept of Intensity Modulated RT (IMRT) (Palma, Verbakel, Otto, & Senan, 2010) made possible with computer controlled MLC leaves, as well as advancements in equipment enabling the more flexible choice of wedges in plan optimisation with Enhanced Dynamic Wedges (EDW) (Svensson & Moller, 2003).

**Table 2.2 A guide to changes in technology over the past 40 years**

Year	Technology or Technique in use
1959	Development of MLCs (Webb, 2001)
1960-1970	Cobalt units common (Edelstyn, 1980)
1970	Introduction of CT
1978	Plain radiographs for treatment planning Simple lead shielding (Lokich, 1978)
1980	Emergence of linear accelerators clinically
1980	Introduction of treatment planning systems
1980-1990	Clinical implementation of MLCs (Webb, 2001)
1988	Idea of IMRT emerged (Webb, 2001)
1994	First IMRT treatment was designed (Webb, 2001)
Late 1990s	Verification EPI
Early 2000	Image guided, gold seeds and BAT
2000s	Functional imaging such a SPECT and PET, as well as MRI used in treatment planning.
2006	Gated RT moving into clinical use.
2007	IMRT widespread clinical implementation
2007	Cone Beam CT and On Board Imaging Introduction
2007	Gantry optimised 3D planning
2010	Rapid Arc technology

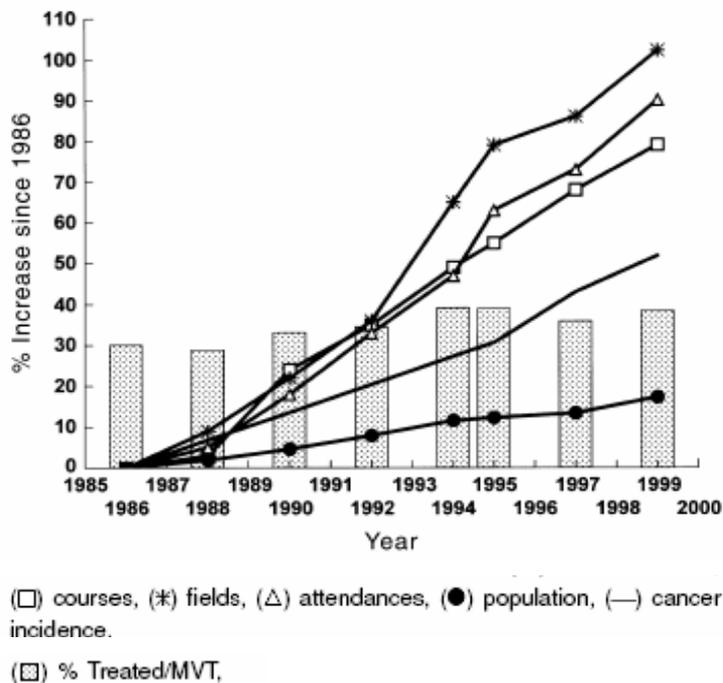
In 2006 some ROTCs experienced the clinical implementation of IMRT and the incorporation of imaging tools such as Computed Tomography (CT), Magnetic

Resonance Imaging (MRI), Positron Emission Tomography (PET) and PET-CT into routine treatment planning practices for some sites. Later in 2008-2010 the profession saw widespread implementation of Cone Beam CT and gantry optimised 3D planning software into clinical departments (Palma et al, 2010). The future has exciting new prospects with developments in advanced techniques such as tomotherapy, scanned photon beam therapy, breathing synchronised radiotherapy (BSRT), Rapid Arc (Palma et al, 2010) and adaptive RT all of which are complex techniques and insist on intensive quality assurance to ensure efficient and accurate implementation (Svensson & Moller, 2003).

Development in technology has provided the profession with the opportunity to expand and grow, these changes have already impacted on the profession making daily routine more complex and demanding ("Radiation therapy education survey results: establishing a professional database," 1998). Figure 2.2 illustrates the increasing complexity of radiotherapy and the impact this has had on workload. Demonstrating that although the percentage of patients treated has remained relatively constant, the number of times patients are being offered a course of radiation therapy and the number of times a patient is required to attend for treatment during a course has increased. A course consists of a number of treatments that occur daily over many weeks. The number of fields per treatment treated has also increased dramatically. This suggests the courses being treated have increased in complexity and workload.

This rapid change in practice has been well documented within the profession (Svensson & Moller, 2003; White, 2003) and it is recognised that the movement of change is affecting all healthcare professions and has been for some time (Fell, 1999). Hughes (1990) has identified the half life of health professional educational knowledge to fall between two and five years, hence the importance of practitioners to focus less on specific content and more on the underpinnings associated with clinical techniques, research methods, critical reasoning and logic. Additionally, as a result of clinical governance the patients expectations of cure have increased, as has their lack of acceptance in treatment failures and complications. This has been illustrated by a 10-15% increase in medical litigation cases (McNee, 2001). Supported by the evidence that an increased demand is placed on health workers as the public become more informed about

their treatment options and the development of patient expectations (Gambling, Brown, & Hogg, 2003).



**Figure 2.2 Percentage increase in population, cancer incidence, workloads measured as megavoltage (MVT) courses, attendances and fields in Australia as a whole between 1986 and 1999 (Wigg & Morgan, 2001, pg. 153).**

### 2.2.3 ROLE OF A RADIATION THERAPIST

The Australian Institute of Radiography (AIR) Competency Based Standards (CBS), the American Society of Radiologic Technologists (ASRT) Practice Standards and the Society of Radiographers (SOR) United Kingdom (UK) Statements of Professional Conduct, clearly outline the expectations of the RT profession. The elements of competency cover generic tasks, such as Occupational Health and Safety (OH&S), quality management/improvement and they also expand to cover the technical component of the profession.

The clinical practice or technical section of all the standards clearly defines the radiation therapists obligation to maintain competence and an up to date, continually expanding technical knowledge base. The standards also outline the

radiation therapists obligation in the realm of patient care and quality of life, inclusive of; physical, emotional and ethical considerations. Defining communication and patient care to encompass the spiritual, functional, social and educational domains. Radiation therapists must continually consider and balance this against the extremely technical component of their work, possessing knowledge that is both technical, scientific and humanitarian (Gambling, et al., 2003).

Radiation therapists play an important role in the development of students in the workplace (Fell, 1996; Stone, 2002). In the clinical environment training of undergraduate students, junior medical and allied health staff, on the basic concepts of RT and its role in multidisciplinary cancer care, is a responsibility of all radiation therapists. Acting as a mentors or role models for undergraduate RT students and colleagues is an integral element in the role of a qualified radiation therapist, and is essential for professional growth (Lewis & Robinson, 2003). As a result of including workplace training and education into a radiation therapists role and the increase in workload this produces, dedicated trainers within the profession have emerged. These dedicated trainers not only provide undergraduate support but also, the co-ordination of staff training, education, Continual Professional Development (CPD) and facilitation and often promotion of radiation therapist led research projects.

CPD is highlighted as an essential component to the development and maintenance of a professional within the field of RT ("Radiation Therapist Code of Ethics," 1998). There is a shift in the concentration of CPD from managers, to refocus on individual practitioners and their responsibility to maintain their skill and further their professional development (Hall & Davis, 1999). The AIR have made CPD mandatory for all AIR members from January 2005, making successful completion of a points accrual CPD program a requirement necessary to obtain a Statement of Accreditation, which is needed to obtain a license to practice (Smylie, 2004). The College of Radiographers in the UK have also outlined similar requirements for the MRS profession, and as a direct result there has been a documented increase in the number of radiation therapists undertaking postgraduate courses (Innes, 1998).

Professional bodies in the three countries discussed, clearly outline the importance of maintaining professionalism and promoting critical assessment of each individual professionals skill base. The AIRs most recent CBS outline in detail the standards and descriptors associated with critical thinking and evaluation (Table 2.3). The CBS maintain that; an awareness of performance, ability to assess performance, identify the need for improvement and seek opportunity to undertake training, is essential to maintaining standards ("Introduction to Radiation Therapy Practice Standards," 2004; Statements of Professional Conduct," 2004). The need to identify strengths and utilise them to the direct benefit of the patient and health team, as well as use critical thinking and professional judgement in daily clinical practice, are highlighted as integral elements of professional conduct. To facilitate this, as well as monitor and evaluate department guidelines to ensure their continual improvement, a CPD program with self determined goals can be employed. This will also support the expansion of knowledge and skill base to parallel the developing technology ("Competency Based Standards for Radiation Therapy," 1998; Introduction to Radiation Therapy Practice Standards," 2004). Essentially the radiation therapist has a multifaceted role encompassing general and staff management, patient care, education, understanding physics principles and their application, as well as becoming integral to the research process (Fell, 1996).

The complex and diverse daily requirements of a radiation therapist and the integral role of evidence based practice in daily decisions, has seen the emergence of role development/expansion within the RT profession (Newnham, 1999; White, 2003). Radiation therapists contribute to the evolving definition of their role as professionals, by constantly increasing their knowledge base and by assuming more challenging roles (Travis, 2002). In light of this role development, the UK has incorporated a four tiered career structure, including the levels of consultant and advance practitioner, where research and evidence based practice participation are essential criteria for the position (Gambling, et al., 2003). Included in this restructure was the introduction of assistant roles, to complete the lower level complexity tasks removing the workload pressures on practitioners, enabling a greater focus on complex tasks and further professional

expansion (McWilliam, 2001). Additional possibilities for role expansion have been indicated in the area of coordinating research trials (Fell, 1999), changing emphasis within the profession from the pure technical focus to that of a more existential one, where there is a shift towards ethical practice and compassion in routine clinical practice (White, 2003). This direction has led to radiation therapist participation/co-ordination of reaction clinics or treatment reviews and developing skills in complementary medicine (Fell, 1996; McWilliam, 2001).

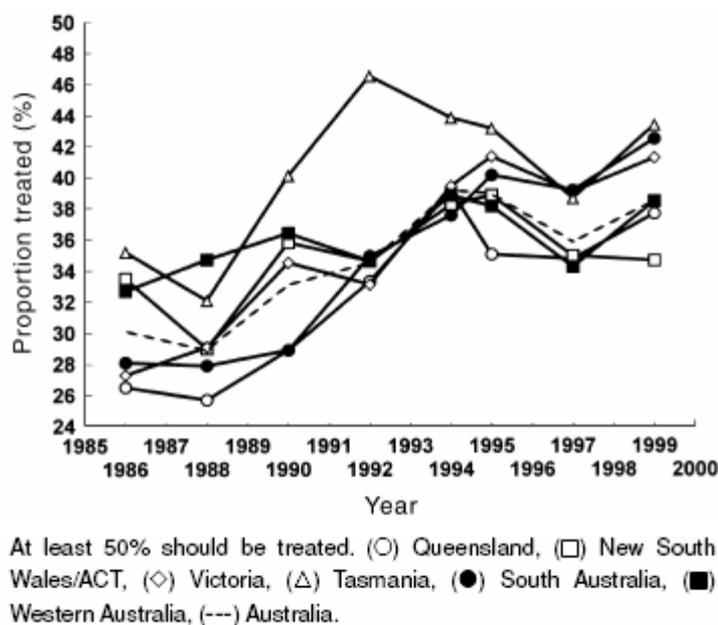
**Table 2.3 AIR CBS for critical thinking and evaluation ("Competency Based Standards for the Accredited Practitioner," 2005, pg 16.)**

Standard	Descriptor Name	Descriptor Details
<b>Critical thinking and Evaluation:</b> This standard defines the essential qualities of the Radiation Therapist to think critically, creatively and reflectively.	Formulation and Delivery	Assess clinical situations and determines the key issues and deliver a timely and quality outcome.
	Clinical Skills	Analyses and responds to problems related to patient treatment and care
	Analyse, Synthesise, Prioritise	Analyse and respond to problems of operation and management
	Research and Innovation	Initiate and evaluate research outcomes and incorporate into evidence based practise where relevant
	Evaluation and Quality Assurance	Evaluate and Implement processes and procedures for ensuring quality outcomes.

The significance of cancer in Australia and the important role that RT, hence radiation therapists play in health care services is well established. As is the state of technical change and the humanitarian burden that the RT profession experiences. All this coupled with changing professionalism as roles develop insist that radiation therapists employ the guidelines outlined by the ASRT, AIR and SOR in their every day practice, which are of self evaluation, further education and reflection.

#### 2.2.4 SHORTAGES IN RADIATION THERAPISTS NUMBERS

In 1966 the World Health Organisation noted that 50% of all new cancer cases would benefit from RT. Although the exact purpose of this figure as a gold standard or an upper level, is well debated, it is a generally accepted international standard (Baume, 2002). In June 2002 the findings of the Radiation Oncology Inquiry, A vision for radiotherapy report chaired by Peter Baume were presented. This inquiry reviewed the status of the profession on many fronts such as, staffing, training and equipment, to name a few. It highlighted that each year in Australia there were approximately 10,000 patients who did not receive radiotherapy, who indeed may have benefited from it. From 1985 to 2000 no state or territory in Australia achieved the 50% benchmark (Figure 2.3) Australia's percentage treated figures compares with those from around the world; Scotland in 1991 reported a rate of 38%, whilst 22 European countries reported a rate of 22% in 1990 (Baume, 2002). Australia's proportion of patients treated figures and the long waiting times for access to RT services were attributed to by the lack of radiation therapists, radiation oncologists and medical physicists (Barton, et al., 2004).



**Figure 2.3 Proportion of patient with invasive cancer (excluding melanoma) treated with megavoltage or Cobalt 60 machines from 1985-2000 (Wigg & Morgan, 2001, pg. 154)**

The shortage of radiation therapists was investigated in depth, with an increased attrition rate within the profession, an increase in number of facilities being operated and not enough radiation therapists entering the workforce, identified as key elements. The numbers of radiation therapists entering the profession was then examined; a small student intake into the undergraduate training program and student attrition were some key areas of interest in addressing the critical staff shortage. Accordingly the student intake across the country was increased; Table 1.2 displays the projected student intake for 2001 to 2010 nationwide.

The report highlighted that, there was little problem in attracting students to the undergraduate program, but there was a problem in student retention once enrolled in the program (Barton, et al., 2004). Difficulty in retaining students was attributed to two primary factors, firstly some students being unaware of what is involved in a career in radiotherapy, partly as a result of being unaware of the patient sample that they will be required to work with. The second factor was attributed to poor experiences in a clinical facility. The latter was identified to be a direct result of staff shortages and workload pressures in the clinical departments. The capabilities of departments to provide adaptive and well managed professional placements for undergraduate students were seen as a limiting factor, primarily due to lack of staff to facilitate the students and their increasing numbers (Baume, 2002). Accordingly dedicated RT educators were introduced into all public New South Wales (NSW) Radiation Oncology Departments. A small pilot study following the trial period allocated for the educators indicated that the RT educators did have a positive impact on the professional placements of undergraduate RT students within NSW (Brazel, et al., 2007).

The most recent RT workforce survey conducted in 2006 and published in 2008 shows the impact that the changes in intake and education has had on the staffing of the profession (RTAP, 2008). Since the last workforce survey in 2000 the profession has grown 45-50%, at the time of this report there were 1246 therapists filling 1163 positions, with vacancy rates falling from 10.3% to 6.6%. The report also continues to demonstrate the rapid growth of the industry showing a 22% in the number of linear accelerators and a 19% growth in the operating hours of these units since the 2000 report (RTAP, 2008).

### 2.3 CHANGES IN THE EDUCATION PROGRAM

Some universities have highlighted the importance of graduates being competent and prepared for practice in the clinical environment, especially in the rapidly changing climate that is currently being experienced (Edwards, Smith, Courtney, Finlayson, & Chapman, 2004; Shepard & Jensen, 1990). As a result there is a reported change in recent years of the delivery and content of health education programs, towards producing graduates that are; orientated towards lifelong and experiential learning, who are skilled as clinicians, administrators, educators, consultants and researchers. As well as the fostering of inter professional learning (Shepard & Jensen, 1990), credited with facilitating a multidisciplinary team approach to health care, by decreasing professional barriers (Morison, Boohan, Jenkins, & Moutray, 2003).

Accordingly, at a national level the Medical Radiation Science (MRS) course has undergone changes in response to developments within the profession and as a response to the increased expectations of graduates as professionals in a health care discipline. Each state in Australia governs its licensing of radiation therapists independently, accordingly the progression of the training structure varies slightly throughout the country. In NSW, initially the training to practice as a radiation therapist was a certificate course. It progressed into an Associate Diploma at TAFE (Technical and Further Education) in 1978. The course then evolved from an Associated Diploma at TAFE in 1988 and moved onto a University offered Diploma, further progressing to become a Degree program in 1992 (Milinkovic, personal communication, May 22, 2005).

#### 2.3.1 NEWCASTLE UNIVERSITY MRS RT PROGRAM

The MRS degree at the University of Newcastle utilises an integrated approach to health care education, merging the two main components of, theory and practice.

The program aims to develop:

- Lifelong learners
- General and specific understanding and skills in MRS
- Professionals who can practice in a multidisciplinary health care team

- Professionals who participate at an introductory level in profession research
- Self direction and self responsibility in learning
- Evidence based practice principles ("University of Newcastle MRS, Course Info 2005," 2005).

### Clinical Component

The MRS RT students at the University of Newcastle complete a total of 25 weeks of fulltime equivalent placement in a clinical centre over three years. The objective of each year's clinical course is outlined below.

Year 1 student clinical objectives are to:

- Describe the structure and organisation of an area health service, hospital and radiation oncology department
- Observe and identify the role and function of medical radiation practitioners and health care professionals in the delivery of health care
- Apply, participate and develop MRS skills at a suitable level to their current clinical experience
- Develop clinical reasoning skills
- Begin to develop and demonstrate a professional attitude with members of the public and other health care workers
- Begin to develop and apply communication skills with members of the public and other health care workers
- Practice within an ethical and legal framework
- Be able to evaluate and critique their work during their clinical period according to their level of experience (The University of Newcastle MRS RT Clinical Education Handbook, 2006, p. 8).

Year 2 and Year 3 student clinical objectives are to:

- Continue to apply, participate and develop MRS skills at a suitable level to their current clinical experience
- Continue to develop and demonstrate a professional attitude with members of the public and other health care workers
- Further develop clinical reasoning skills

- Further develop and apply communication skills with members of the public and other health care workers
- Practice within an ethical and legal framework
- Be able to evaluate and critique their work during their clinical period according to their level of experience (The University of Newcastle MRS RT Clinical Education Handbook, 2006, pp. 11-14).

Generic objectives are to:

Manifest those personal characteristics essential for the practice of excellent medical care including:

- An awareness of their own assets, limitations and responsiveness
- Responsibility, thoroughness, reliability and confidentiality
- Sensitivity to the needs of others and concern for other persons
- Consistently displaying a deep regard for others, thereby showing that caring and comforting are held to be amongst the appropriate tasks for medical radiation practitioners.
- Apply skills in interacting with patients to increase the probability of accurate imaging and treatment, and to decrease the anxiety associated with potentially threatening medical interventions.
- Adopt and apply the principles of best clinical practice through the use of critical reasoning, evidence based practice and reflection.
- Assist the nation and international community in advancing health care (The University of Newcastle MRS RT Clinical Education Handbook, 2006, pp. 3-4).

### Academic requirements on clinical placement

Fieldwork and clinical education have long been recognised in many fields of health such as occupational therapy and nursing as essential components (Edwards, et al., 2004; Mackenzie, 2002). Some believe that it is the most influential component of health science education, for the development of knowledge and skill (Chun-Heung & French, 1997). The practical component of the University of Newcastle degree program for RT is split into five Professional Placement units, run in the clinical environment; allowing integration of the theory components with the clinical setting and professional skills. Students are able to

not only connect the links between theory and clinical practice, but also engage in experiential learning both clinically and professionally (The University of Newcastle MRS RT Clinical Education Handbook, 2006). Completing this practical component does not ensure the student understanding, nor that the theory practice gap has been bridged (Milinkovic & Field, 2005). To what extent and the causes of the theory practice divide is unknown, however its negative effect on students learning is recognised (Harris, Dolan, & Fairbairn, 2001). These can include a negative effect on the professional socialisation of the student as well as inhibiting the implementation of an evidence based practice learning model; as evidence based practice requires that practice be grounded in theory, and research (Ousey, 2000). It is suggested that reflection on clinical experiences is one strategy that can assist in bridging the theory practice divide and hence is an important aspect of learning during clinical experience (Milinkovic & Field, 2005; Pierson, 1998). Student clinical can be used to not only teach practical and professional skills but to also encourage the students to reflect, providing skills to deal with complex situations they may encounter in the clinical setting as students and eventually qualified practitioners (Milinkovic & Field, 2005).

Whilst undertaking professional placement the students are expected to complete specific academic assignments and reports. A reflective diary has been incorporated into this academic work in the form of a 'Personal Critique'. The reflective journal was first implemented in 1995 by the program coordinator as a means to include elements of reflection into the very technical based clinical component of the degree, where previously the students progress was gauged only by a checklist of skills obtained. The journals were aimed at:

- Ensuring students grasp the range of their role and all its facets e.g. technical, patient, staff interaction and quality assurance
- Allowing students to identify achievements, limitations and areas where a learning need exists
- Providing a method of feedback for the course on the profession and the students interpretation of learning whilst on placement (Dempsey, personal communication, June 22, 2005).

The students are given the following set of instructions:

“Write a report assessing your achievements and progress in this block. Include new or different techniques you took part in or observed, your progress in communication skills and team work, any problems you experienced and how you feel these could be addressed. Do not make this a critique on the centre but address it to your own personal performance” (University of Newcastle MRS RT, Clinical Education Workbook, 2004, p.16).

An additional briefing session is provided to all the students prior to the commencement of the first professional Placement in first year. This group briefing addresses the task, acceptable formats for the journal to be completed in and instructions on how to write in the first person. It is highlighted that the journal is not academic work and hence prose; grammar and academic merit is not a primary concern. Possible content of the journal is discussed, outlining that the journal is not a critique of the centre, or the patients in the centre but of themselves in the clinical environment. Tools, such as questions to ask themselves when writing the journal are also given to the students e.g. When that happened how did you feel? Or when you smelt that how did that make you feel? (Dempsey, personal communication, June 22, 2005).

These journals do not form part of the summative assessment; however completion of the journal is compulsory. Feedback is not generally given on an individual or written basis, themes that emerged from the journals are discussed in a group debrief following the clinical placement.

### 2.3.2 UNIQUE CLINICAL ENVIRONMENT

There is a vast amount of literature that discusses issues known to affect health care students during their clinical placement. Patient interaction and empathy, increase in practical skill and professional knowledge, as well as concepts linked to making the theory practice connection, have been identified as issues that affect students whilst on clinical placement from professions including; nursing, physiotherapy, medicine and dentistry (Boyd, 2002; Landeen, Byrne, & Brown, 1995; Patton, et al., 1997; Pitkala & Mantyranta, 2004; Williams & Wessel, 2004; Williams, Wessel, Gemus, & Foster-Seargant, 2002; Williams & Wilkins, 1999).

However there appears to be a lack of published literature that focuses specifically on the clinical experiences of RT students. The environment that radiation therapists routinely work in, varies greatly from that associated with other nursing and allied health professions. The large technical element and its state of rapid change, coupled with the often challenging humanitarian facet of the profession provide a unique environment for radiation therapists to work in. Radiation therapists work in an intimate and unique team environment, constantly working in a pair and relying on colleagues for not only professional competence, but also for professional and emotional support. Hence it is not feasible to generalise the findings of studies such as those mentioned above with the experience of RT students whilst on clinical placements.

## 2.4 REFLECTION

There is an immense amount of literature that covers all aspects of reflection, including the reflective process and its influence in education and learning. Reflection is born from a constructivist perspective where learners are “believed to construct, through reflection, a personal understanding of relevant structures of meaning derived from his or her action in the world” (Fenwick, 2000, p.248). Research in the area of reflection is often strongly linked to “cognitive behavioural skills of self-monitoring, self-evaluating and self-reinforcing goal-orientated behaviours” (Kuiper & Pesut, 2004, p.385). There are a few prominent authors (to be discussed below) that are acknowledged as experts in the area and are heavily cited within the literature. Confusion often arises from the literature that surrounds reflection; it can originate from the many different models of reflection described in the literature that are intended for different fields and contexts, such as education, philosophy and psychology, with little overlap seen. Ruth-Sahd (2003) comments that it is often seen as an academic pastime to clearly define the concept of reflection. The extensive and interchangeable vocabulary present in the literature discussing reflection also contributes to the difficulty in understanding reflective concepts (Table 2.7, p71) (Mann, Gordon, & MacLeod, 2009). Kitchener (1983) discusses how terms including; reasoning, thinking, reviewing, problem solving, inquiry, reflective judgement, critical reflection, reflective practice and many more are used by authors, whilst discussing reflection in some form. A commonsensical and widely accepted description of

reflection is, a mental process “with a purpose and/or an anticipated outcome that is applied to relatively complicated or unstructured ideas for which there is not an obvious solution” (Moon, 1999, p 4), where the focus is on understanding of the event or experience (Henderson, Hogan, Grant, & Berlin, 2003).

Acknowledging three key elements to the concept of reflection; it surrounds the process of learning, is purposeful in its intent and address areas where there is no obvious solution and complicated processing is required (Moon, 1999).

Critical reflection is said to allow practitioners to make well informed action, develop a rationale for practice and enliven learning whilst allowing for emotional grounding (Hackett, 2001).

It must be acknowledged that the literature also presents an alternative strand of thinking in terms of reflection, built primarily around the work of Johns (1996).

The traditional definitions of reflection are focused on the cognitive knowledge about our practice. This alternative strand has moved the focus to being mindful of one’s self, in the many different contexts of experience and clinical practice. Where an aim of “accurate and undistorted self-knowledge” is obtained (Rolfe, 2006, p.595). However for the purpose of this study this is not the form or definition of reflection that is being investigated.

The following section (2.5) is a peer reviewed publication that provides an overview and details of the theory of reflection in learning. The paper outlines the origins and pioneers of reflections as well as placing it within the literature of experiential learning.

## 2.5 PAPER ONE - THEORY OF REFLECTION IN LEARNING FOR RADIATION THERAPISTS

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### **Abstract**

Practicing reflectively can assist the radiation therapist to monitor their work, foster professional growth and encourage currency of skills. Reflection is an attractive and desirable component to a radiation therapist's skill base. To provide radiation therapists the skills necessary to engage in reflection, they need a basic understanding of the theory underpinning reflection and reflective practice, and how they can be applied in the context of radiation therapy. This paper discusses the modern pioneers of reflective theory, as well as the concepts surrounding reflection and professional practice. The concepts central to experiential learning and the role reflection plays in the experiential learning cycle are described. This paper supports the role of reflection in the radiation oncology workplace and simplifies the theories of reflection described in the literature. It is the first step towards facilitating and supporting skill development in reflective thinking for clinical radiation therapists.

### **Introduction**

This paper discusses the theories and underpinnings of reflection in learning. It aims to clarify some of the concepts central to reflection and reflective practice. Simplifying the literature surrounding the theory of reflection and reflective practice will allow practitioners the opportunity to become familiar with the concepts central to reflection prior to being introduced to reflective frameworks and user guides on which to model reflective practice.

The radiation therapist (RT) is an integral member of a health care team in a radiation oncology department. RTs are responsible for the implementation of a radiation prescription as authorised by a radiation oncologist. The RT plays a

key role in the localisation of the disease to be treated, development of the treatment plan and delivery of the radiation therapy treatment. In addition the radiation therapist needs to consider patient care, radiation safety, quality assurance, legal and professional responsibilities ("Competency Based Standards for Radiation Therapy," 1998). The American Society of Radiation Technologists (ASRT) outline that, "professional judgment and critical thinking" ("Introduction to Radiation Therapy Practice Standards," 2004, p. 1) are important skills to display in daily practice when; assessing accuracy and appropriateness of treatment delivery, anticipating patient needs and being a valuable member of the interdisciplinary team in an ever changing and advancing environment. The role of the RT is rapidly evolving as technology and techniques advance. Development over the past decade have been considerable and there are strong indications that the coming years will continue this trend (Svensson & Moller, 2003). In order to stay current with changing techniques and emerging technology, as well as manage the varied and demanding role that is required of a RT, it is important to incorporate reflection into their everyday practice. Practising reflectively can assist to monitor practices, encourage professional growth and support maintaining currency of skills. It can allow the practitioner to generate knowledge about practice that is not available from other sources, to develop the artistry of their profession.

Although reflection is an attractive component to the health practitioners skill base, not all people have the ability to reflect and those that do have varying abilities (Boud, Walker, & Keogh, 1985). There are many models available to facilitate reflective practice. However before considering these health professionals need a basic understanding of the theory and principles underpinning reflection and reflective practice presented in the literature. There is an immense amount of literature that covers all aspects of reflection, the reflective process and its influence in education and learning. Confusion can originate from the many models of reflection intended for very different fields and different contexts; from education, to philosophy and psychology. Ruth-Sahd (2003) comments that it is often seen as an academic pastime to clearly define the concept of reflection. Confusion may also arise from the extensive and interchangeable vocabulary that the literature uses to discuss reflection. Kitchener (1983) discusses how terms including; reasoning, thinking, reviewing,

problem solving, inquiry, reflective judgement, critical reflection, reflective practice and many more are used by authors, whilst all discussing reflection in some form. This makes the review and discussion of the literature on reflection difficult. A commonsensical and widely accepted description of reflection is, a mental process “with a purpose and/or an anticipated outcome that is applied to relatively complicated or unstructured ideas for which there is not an obvious solution”, (Moon, 1999, p. 4) where the focus is on understanding of the event or experience (Henderson, et al., 2003). This acknowledges three key elements to the concept of reflection; reflection surrounds the process of learning, reflection is purposeful in its intent and reflection addresses areas where there is no obvious solution and complicated processing is required (Moon, 1999). Below is a discussion of some of the theories on reflection and the concepts that authors such as Dewey (1933), Habermas (1971) and Schön (1983, 1987) have developed, as well as the important role of reflection in the experiential learning process.

### **Theory of reflection**

Both Dewey (1933) and Habermas (1971) could be referred to as the modern pioneers of reflection, they have both contributed greatly to the development of reflection. Both authors believe reflection serves to generate knowledge, although they have developed their ideas in different context.

Dewey’s main concern was with the nature of reflection and how it occurs within an educational and psychological context. He uses many terms to describe reflection and its link to thinking. Insisting that reflection is not just a procession of conscious thoughts, (Hullfish & Smith, 1961; Moon, 1999) but rather a process that leads to resolve a problem that initially posed perplexity and required a combination of evidence and rationality to reach an appropriate conclusion. Hence, Dewey’s model details reflective thinking as being driven by purpose and intent to reach a conclusion.

Habermas primary concern was with the generation of knowledge and how this process occurs, with reflection being only one element that plays a role in the development of knowledge (Habermas, 1971). He questioned how do humans validate their knowledge, for example, how do they know that they know

something? Habermas describes the different ways of validating knowledge as; empirical observations, conventional knowledge, sharing through language and critical knowing. He was concerned with the role reflection played in defining or describing what we know, then challenging the given or accepted theories that have informed our existing knowledge.

## **Reflection and Professional Practice**

Most of the literature that surrounds the notion of reflection and professional practice, or the development of a reflective practitioner has been inspired by, or influenced by Donald Schön's work (Schön, 1983). It must be acknowledged that the work of Schön discussed below is no more tested or has no more claim to being right than any other work within the field. However his work has been a catalyst for investigation and thought into the relationship between theory and professional practice. His work has triggered interest in many contexts; theorists on professions, educators of professionals and also those whose primary interest is the specifics of reflection (Moon, 1999), which is the primary focus of the discussion that follows.

Schön's work focused on reflection, incorporating the affective and emotional component into the reflection cycle. (Ruth-Sahd, 2003) Schön believes that a gap exists between the formally accepted theories that guide practice and how the professional practitioner acts in daily activity. Suggesting that these accepted or 'espoused' theories are unable to guide professional practice, that the development of knowledge and practice is more linked to the development of professionals and their associated beliefs in their everyday practical environment (Moon, 1999). He believes practitioners are often able to deal with uncertainties that arise in daily practice without the use of espoused theories, but with 'know how' or professional artistry (Schön, 1983). When applied to radiation therapy, Schön's theory suggests, the knowledge and 'know how' that guides our daily practice is not always attributed to the well accepted theories of practice taught in a formal or informal environment. Rather to daily practice where problem solving of either a patient set up, a difficult treatment plan or working with a challenging patient can provide a learning experience that adds to a practitioners existing knowledge or professional artistry. Reflection is an essential element in this

learning experience and Schön describes two distinct forms of reflection, reflection-in-action and reflection-on-action.

### Reflection-in-action

A definition central to Schön's concept of reflection-in-action, is knowing-in-action. Schön succinctly conveys the concept of knowing-in-action in this quote, "When we go about the spontaneous, intuitive performance of the actions of everyday life, we show ourselves to be knowledgeable in a special way. Often we cannot say what it is we know..... our knowing is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff for with which we are dealing"(Schön, 1983, p. 49). This is extended into the professional arena when applied practically to a profession, for example radiation therapy. A RT may easily be able to recognise a family of symptoms that indicate treatment side effects needing physicians review and pharmaceutical intervention, or a patient behaviour that requires referral to psycho-oncology services. However in most cases not be able to accurately and on demand, provide a complete description of the side effects or behaviours. Although in radiation therapy most decisions are made with consideration to empirical data and evidence based practice, there are many daily decisions that are made, "for which he cannot state adequate criteria" (Schön, 1983, p. 50), or skills displayed that there are no obvious rules for. Even when utilising evidence based theories we are often relying on our tacit knowledge and judgements (Schön, 1983). This is the essence of knowing-in-action.

Reflection-in-action is the process that occurs when the result of an action does not accord with what was expected. It is the reflection on the unexpected outcome of an event that can then influence the actions of the practitioner in the next event (Schön, 1992). Reflection-in-action may not necessarily be a conscious process. For many expert practitioners this is a process that occurs as a part of daily practice. Incorporated into daily routine, RTs inherently practice reflection-in-action in many forms; as a means to assess the accuracy of a treatment set up, to problem solve unusual verification images or problem solve a difficult treatment plan.

### Reflection-on-action

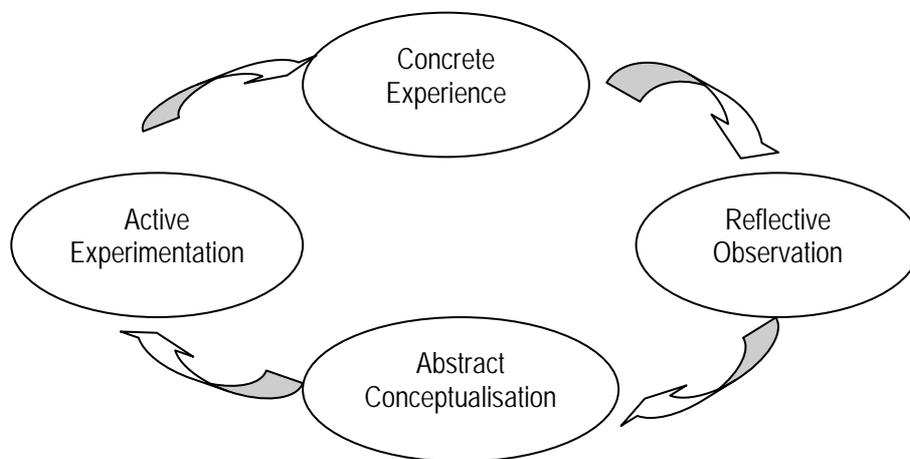
Reflection-on-action is the form of reflection that occurs after an event or action is complete, and is usually associated with verbal or written description. Aligning with Dewey's work on reflection, Schön accords reflection as a result of a situation with an unexpected outcome. The process of reflection-on-action can be illustrated in the events that may occur in a radiation oncology department when RTs are viewing poorly aligned patient verification images from an otherwise well aligned and within tolerance treatment set up. Some criticise Schön for neglecting to acknowledge the role of imagination in reflective practice, especially those who view the combination of reflection-on-action and imagination, as vital in preventing many errors and clinical incidents occurring in health professions (Moon, 1999). It is the process of reflection-on-action that can be employed in staff debriefs or when analysing an event that has occurred either as an individual or group.

There is a great amount of debate that has arisen from Schön's work on reflection-in-action, it generally surrounds the timing of the reflective process with practice. Moon (1999) reports how Schön contradicts himself in his work of 1987 and 1992, where initially he associates the stop and think idea with reflection-on-action and later with the concepts of reflection-in-action. Regardless, both reflection-in-action and reflection-on-action clearly describe the forms of reflection that can occur as part of daily clinical practice and serve as an essential element to learning at work, enhancing a radiation therapists professional artistry.

### **Reflection and Experiential Learning**

Experiential learning can be defined as the integration of learning that has come from a practical situation. Similar to the literature on reflection, experiential learning seems to be an overused phrase and there are varying views as to what constitute experience (Ladyshevsky & Edwards, 1999). Some definitions are quite broad, focusing on educational philosophies, whilst others such as Henry (1989) include; learning contracts, group discussions, counselling and journal writing. Experiential learning can also include the integration of material presented to a learner, such as in written or oral format as experience ( Usher, 1985).

Kolb's work has been very influential on the development of adult education theory (Bond & Spurrirt, 1999). He defines experience as action that involves physical engagement and experiential learning as a process that links education, work and personal development. Kolb's (1984) learning cycle (Figure 2.4) is a self-perpetuating process identifying four phases in the experiential learning process; concrete experience, reflective observation, abstract conceptualisation and active experimentation. The learner is able to enter this cycle at any stage and continues from one learning experience to the next. The quality of reflection and hence the ability to reflect is essential to ensure the learning cycle progresses onto the next phase (Kolb, 1984).

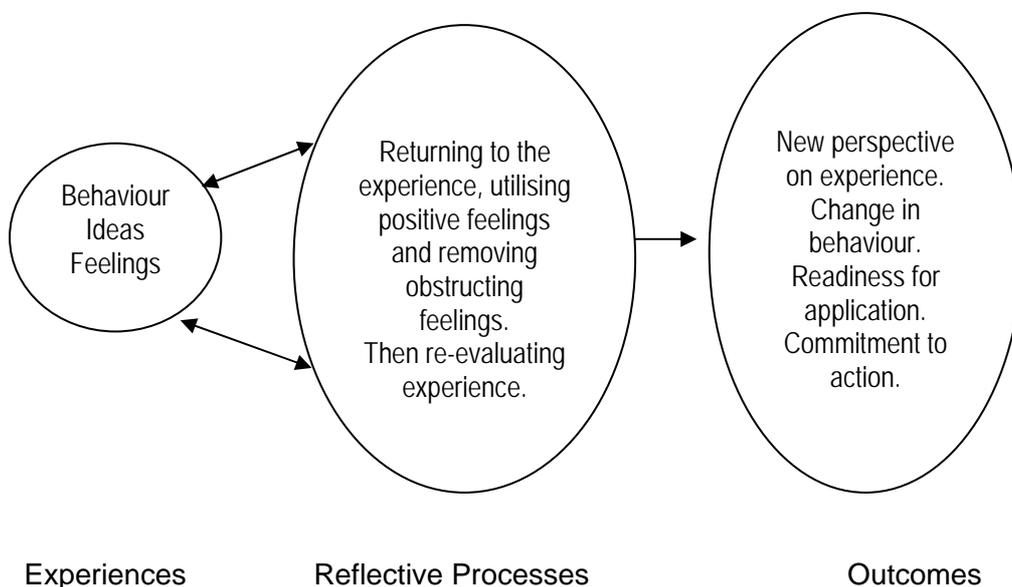


**Figure 2.4 Schematic view of Kolb's learning cycle (Kolb, 1984)**

The role of reflection in experiential learning is congruent with Schön's definition of reflection-on-action and can easily be assimilated into the Kolb learning cycle. Kolb's primary concern was not reflection, however there are some prominent authors in the literature that expand on the use of reflection in Kolb's learning cycle (Boud, et al., 1985).

Reflection can take place on both a conscious and subconscious level, Boud (1985) explains that for learning to take place it is important that the learner be aware of their reflective processes in order to evaluate them and make choices about what they may or may not do as an outcome of their experiences. The model by Boud shown in Figure 2.5 was developed to demonstrate the process of reflection in learning.

Boud (1993) adds to Kolb's model of experiential learning outlining the process to include cognitive and affective elements. Here learners undertake a process of reflection by attending to feelings and re-evaluating their experience as they move towards integrating their new knowledge. This model details a process where a reflective learner must actively use knowledge gained from past experience, describe their experiences, discover and consider their emotions and attitudes associated with the event, then create order and be able to make sense of these new ideas and information gained (Davies, 1995). Boud also recognises that not all learners will be equally skilled in each sector and often least equipped in the realm of reflection, hence some may need more or less assistance to complete the reflective phase. Boyd and Fales (1983) substantiate this process by defining reflective learning as the process triggered by experience where one internally examines and explores issues of concern, resulting in a clarified meaning and a changed conceptual perspective (Kok & Chabeli, 2002).



**Figure 2.5 Boud's Model of reflection in the learning process (Boud, et al., 1985, p.36)**

Reflection in the cyclic experiential learning process is a valuable tool that can assist RTs to learn from past experience, generate knowledge and alter future practice aiming for optimal patient care and radiation therapy treatment delivery. For example, a RT may reflect on the success of a complex patient treatment plan, identifying the beam configuration, methods of optimisation and resultant distribution and critical structure doses. In doing this the RT generates knowledge on the characteristics that contribute to a successful treatment plan for the specific site and can use this knowledge to apply to future treatment plans in the same anatomical region.

Atkins and Murphy (Atkins & Murphy, 1993) go one step further to define a model of the reflective process detailing the skills required to complete the reflective cycle Figure 2.6. For each stage of the reflective process they have identified and outlined, in everyday language, the personal journey that the practitioner undertakes to complete each stage with contextualised examples at each of these stages for clinical radiation therapists.

## **Discussion**

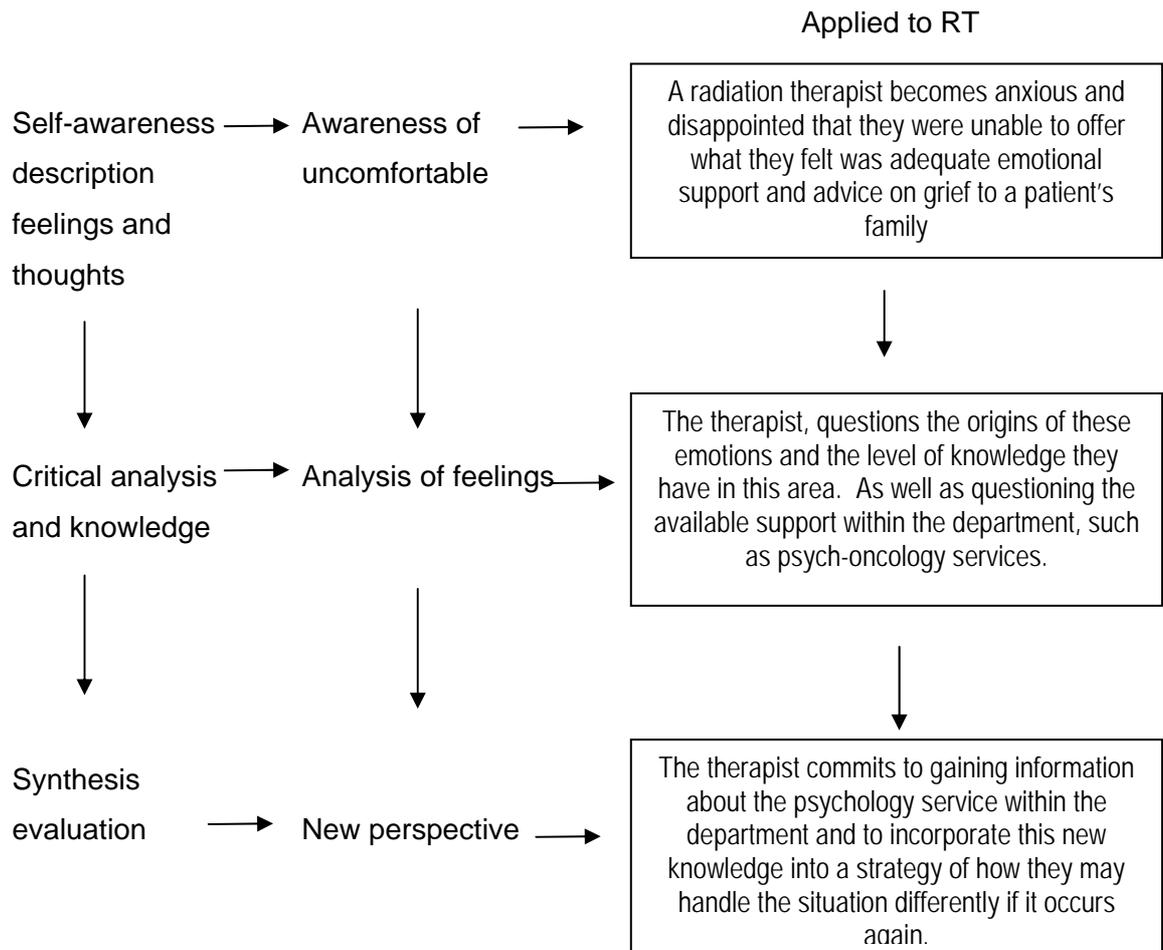
All these models assimilate and quantify the role of reflection in experiential learning, demonstrating that reflection plays a vital role in the experiential learning process. In some cases the authors are not making huge statements on the theory of reflection, but more cementing reflection as an essential element in the experiential learning process. With the constantly evolving technology in the radiation therapy workplace and the demanding multifaceted tasks that RTs face in routine daily practice, it is well accepted that currency of skills is essential. With opportunities for formal education in a radiation oncology department limited by resource, learning through practice is key to maintaining technical skills and evolving techniques towards best practice. With reflection being firmly embedded in the experiential learning process, it seems important to foster and encourage reflection for RTs.

By gaining some understanding of the fundamental principles of reflection, the core practices associated with reflection can be more easily incorporating into health professionals everyday practice. This may be achieved by either improving their current reflective practice skills or assisting them to understand

reflective principles and encourage them to initiate the process of reflection.

There is no doubt that incorporating reflection as part of professional practice in a health care profession such as radiation therapy will promote experiential learning, and also facilitate the constant evaluation of everyday practices.

Allowing for individual RTs and the profession to consistently move towards a best practice model.



**Figure 2.6 A model of the reflective process, including the skills require for reflection, (Atkins & Murphy, 1993, p. 1191) adapted to describe each stage to a clinical radiation therapy example.**

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## 2.6 MODELS OF REFLECTION

There are many models of reflection available in the literature below is a summary of the three popular authors that have been well used and cited in the field of reflection in health and health education (Mann, et al., 2009).

### 2.6.1 VAN MANEN MODEL

Van Manen's tool describes three levels of reflectivity, appropriately named in Ushers study (2001) as technical, theoretical and critical. The technical level describes the practical application of technical knowledge to reach a given endpoint, where there is no allowance for conflicting principles or a variation in technical approaches. If confusion or lack of clarity is present the next level of reflection would be required, the theoretical. At the theoretical level Van Manen describes that each clinical decision would be based on the analysis and processing of experiences, meanings, perceptions and presuppositions, to provided direction for practical action. Finally the critical level, is where the practical addresses itself through reflection, with consultation to the impact on institutions, and authority of each situation (Van Manen, 1977). Usher's (2001) study confesses its limitations only in its lack of ability to assess prior writing or reflective skills using this method. However no validity measures or further discussion of the tools limitations were outlined.

### 2.6.2 BOUD'S MODEL

Boud's model is based on three stages, constituting six steps or levels of the reflective process as outlined in Table 2.4 (Boud, et al., 1985).

### 2.6.3 MEZIROU'S MODEL

Mezirow was interested in how we form our assumptions about the world we live in. He discussed how one of the methods of developing the schemas that help form our assumptions is via critical reflection. Mezirow (1990) describes that reflection is a process that involves critically assessing either the content or process of an experience in an effort to derive meaning from it. He categorises the reflective process into Content, Process and Premise reflection. Where

Content reflection and Process reflection questions meaning schemes, and premise reflection has the opportunity to transform them (Table 2.5) ( Williams, 2001).

When describing levels of reflection Mezirow classified people into one of three categories: Non reflector, Reflector or Critical Reflector. The non reflector was categorised as one who shows no levels of reflection (Table 2.6) .

**Table 2.4. Boud's levels of reflectivity (Boud, et al., 1985).**

Stage 1	Level 1	Stage one considers that as an individual undertakes the process of reflection, first they return to experience. At this stage the individual is able to recollect the experience and replay it in their mind or written format, allowing all the events and reactions, of themselves and those involved to be considered.
Stage 2	Level 2	Stage two involves attending to feelings, in this stage the importance of acknowledging and dealing with the emotions that an experience evokes is discussed. Hence harnessing the power of positive emotions or setting in abeyance the barriers that may accompany negative emotions is essential to this stage.
Stage 3	Level 3	Association, during this stage feelings and knowledge for the experience are assessed for their relationship to pre existing knowledge and feelings of a relevant nature.
	Level 4	Integration, involves the process of assessing whether the feelings and knowledge are meaningful and useful to us, bringing together ideas and feelings.
	Level 5	Validation, requires the individual to determine the authenticity of the new feeling and ideas that have emerged.
	Level 6	Appropriation, is the final stage where the process of making the knowledge our own occurs. Where the individual appropriates the knowledge into ones identity and in some cases can make a significant impact on their lives.

**Table 2.5 Types of reflection as described by Mezirow (Williams, 2001)**

Type of Reflection	Description
Content Reflection	The content or description of an issue or experience is examined.
Process Reflection	This type of reflection involves examining the problems solving strategies that were employed in a situation.
Premise Reflection	This is often referred to as critical reflection. It is the most complex of the three reflective types and involves asking the question "why?" It is essential to facilitate critical reflection so that standard practice is not taken for granted and that previous knowledge and everyday assumptions are challenged.

**Table 2.6 Mezirow's three categories for reflectors (Kuiper & Pesut, 2004, p.385)**

Category	Definition
Non Reflector	Total absence of reflective thought.
Reflector	Where there is an awareness of judgements, evaluation, descriptions, evaluation of assessment and assessment of decisions.
Critical Reflector	This level includes the assessment of the need for additional learning and well accepted practice is not adequate and that change to process and perspective may be needed.

#### 2.6.4 MORE MODELS OF REFLECTION

The sections above have described some of the prominent authors surrounding models and levels of reflection. There are many other authors that have since developed varying models of reflection for varying contexts however they will not be discussed in depth here. The nursing literature makes reference to the frameworks of Driscoll (1994; 2001), Johns (1995), Hodges (1996) and Gibbs (1988) all of which have similarities and overlaps with the models and frameworks presented above, that have been revised and used successfully in the field of nursing.

## 2.7 REFLECTION AND HEALTH PROFESSIONALS

Reflective practice in health care has been reported to facilitate a patient focused model of care (Davies, 1995) and is widely promoted in health care professions (Sim & Radloff, 2009). Utilising reflection in professional practice can assist in not only currency of skills and learning through work but also the development of a therapeutic relationship with the patient (Sandras, 2009).

Practising reflectively requires the practitioner to examine both espoused theories and theories in use (Kinsella, 2001). Cole (2005) succinctly describes its practical application and importance in the health care setting;

“The material on which one reflects is drawn from practice; the outcomes that one derives from that activity should then be fed into practice with the intention of improving it. The experience of reflective practice will have generated observations, analyses and proposed actions. If the opportunity is not taken to make the essential connection between reflection and action, then the whole exercise will feel like little more than an elaborate paper chase” (Cole, 2005, p.19).

Unfortunately reflection is not a spontaneously initiated process and requires health professionals to actively engage themselves in the activity of reflection (Hyrkas, Tarkka, & Paunonen-Ilmonen, 2001; Levett-Jones, 2007; Mann, et al., 2009). Engaging consciously in reflective practice is not something that practitioners will need to do as an everyday part of their practice or every time they are engaged in some form of learning process. Research has suggested that when a mental process is used repetitively it often becomes more efficient and automated and it is when a process produces something unexpected that the practitioner will be forced to engage the conscious level of reflective learning and practice (Ertmer & Newby, 1996).

Reflection and reflective practice has been popularised over the past decade in the healthcare setting (Mann, et al., 2009). As a result some criticise it suggesting overuse has made the process of reflective practice devoid of meaning in some cases (Atkins & Murphy, 1993; Hyrkas, et al., 2001). There is also a lack of empirical evidence to support the correlation between reflection and

its effects in healthcare practice such as, bridging the theory practice gap, increasing the practitioners ability to reflect and ultimately its impact on patient outcomes (Mann, et al., 2009; Newnham, 1999; O'Donovan, 2006; Sandras, 2009). Stuart describes a reflective practitioner succinctly as being able to see, “with ‘new eyes’ at ourselves and what we do, and especially, reflect on the implications of what we see, so that we can create ‘new landscapes’ in the form of concepts, attitudes and good professional practice” (Stuart, 1998, p 646). It is this element of subjectivity to reflection and reflective practice that does not allow it to be explored by a rationalistic inquiry such as a large scale empirical study or trial (Hargreaves, 1997; Mann, et al., 2009; Palmer, Burns, & Bulman, 1994). Others reject the lack of empirical evidence, suggesting reflective practice affords us the ability to examine our beliefs and attitudes in dealing with patients, that it is highly intuitive and personal, making it a difficult area to investigate with scientific rigour (White, 2003).

Section 2.8 is the second peer reviewed publication from this body of work. The paper on workplace diaries and promoting reflective practice covers the areas of defining reflective practice, reflective practice and RT and CPD . The paper also provides simple and pragmatic ideas on how to develop reflective diaries in the workplace and evaluation them for evidence of reflection to promote lifelong learning.

## 2.8 PAPER TWO - WORKPLACE DIARIES PROMOTING REFLECTIVE PRACTICE IN RADIATION THERAPY

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### **Abstract**

Competency standards usually describe that radiation therapists are expected to display characteristics of reflective practice. Many radiation therapists may be unequipped to undertake reflective practice or produce evidence of reflective practice due to limited understanding of the process. There are many models to guide practitioners in their reflective journeys, however the literature describing reflective practice can appear confusing. This paper will discuss the role of reflective practice, provide a definition for reflective practice and define concepts central to reflective journaling or workplace diaries. The paper will offer practical advice to increase radiation therapists knowledge and skills in the use of reflective workplace diaries.

### **Introduction**

In order to stay current with the changing techniques and emerging technology and the expansion of roles it is important that radiation therapist's development a commitment to lifelong learning (LLL) and continuing professional development (CPD) in their everyday practice (Fell, 1999; Hughes, 1990; Radiation therapy education survey results: establishing a professional database," 1998; Svensson & Moller, 2003; White, 2003). Common methods for undertaking LLL and CPD can be via structured programs, whilst a complementary approach is the incorporation of self guided reflective practice and thinking. Practising reflectively can assist the practitioner to monitor aspects of their practice, encourage professional development, personal growth and to evaluate the currency of their skills. One method that can be used to document reflective thinking is by using a written reflective journal.

Although a small amount of literature describes the informal reflective nature of daily radiation therapy practice, not all practitioners are able to reflect and certainly not to the same level (Paterson, 1995). Practitioners can improve their skills in reflective thinking, writing and ultimately reflective practice through education and awareness of the concepts central to reflective practice and frameworks available to guide reflective journaling.

The purpose of this paper is to review the literature on reflective practice and frameworks for reflective journaling in allied health and nursing, and to provide a guide for reflective journaling or workplace diaries for radiation therapists. This will be done by discussing the role of reflective practice, as well as define concepts central to reflective journaling or workplace diaries. Finally the paper will offer practical advice to increase staff knowledge and skills in the use of reflective workplace diaries.

### **Defining reflective practice**

To encourage and foster reflective practice as a self learning tool in the professional practice setting there needs to be a definition that radiation therapists can use as a starting point. There are three key elements to the concept of reflection; reflection surrounds the process of learning, reflection is purposeful in its intent, and reflection addresses topics or problems where there is no obvious solution and reflective processing is required (Moon, 1999). The literature presents an array of definitions for the process of reflection as demonstrated in Table 2.7. The authors of this current paper have defined reflective practice as:

“Involving self, a process that is undertaken in response to a positive or negative event that may be initiate consciously or subconsciously, that requires analysis to provide an answer or insight.”

### **Radiation therapy clinical practice and reflection**

There is little literature that discusses the concepts and processes of reflection within radiation therapy, compared to the amount of literature detailing the use of reflection within the nursing profession. Like most professionals those working in

Medical Radiation Science (MRS) have the potential to become habitual in their practice. Baird (1996) accurately describes this repetitive state of practice to be a 'non-learning' situation. To avoid becoming entrapped in this mode of practice, Baird highlights that it is essential for practitioners to be aware and in some cases critical of their thought process (Baird, 1996).

**Table 2.7 Definitions of reflective practice**

Author	Definition
Jarvis (1992)	Reflective practice is more than just thoughtful, through the reflective practice, thoughtful practice has the potential to be turned into a learning situation where future practices can be altered as a result of the process.
Boud (1985, p. 19)	"those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding"
Moon (1999, p. 4)	"with a purpose and/or an anticipated outcome that is applied to relatively complicated or unstructured ideas for which there is not an obvious solution"

Newnham (1999) discusses the advantages of reflection in the radiation therapy field and the ways in which reflection is already integrated into daily practice. He highlights the importance of radiation therapists knowing and feeling confident in their specialised knowledge especially on a multidisciplinary stage, suggesting that a lack of reflection may have inhibited this discovery in the past.

Benefits of incorporating reflection into radiation therapist's professional practice can include:

- Introduction of a structured tool or process for therapists to express radiation therapy knowledge of everyday practice
- Enabling therapists to share knowledge with others (Newnham, 1999) to benefit practice, the profession and patient outcomes
- Enabling individuals or groups to reflect, verify and examine clinical actions, optimise work practice, improve inter-professional relationship

- Incorporating formal or structured reflection into the clinical environment that allow techniques and developments to be constantly evaluated and adapted, promoting best practice (White, 2003). In daily decisions radiation therapists are constantly and repeatedly evaluating clinical parameters as indicators of accuracy in highly complex situations
- Providing a method to review or improve decision making abilities
- Exploring areas of special interest where advanced practice may occur and
- Realising career desires and aspirations allowing for career mapping or planning.

All radiation therapists decisions in the areas of planning, treatment and simulation are subject to peer reviewed quality assurance assessment, which may indicate that this repetitive, yet informal and mostly undocumented reflective practice environment may be unique in the health profession (Newnham, 1999). In addition to these highly clinical and empirically based decisions there are many elements to daily radiation therapy practice that are centred on the implicit knowledge that only comes from heuristic experience (trial and error). It is in these decisions that cannot always be answered by empirical evidence, nor rationalisation and where there is no obvious answer, that tacit knowledge (knowledge held in the mind that cannot always be easily accessed) and the use of reflection to access it, is vitally important in the practice of radiation therapy. These decisions alone may not have large clinical impact, they are more often than not decisions concerning patient stability, localisation problems, difficult treatment plans or a puzzling patient presentation, but all have an impact on workflow and ultimately patient experience. It is the role of reflection in these situations that White (2003), suggests could support existing practice and if necessary provide a process to facilitate change.

### **CPD and reflection**

CPD is essential to the currency of clinical skills. It can take on many forms, one of which is structured formal education such as post graduate academic programs, conferences and national/international courses. Structured CPD can also include in-service training and workshops offered within departments. More informal CPD can include debriefing sessions, brain storming exercises and

learning through daily work. Often informal CPD is on an individual basis and can include journal reading and workplace diaries or journaling.

Completing a professional journal or workplace diary is a very personal and individual form of reflective practice. These journals can be based around one of the many reflective models available in the literature or very informally written in the preferred style and format of the individual. There has been much focus on how structured reflection can be incorporated into CPD as a means to enhance and maintain reflective practice in the clinical environment. The Australian Institute of Radiography have incorporated reflective journaling as an element of the professional portfolio program ("Guide to AIR Continuing Professional Development," 2007).

Similar to other allied health care professions, there is a lack of any large scale research into the ability of reflective frameworks to increase a professional's ability to be reflective or become a reflective practitioner. However, reflective practice affords the ability to examine our beliefs and attitudes in dealing with cancer patients and working in the cancer setting, suggesting that reflective practice is a highly intuitive and personal process. This subjectivity makes reflective journaling difficult to investigate with historic quantitative methodologies (White, 2003), and cannot realistically lend itself to a rationalistic inquiry such as a large scale empirical study or trial (Hargreaves, 1997; Palmer, et al., 1994). Heath (1998) describes the benefits of introducing structured reflective models as unlikely to be quantifiable, however anecdotally he believes practitioners are able to make substantial professional progress with limited reflective practice exercises.

### **Reflective journaling in radiation therapy**

Journaling or workplace diaries is not the only method available to facilitate reflection, however, in radiotherapy departments where staff and resources are often stretched, journaling to facilitate reflection may minimise the burden on resources (Milinkovic & Field, 2005). The literature discusses three approaches to reflective writing in clinical practice: reflective journals, significant event analysis and portfolios. There is significant overlap between all these techniques (Henderson, et al., 2003), hence this paper only discusses reflective journaling.

Reflective journals can be completed by health professionals at any interval, daily, monthly or randomly. They are an ideal way for them to be actively involved in their learning (Milinkovic & Field, 2005). Typical academic requirements such as spelling, grammar and syntax assessment are seen as less important, hence enabling those that may be burdened with the restraints of academic prose the freedom to tell their story without criticism (Paterson, 1995). Writing is the closest form of communication to natural speech. Often people are able to write and allow their thought to flow in an uninhibited manner, it is this articulation of thought that is said to promote learning and skill development (Kerka, 1996; Murphy, 2004; Usher, et al., 2001).

A vast amount of literature has been written over the past three decades that discusses the use of journaling or reflective assignments as a tool to promote reflective thinking skills in the fields of nursing, medicine and allied health sciences (Paterson, 1995; Williams, et al., 2002). Reflective journals are seen to allow health care workers to record events, document their reactions to them and how this may effect their future practice (Williams & Wessel, 2004); as well as explore changes in their attitudes and often identify what it means to be a professional (Winnie & Palmer, 2004), facilitating them to become autonomous self directed learners (Harris, et al., 2001). There is no consensus that structured reflective models will provide an increase in reflective practice in clinical situations compared to less formal methods of reflection (Burnard, 1995; Mackintosh, 1998), although some authors insist that for reflective writing to assist in learning it is essential to “set parameters or rules for writing” (Rolfe, Freshwater, & Jasper, 2001, p. 43).

### **Starting a reflective workplace diaries**

Many clinical health professionals are often reluctant to begin writing reflective journals because many do not see the value in writing things down as they are predominantly “doers” and their primary mode of communication is verbal (Rolfe, et al., 2001) and are unsure how to initiate the process. In everyday practice health practitioners talk to each other, talk to their patients and their families. It is important to remember when promoting reflective journaling the assumption is made that the practitioner is able to reflect, willing to reflect and also willing to make changes as a result of this reflection. If the concepts surrounding reflection

and reflective journaling are simplified and its relevance to clinical practice clearly described, more radiation therapists may be interested in undertaking it as a CPD activity.

Reflective workplace diaries can be completed at any interval; daily, monthly or after a significant event that the practitioner wants to write about. The length of the entry may vary from a few lines to pages, depending on the topic and impact it had on the author. This diary does not have to be completed in a specific format, it could be a small notebook, loose leaf paper or in electronic form. Stimulus for completing a diary entry can originate from many events, some examples include:

- A patient interaction
- A workshop or conference attendance
- A change in work location due to roster change
- An interesting conversation with a colleague, and
- A critical incident.

By asking simple questions such as, what happened and why? how do I feel about it? what have I learnt from it? The practitioner will be able to begin exploring the topic of the entry in a deep and personal manner.

### **Reviewing your workplace diaries**

It is unrealistic to expect a large cross section of therapists to be skilled in writing reflectively and then reviewing their work. It is important however for practitioners to review their writing as a means of gaining feedback on their development as a reflective writer and for improvements to clinical practice.

One simple model that can assist the review of reflective writing is the work of Boud, et al,(1985). This model defines and describes the stages of reflection that could be easily adapted to a personalised framework to support the review reflective journaling in professional practice

**Table 2.8 Guide to reviewing reflective workplace diaries . Adapted from the work of Boud et.al.(1985)**

**Level of Reflection: Describing the event or experience.**

Cue: Recollect the experience and replay it in their mind or written format, allowing all the events and reactions, of themselves and those involved to be considered.

Example: "In planning, I was given a patient's plan to do. I had a short time to do the plan so that it could be checked in time for the patient's appointment that afternoon. The doctor was in the planning room while I was working on it, and was checking on how the plan was going."

**Level of Reflection: Defining your reaction and feelings.**

Cue: Acknowledge the emotions that an experience evokes. This may involve harnessing the power of positive emotions or setting in abeyance the barriers that may accompany negative emotions.

Example: "I had some difficulty making changes to the plan and became flustered. Feeling flustered made me lose focus slightly on what I was trying to work on. It took me longer to do what I was trying to achieve."

**Level of Reflection: Assessing whether this varies from what you already know.**

Cue: Feelings or knowledge from the experience are assessed for their relationship to pre existing knowledge and feelings of a relevant nature

Example: "I have sometimes felt flustered before when I have had people checking my work and I worry I may have made a mistake, or when I am feeling stressed or pressured."

**Level of Reflection: Can this new knowledge be integrated?**

Cue: This involves assessing whether the feelings and knowledge are meaningful and useful to us, bringing together ideas and feelings.

Example: "This is something I obviously need to work on. I maybe need to look into ways of managing my stress and having more confidence in my ability, even under pressure."

**Level of Reflection: Question yourself.**

Cue: Are the new feelings that have emerged authentic or the new knowledge accurate?

Example: "I think feeling flustered was valid as I perceived that I was under pressure, though in retrospect, it was not a big enough issue to warrant the magnitude of my feelings."

**Level of Reflection: Is this going to change anything?**

Cue: Describe if the new knowledge will change you practice and how. Alternatively, have the feelings and knowledge from the experience changed any of your attitudes or perspective on a topic?

Example: "If I did start to feel pressured again I would try to relax. I wouldn't stress. I would focus on the task and ask other RTs for their assistance if I needed it"

Table 2.8 provides a guide and examples to consult when reviewing your workplace diary. This can either be used as a means to audit the diary if it is included in a professional portfolio that may be externally reviewed or simply as a means to gain an insight into the quality of your reflective writing on a personal level. Reviewing the diary will assist in the progression of reflective writing from low to higher, more critical levels of reflection.

## **Conclusion**

There are obvious barriers to formalised or documented reflective writing within a RT department, such as time restraints, some staff not knowing how to reflect in such a manner and being apprehensive about documenting personal experiences or emotions (Rolfe, et al., 2001). This paper provides radiation therapists with ideas to guide reflective journaling in an attempt to minimise the barriers to workplace diaries and journals within the RT workplace.

With reflective practice becoming an essential skill to incorporate into clinical practice and CPD in RT, it is important that radiation therapists understand the role and potential of reflection in these areas. Radiation therapists should and can adopt reflective diaries into their professional growth without the need for a formal model to guide them. The use of inventories can simplify the process by directing thoughts and words, enabling progression through the reflective process.

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## 2.9 REFLECTION AND HEALTH PROFESSIONAL EDUCATION

Incorporating reflection into health care education can allow students to learn to deal with clinical situations in a competent manner. Schön comments that the practicum or clinical placement is of great importance, as it is essential that the students are educated in an environment that encourages them to become reflective practitioners. Schön clearly distinguishes between the theory of the professional knowledge base and learning how to cope in situations that are complex, where no obvious solution exists. This is where the process of reflection-in-action is utilised and also where the artistry of a profession can be acquired (Schön, 1987). It is expected that a student's professional development would take them from consciously reflecting on what is unexpected in a situation to being able to reflect simultaneously with action. However it is often the case that students are so caught up in the job at hand that they lack the ability to truly appreciate the complexity of professional practice (Levett-Jones, 2007). Reflection is a common teaching tool to be incorporated into health education programs (Hyrkas, et al., 2001; Mann, et al., 2009).

The concept of reflection is well investigated in educational processes of the nursing profession, where reflection is seen as an essential component to produce nursing practitioners that can reflect on professional goals, political issues, and ethical considerations (Paterson, 1995). It allows students to attend to their feelings and emotions in a non threatening environment in the form of reflective exercises (Hyrkas, et al., 2001). This can result in reduced levels of anxiety often associated with clinical practice, consequently having the potential to enhance the learning that takes place in the clinical setting by enhancing student confidence through:

- Reflecting on their skills and achievements
- Sharing their knowledge
- Gaining feedback from their colleagues and peers (Boud, et al., 1985).

Another advantage of encouraging reflection during students clinical placements is the development of skills to organise thoughts and ideas as well as written and verbal communication (Davies, 1995). Nurse educators comment on the shift in education strategies from teaching theory and memorising factual knowledge, to fostering students to develop reflective thinking skills, embedding problem solving

skills, facilitating improved practice and a good foundation for lifelong learning (Kok & Chabeli, 2002). This allows the concepts of theory and practice to inform each other (Davies, 1995).

Unfortunately, similar to practitioners not all students find reflection a natural process and often require assistance to initiate and guide the reflective process in professional practice (Henderson, et al., 2003; Holm & Stephenson, 1994; Mann, et al., 2009). Reflection is thought to be a skill that can be taught and learnt (Mann, et al., 2009; Paterson, 1995). It has been identified as a tool to bridge the theory practice gap and highlight best practice in the health care profession then it is essential to incorporate it into undergraduate RT training. This needs to occur during and after their professional placements (Turley, 2009).

In RT, incorporation of reflection into undergraduate training has been associated with enhanced student learning, by allowing students to revisit and evaluate their clinical experience, preparing them to become reflective practitioners and allowing them to identify that often tacit wealth of knowledge, specific to the radiotherapy community (White, 2003).

Holm and Stephenson (1994) detail how the reflective process can be difficult for some and not all students possess the skills to be reflective (Mann, et al., 2009). It is these skills that need to be fostered and coached early in degree programs. Varying levels of reflective ability among students could impact on their ability to complete their experiential learning cycle whilst on clinical placement (Mann, et al., 2009). Hence it is important to actively investigate their reflective ability. This is especially difficult considering reflection is something that is very unique to each individual and not easily observed (Boud, et al., 1985). One way to monitor a student's reflective progress is by having the students document the reflective process in the form of a journal.

## 2.10 PROMOTING REFLECTION THROUGH JOURNALLING

The literature discusses three approaches to reflection and reflective writing in clinical practice: reflective journals, significant event analysis and portfolios.

There is a significant overlap between all these techniques (Henderson, et al., 2003), and only reflective journals will to be discussed here.

Reflective journals can be completed by health professionals at any interval, daily, monthly or randomly. They are an ideal way for them to be actively involved in their learning (Milinkovic & Field, 2005). Typical academic requirements such as spelling, grammar and syntax are seen as less important in the creation of journals, enabling students the freedom and liberation to tell their story without criticism (Paterson, 1995). The features of writing as described by Rofle, Freshwater and Jasper (2001) have obvious links with the possible benefits of reflective writing (Table 2.9). Writing is the closest form of communication to natural speech and often students and health professionals are able to write and allow their thoughts to flow in an uninhibited manner using reflective journals. It is this articulation of thought that is said to promote learning and skill development (Kerka, 1996; Murphy, 2004; Usher, et al., 2001).

Reflective journals are seen to allow students to:

- Record events (Levett-Jones, 2007)
- Document their reactions to events
- Describe how this may effect their future practice (Williams & Wessel, 2004)
- Explore changes in attitudes (Levett-Jones, 2007)
- Identify what it means to be a professional (Winnie & Palmer, 2004)
- Facilitate students to become autonomous, self directed learners (Harris, et al., 2001; Levett-Jones, 2007).

#### 2.10.1 JOURNALING ASSISTS TO BRIDGE THE THEORY PRACTICE GAP

There is an vast number of authors that have discussed the link between student journal writing and its ability to decrease the gap between theoretical knowledge and clinical practice (Smith, 1998; Usher, et al., 2001; Williams, et al., 2002; Winnie & Palmer, 2004). Journal writing has been credited with providing a vehicle to learn from and to make the theory and practice connection, by providing a safe place for students to try out and defend their ideas, as well as provide a break from the highly technical environment they constantly work in (Kerka, 1996). Shepard and Denton (1990) discuss that reflective journal writing

whilst on clinical placement assists to not only integrate perception, knowledge and experience gained, but also allows cognitive and affective aspects of their experiences to be explored. This is essential in a health profession with a large technical and humanitarian component, such as that which radiation therapists face.

**Table 2.9 Features of writing (Rolfe, et al., 2001, p.52) and its benefits to the reflective journaling process.**

Feature of writing	Benefit to the journaling process
It is a purposeful activity	Provides a focus
	Helps identify important points
	Active nature of writing promotes critical thinking
Assists in ordering thoughts	Creates an order that is logical to the writer
	Assists to identify priorities and limit chaotic thinking
	Helps identify multiple elements to issues
	Aids understanding by analyses and the development of critical thinking
Produces a permanent record	Allows the writer to capture the moment
	Allows time for contemplation
	Allows for consideration and reflection over time as the entry is revisited
Can make connections between ideas	Helps integrate previously separated pieces of information
	Aids personal insight
	Helps the writing frame the action and view things differently
	Helps integrate theory and practice

### 2.10.2 LIMITATIONS OF JOURNALING

The use of journaling as a learning tool does present some limitations and concerns. There are obvious concerns expressed by many authors that students may write what they think the assessor or teacher wants to hear (Kerka, 1996; Williams & Wessel, 2004). Others comment that students who have trust in the non judgmental nature of the assessor are more likely to be honest and disclose

more of themselves (Bain, Mills, Ballantyne, & Packer, 2002; Williams & Wessel, 2004). Hence it is important to foster a trusting, confidential and sensitive environment for the students in order to minimise the potential of students writing to impress those who read the journals (Milinkovic & Field, 2005).

The task of completing the journal may be seen as unfair as not all students are equally proficient in reflection, as a high level of narrative competence is required to complete the task (Stanton & Grant, 1999). Hence not all students respond positively to it as a learning tool and may not be seen as worthy of the attention and time needed to write them, when compared with other academic work (Paterson, 1995). The work of Henderson et al. (2003) showed that students found writing difficult and preferred oral discussion as a mode of communication. Others report some students may view a completion of a compulsory journal as a mandated confessional (Winnie & Palmer, 2004). All these concerns impact on not only the content of the journals but also on the ability of the journal to truly promote reflection and reflective practice (Mann, et al., 2009).

Recognised problems associated with unstructured freeform writing include that writing can be time consuming due to its lack of direction. Researchers have commented that authors are often unsure what to write and may feel awkward writing about personal issues (Mann, et al., 2009; Rolfe, et al., 2001). Additional barriers to journal writing can include a lack of mentoring and support of practitioners wanting to engage in reflective writing for their CPD within the workplace, as well as the large workload that clinicians and students already carry, limiting the time to engage with freeform writing. Reflective writing is often seen as having less priority assigned than other work.

### 2.10.3 JOURNALING TO FACILITATE REFLECTION

There is a vast amount of literature written over the past three decades that discusses the use of journaling or reflective assignments as a tool to promote reflective thinking skills in health science students and professionals (Davies, 1995; Fakude & Bruce, 2003; Ibarreta & McLeod, 2004; Paterson, 1995; Riley-Doucet & Wilson, 1997; Tryssenaar, 1995; Williams, et al., 2002; Wong, Kember, Chung, & Yan, 1995; Wong, et al., 1997). In light of the masses of

available literature not all references will be discussed here, instead only the most relevant to this project will be cited.

Journaling is said to assist in reflection, as writing is a conscious practice and insists on deliberate and tangible action being undertaken in reference to an event or situation (Harris, et al., 2001; Kerka, 1996). Allowing the student to explore reactions, discover relationships and connect new meaning with past experiences (Metrick Kennison & Misselwitz, 2002). However caution must be taken as it is well documented that journal writing does not guarantee reflection, with some students writing more descriptively than reflectively (Kerka, 1996).

Many small studies have been undertaken to investigate the relationship between journaling and reflection. In Williams and Wessels (2004) study of 48 undergraduate physical therapy (PT) students reflective journals for evidence of reflection, they noted that 67% of students displayed evidence of level 4 reflection as per Williams (2000) tool for assessing reflection based on Boud's levels of reflectivity. A similar study of 56 PT students using the same tool, shows 42 students displayed evidence of the same levels being achieved (Williams, et al., 2002). Usher et al. (2001) completed a study that assessed the evidence of reflection in student clinical journals over a period of time, as a means of identifying whether interactive tutorials and guidance of student on the process of reflection, impacts the students ability to reflect in their clinical placement journals. This study found that after receiving assistance on the principles of reflective practice and writing, students were able to differentiate better technical, theoretical and reflective writing in their journals. Richardson and Maltby (1995) studied undergraduate nurses reflective journals whilst completing a clinical placement in community health and found that most students were very apt at reflective journaling at the lower end of Mezirow's reflective scale (94% of the total number of scores). However similar to the studies of Williams (2000; 2004), much fewer students were able to reflect at the higher critical reflection level (6% of the total number of scores). Again a study by Wong assessing the reflective writing of post registration nurses, found that 76% of the sample were classified as reflectors, only 11% were able to reach the higher levels of reflectivity. All the studies discussed above do have notably small sample sizes and hence are not conclusive. However, these available

descriptive studies provide evidence that link journal writing and reflection in the healthcare setting.

Journaling can be used to foster self reflection as it facilitates the student returning to the experience, re-evaluating the situation and even making connection between existing knowledge and this experience to form ideas or frameworks for future practice. Hence being an effective tool in the pursuit of experiential learning (Kerka, 1996; Paterson, 1995; Williams & Wessel, 2004; Winnie & Palmer, 2004).

Journaling is not the only method available to facilitate reflection (Williams, 2000), however, in health care facilities and radiotherapy departments where often staff and resources are stretched, journaling to facilitate reflection minimises the burden on staff and resources (Cole, 2005; Milinkovic & Field, 2005). None of the studies discussed above have investigated this concept in the radiation oncology environment, or when journals were completed by RT students.

#### 2.10.4 GUIDED REFLECTIVE WRITING

The use of structured reflective models to implement reflective practice into the health care setting is not proven. Although there is no consensus as to the benefit of structured reflective practice models in clinical situations than less formal methods of reflection (Burnard, 1995; Mackintosh, 1998), it is important to consider whether these models are intended to be rigidly implemented, or used as frameworks to facilitate and guide practitioners during the reflective process, rather than being introduced as a guaranteed means of implementing reflection into the healthcare workplace. It is important to remember when promoting reflective practice in the health profession that, the assumption is made that the practitioner is able to reflect, willing to reflect and also willing to make change as a result of reflection. Especially when much of the literature associates the use of reflection with a negative outcome from a clinical event. This can taint the process of reflection for many, prompting some health care professionals to view it as a means to apportion blame (Smith, 1998; White, 2003).

Within the literature there are two main processes of guided reflection that are discussed, that guided by a series of short questions or prompts and completed individually and reflection that is guided by a mentor or colleague in a face to face session. Both of these processes could be guided by any of the above mentioned reflective models or frameworks. The nursing, medicine and teaching professions have publications describing both of these method of guided reflection and it benefits (Duffy, 2008, 2009; Husu, Toom, & Patrikainen, 2008; Lasater, 2009; Orland-Barak & Yinon, 2007; Sandras, 2009; Williams, 2000). Ashby (2006) argues that unstructured and unguided reflection runs the risk of students taking a myopic view and limiting the reflective journal process. Some authors believe that structured reflection should not be mandated for all students and health professionals, for those that are less apt in reflective thinking and writing, a guided from or structured approach may be appropriate (Duffy, 2008; Kuiper & Pesut, 2004). Whilst others promote the use of "The What? Model of Structured Reflection" (Driscoll, 1994) to effectively support the examination of practice and to enhance experiential learning in nursing (Driscoll & Teh, 2001; Levett-Jones, 2007). RT graduates have indicated their support of structured reflection in a study by Brackenridge (2007). When RT graduates were questioned as to what improvements could be made to undergraduate reflective exercises, 65% of the participants indicated that the provisions of template and 42% indicated that more reflective examples would improve the experience (Brackenridge, 2007).

## 2.11 ASSESSING JOURNALS FOR REFLECTION

The literature demonstrates a handful of authors that have presented combination of many models or frameworks of reflection mentioned above that could be used for assessing the levels of reflection in student's personal journals. In the literature there appears to be an overlap between the models/ assessment frameworks tools and their implementation in the studies found in the literature.

Usher, Tollefson and Francis (2001), employed a tool based on Van Manen's (1977) model of reflection when assessing the levels of reflection evident in the clinical journals of 38 pre-registration nursing students. The authors adopted Van Manen's tool, as they considered it more easily adaptable to the nursing

profession, due to their knowledge of both nursing and the tool. The study counted the different levels of reflection exhibited within the diaries and worked out the percentage these made up of the total reflective comments excluding comments of a personal or subjective nature.

Usher's (2001) study confesses its limitations only in its lack of ability to assess prior writing or reflective skills using this method. However no validity measures or further discussion of the tools limitations were outlined.

Another study assessing the levels of reflection evident in 30 undergraduate nursing students reflective journals was conducted by Richardson and Maltby (1995). It used a tool developed by Powell (1989), which was derived from Mezirow's (1981) seven levels of reflectivity. Mezirow's work focused on using reflection to construct meaning from experience, which then has impact on an individual's values belief and meaning schemes (Kuiper & Pesut, 2004). Powell's tool adapted Mezirow's levels from seven to six specifically for the purpose of application in the nursing profession defining, the first four levels as levels of consciousness and associating the final two higher levels of reflectivity as being critical consciousness (Richardson & Maltby, 1995). The authors of this study described the sensitivity and specificity of Powell's tool as valid, due to the comparable result of their study and that of Powell's.

Both Williams, Wessel, Gemus, and Foster-Seargant (2002) and Williams and Wessel (2004), used a tool established and outlined in Williams, Foster-Seargant, Sundelin, and Norman (2000) to assess levels of reflection in students written material. The tool was adapted from Boud, Walker, and Keogh's (1985) six levels of reflection, to form five levels of reflection. In each of these studies students were checked against five levels of reflection, which were defined as:

- Describes learning
- Analyses learning
- Verifies learning
- Gains a new understanding
- Indicates future behaviour
-

Both of these studies discuss the importance of remaining cognisant of the cyclic rather than linear nature of reflection which is often not considered in assessment of journals for evidence of reflection when using tools containing specific levels.

Wong et al, (1995), also used a model based on the levels of reflections as described by Boud (1985) in the first phase of a study of reflective scripts completed by undergraduate nursing students. Boud's model is based on three stages, constituting six steps or levels to the reflective process as outlined in Table 2.4 (Boud, et al., 1985). Boud's six level model was adapted into five levels by removing level 1 from Boud's model. This was done based on the principle that by completing a journal students were required for assessment purposes to "return to the experience", hence negating the need for this to be assessed again. Wong then included a coding category for "outcome of reflection" at the end of Boud's reflective framework e.g. Level 6. Although validation (level 5) and appropriation (level 6) are elements of reflection, the reflective process as mentioned above does not adhere to a linear model, nor are all steps completed to reach the end point of reflection. Hence coding for "outcome of reflection", which is defined by Boud et al, (1985) as, the development of new perspectives or changes in behaviours, attempted to counter the problematic spiralling model of reflection for the purpose of assessment in clinical journals, with a linear tool.

Wong (1995), completed the assessment of levels of reflectivity by designing a two phase process. Phase one involved the assessment of journals using the model adapted from Boud (1985), discussed above. Phase two utilised the results from the initial phase and categorised the participants into one of three broader levels of reflectivity, based on the work of Mezirow (1990), non reflector, reflector and critical reflector (Table 2.6). critical reflector demonstrated validation, appropriation or outcome of reflection. Wong's study discusses in detail the difficulty in assessing levels of reflection as discriminate processes, when often they are inseparable and interrelated stages of a larger process. Hence Wong (1995) concludes that coding to the finer levels of Boud's model (Phase 1) may not be useful, as at these levels it can be difficult to categories textural data into one category or another with accuracy. However, she believes that there can be a distinction made between reflectors and non reflectors as the

discrimination of levels one to three (Attending feelings, association and integration) and the higher levels (validation, appropriation and outcome of reflection) is possible. These conclusions are supported by the results of the coder agreement scores that were calculated during each phase of the study, where initial phase one coders obtained scores between 0.5 and 0.75, secondary set of coders however we unable to reach even this level of agreement. Whilst phase two coders obtained an agreement of 0.88.

#### 2.11.1 CHOOSING A MODEL TO ASSESS JOURNALS FOR EVIDENCE OF REFLECTION.

All of the authors discussed above illustrated methods to be used in assessing levels of reflection, of students written material, they also discuss the difficult nature in accurately assessing the levels of reflection when using a definitive linear tool, due to the spiralling and often random nature of the reflective process, as outlined in all the examples. The only study that addressed this limitation was that of Wong, Kember, Chung and Yan (1995), with the suggestion of coding for broader categories rather than finer discriminate ones, Williams et al., (2000) criticises the use of these three simpler categories as not describing the true process of reflective thinking. Wong continues to validate his choice to complete two phases of analysis by demonstrating that the coder agreement for these broader categories of non reflector, reflector and critical reflector to be much higher and accurate than that of the narrower categories. Wong (1995) measured the coder agreement by dividing the total number of agreements by the total number of agreements plus disagreements. Intercoder reliability can also be measured using a form of analysis called Kappa. Kappa measures the agreement between two individuals who are attempting to measure the same thing beyond chance.

Many authors in the area of research and reflectivity have recognised the valuable work of Wong et.al, (1995) (Burton, 2000; Duke & Appleton, 2000; Hargreaves, 2004; Spencer & Newell, 1999; Wong, et al., 1997), with some commenting on the reliable and convincing nature of the study (Milinkovic & Field, 2005). When Spencer and Newell (1999) adopted the tool developed by Wong in their study of nurses exhibited levels of reflectivity in, written reflective

accounts of incidents related to their professional life, they report Wong's (1995) tool, to be the only reasonably valid and reliable tool to be used in the assessment of levels of reflectivity in written materials. They highlight that although coding for levels of reflection to be a subjective activity, utilising a structured coding systems such as Wong's, attempts to establish a consistent approach. It is the work of Wong et.al, (1995) that forms the basis for the development of a tool specifically designed to assess reflective writing in RT.

## 2.12 QUALITATIVE ANALYSIS OF STUDENT CLINICAL JOURNALS

### 2.12.1 RESEARCH APPROACH

Both qualitative and quantitative approaches have various methodologies that can be used depending on the research question or phenomenon under study. Each method within both disciplines, have a set procedures that underpin it (Morse and Richards, 2002). Both qualitative and quantitative methods are shaped by positivist and post positivist traditions, (Denzin and Lincoln, 1998) and view the concepts of validity and rigour as important components of the research process (Morse and Richards, 2002).

Qualitative research searches for meaning and tends to want to know the why of peoples experience and social interaction, to discover understanding. Rather than the how much, the when and the quantifiable variables that are involved in our world, as seems to be more the case with quantitative research (Morse & Richards, 2002). Unlike qualitative methodologies where the procedures underpinning specific theoretical methods are reflexive, methodologies associated with quantitative research are rigid and very structured, not adaptive to the subject under study (Morse & Richards, 2002). The subject of quantitative research is generally predetermined, to prove or disprove existing knowledge, however qualitative research focuses on searching for new knowledge or meaning in a given situation, making it an ideal discipline to be used in this project.

There are many qualitative disciplines or frameworks that can be applied to research settings in health care. Some have methodological underpinnings that make them more or less suited to each context depending on the sample and the

phenomenon being studied. Three popular methodologies in qualitative research could be considered for the analysis of RT students reflective journals mentioned above, Phenomenology, Narrative Inquiry and Qualitative Descriptive Analysis (QDA).

Phenomenology - This qualitative methodology originated in phenomenological philosophy, from the works of Husserl, Heidegger and Merleau-Ponty (Macann, 1993). Phenomenology traditionally sought to understand the lived experience of individuals, in the lived world (Morse & Richards, 2002). The basis of the method, is describing the life world of the participants in relation to four elements; lived experience, lived space, lived body and lived relationally (Van Manen, 1990; Crotty, 1996; Field & Morse 1985). As a method it has wide application in the health care setting, with the ability to provide rich description or interpret the lived experience of any individual or group.

Narrative Inquiry - Narrative inquiry is a method, designed to gather information for the purpose of telling as story. It aims to understand how people act, think and make sense of their experiences. It is through their stories that they reveal their experiences and allow the researcher to develop a research text that describes the participants experience, giving it a voice (Connelly & Clandinin, 1990). Hence a study of student's narratives or stories would be a study of how they experience their world. Further, a sequential narrative analysis would follow the student's experiences over a period of time and observe how this story changes for each individual. The data or stories could originate from many sources including field notes, letters or journals and is appropriate for use in many social science fields but is most often seen in the psychology, education and political sectors.

From the two qualitative frameworks listed above neither are suitable for use in this study. The journals being studied were de-identified due to ethical constraints. With phenomenology aiming to provide a rich description of the life world of the participants, interested in why people describe things the way they do and what they really mean when they make statements,<sup>18</sup> the de-identified and retrospective nature of the data provided for this study makes it unsuitable. The data does not allow for participants to provide supplementary data to gain a

greater insight into any phenomena that emerge from the journals if necessary. Hence there is a risk that adopting a phenomenological framework for the study of these journals may yield only a superficial description of the participant's experiences, rather than deep rich representation.

Narrative inquiry is often used in telling the stories of participants in a study, a sequential narrative analysis would have been ideal in this instance, allowing for any changes in experiences as an individual participant progresses through the degree program to be revealed. However the 97 students reflective journals are de-identified and there is no way of tracing individual participant journals from year to year, rendering a sequential narrative analysis unachievable.

Hence a QDA is the method of choice for this study, the final of the peer review papers that contributes to the literature review, (Section 2.13) outlines the development and validity testing of a framework to analysis students journals for the content/descriptors that they contain.

## 2.13 PAPER THREE - DEVELOPING A QUALITATIVE FRAMEWORK FOR ANALYSIS OF STUDENT JOURNALS

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### **Abstract**

Learning from work is an important aspect of student and professional life when working within the health profession. Personal journals are one way that health professionals are able to document their experiences (Chapman, Dempsey & Warren-Forward, 2009). These journals also hold a wealth of information about the student experience on placement (Findlay, Dempsey, & Warren-Forward, In Press). To analyse the content of journals a qualitative research analytical method is required.

There are many different methodological underpinnings or approaches within qualitative research and it is important that the researchers consider their own world view and the context of the research and the data to be evaluated when selecting a qualitative methodology to utilise.

This paper discusses an overview of the process of choosing a qualitative framework for the analysis of the descriptions contained within student personal journals. The paper describes the development and validity checking of a coding or source book for qualitative descriptive analysis of student personal journals.

### **Introduction**

When working as a health professional some of the most valuable lessons are learnt from interactions with patients, carers and colleagues. These same interactions can assist the professional and personal development of undergraduate health science students during professional placement within a clinical facility. Personal journaling is one way that undergraduate health students can describe and reflect on these day to day events, interactions and

experiences , and the insights and experiences recorded in the journals can provide a wealth of information about the experiences that were meaningful for the students whilst on placement (Findlay, et al., In Press). The descriptive or professional situational content of the journal can also provide feedback that can be used to shape undergraduate curriculum and provide essential feedback to professional placement sites.

Radiation therapy (RT) students at an Australian University have completed personal development journals during their professional placements within Radiation Oncology Treatment Centres (ROTC) for over 15 years. The contents of these journals have not until recently been formally investigated for the insight they hold into the specific clinical experience of undergraduate RT students whilst on professional placement.

Recent work by the authors (Findlay, Dempsey, & Warren-Forward 2010; Findlay, Dempsey, & Warren-Forward, 2009), has developed and validated reflective analysis measures that assess the level of reflection found in the writing of students. The authors have validated reflective measures on both freeform and short form guided reflective writing. Their analysis of RT student's reflective journals identified that whilst many RT students are able to write reflectively, few reach the highest level of critically reflection (Findlay, Dempsey, & Warren-Forward 2010).

However, the evaluation of reflective writing is not an analysis of the specific professional situation that students reflect about. To evaluate what students reflect about a separate descriptive analysis is required that seeks to describe the content or themes of their reflective writing. By doing this we will be able to assess the level of reflection for specific professional situations.

Qualitative descriptive analysis provides a framework where personal journals can be analysed for the written descriptors that they contain. The flexible nature of qualitative descriptive analysis research makes it a suitable method to understand the meaning or interpretation of subjective experiences (Liamputtong, 2009). However, it is this flexible and fluid nature of qualitative descriptive analysis research that lends itself to criticism due to the perceived lack of

reliability, validity and rigid rules (Carpenter & Suto, 2008; Liamputtong, 2009, 2010).

A sample of 97 personal journals, completed by RT students over three consecutive years of the undergraduate RT program has been selected to undergo qualitative analysis. Analysis of these journals will allow a rich description of the issues that undergraduate RT students feel impact on them during professional placement to be explored. In doing qualitative research and qualitative data analysis it is important for researchers to consider which qualitative methodological framework will be used to for their study, as the qualitative methodology will influence the processes and outcomes of the research project (Krippendorff, 2004; Liamputtong, 2009, 2010; Neuendorf, 2002).

This paper aims to:

Provide an overview of the process of choosing a qualitative framework for the analysis of the professional or developmental content in student journals.

Describe the development and validity checking of a coding or source book for the analysis of student journals to increase the reliability and trustworthiness of the outcomes.

## **1. Choosing the Qualitative Framework**

There are many qualitative disciplines or frameworks that can be applied to research settings in health care. Some have methodological underpinnings that make them more or less suited to each context depending on the sample and the phenomenon being studied. Popular methodologies in qualitative research that may be considered for the analysis of RT students' journals mentioned above include: Phenomenology, Narrative Inquiry, Grounded Theory, Ethnography and Qualitative Descriptive Analysis (QDA). While each of these have their own philosophical perspective, all use naturally descriptive and/or interpretative data analysis methods to analyse the data collected.

### Qualitative Descriptive Analysis

QDA is underpinned by naturalistic enquiry and is a common form of data analysis in qualitative inquiry in practice fields (Sandelowski, 2000). In QDA the

researcher is not trying to describe events in a way that follows a specific research philosophy, like ethnography or phenomenology research. Instead the researcher seeks to describe events, purely as the participant has reported they occurred. A wide range of techniques can be used for the data collection, sampling and analysis in a QDA study (Sandelowski, 2000, 2010). Data collection techniques can include focus groups, journals, interviews or even observation (Morse, 1996; Morse & Richards, 2002; Sandelowski, 2000). The subsequent sampling may be selected using convenience or purposeful sampling techniques (Morse, 2006; Patton, 2002).

QDA is often overlooked as a research method in its own right. Sandelowski (2000, 2010) describes the characteristics of a QDA as often working with the surface of the words rather than their deeper meaning, with little interpretation required. A qualitative descriptive analysis is often used when a straightforward answer, with little interpretation from an imposed theoretical philosophy, is required.

In terms of the requirements for this research, i.e. the descriptions of events recorded in personal journals, a qualitative descriptive analysis is an appropriate methodology that will yield a straight descriptive summary of the information evident in the journals., A QDA is the method of choice for this study, working within the confines of the predetermined data set.

## **2. Development of a Qualitative Sourcebook**

One analysis technique often utilised in QDA is a qualitative content analysis (Sandelowski, 2000). Qualitative content analysis can be defined as a systematic analysis of text to describe the content and visibly obvious components of the data (Graneheim & Lundman, 2004). It requires the systematic reading and coding of text, images or even symbolic matter (Krippendorff, 2004). Essential to any content analysis is the formulation of a good sourcebook and worksheet with the accompanying dictionaries (Neuendorf, 2002).

A code or sourcebook can be a hardcopy or electronic resource that provides the person evaluating and perhaps coding the data with a set of rules, variables and description of the variables (Neuendorf, 2002). Sourcebooks can include

general coding instructions, information on each coding unit /sub-unit to be coded for and dictionaries to assist the coding process. The dictionaries can range from those containing information emergent from the text to be coded, to author created dictionaries that contain words, phrases and definitions that assist the coder in recognising portions of text that belong to the units and subunits being coded for (Krippendorff, 2004; Neuendorf, 2002). A worksheet can also be in many different mediums and allows the results of the coding to be documented (Neuendorf, 2002).

A coding system and sourcebook should provide a complete and unambiguous guide to facilitate the coding process of the personal journals, allowing the coding process to be replicated elsewhere with rigour (Krippendorff, 2004). A good sourcebook aims to minimise the difference between individual coders during the content analysis stage.

Creating a coding system including an original sourcebook and worksheet is a very involved process. The following sections of this paper will describe the method used for the development of the sourcebook for analysis of the 97 RT personal journals mentioned above and the result of each step in the process.

### Bracketing in Qualitative Analysis

All researchers and practitioners carry biases of some form. For example a bias may stem from previous experience in a given field or personal perspective about a specific topic. In qualitative research biases have the potential to impact on the research process and findings, either at a conscience or subconscious level (Carpenter & Suto, 2008; Liamputtong, 2009, 2010). Bracketing is an exercise that can be undertaken to minimise the possible impact biases can have on the qualitative research process. Bracketing involves identifying and placing on hold everyday assumptions, beliefs and previous personal experiences, in relation to the phenomenon under study (Lopez & Willis, 2004; Morse & Field, 1995). It provides a way for the researcher to avoid imposing these elements on the experience of the participants, minimising the possibility of the researchers preconceived ideas guiding them as they collect and analyse the data (Crotty, 1996). A framework to guide bracketing where the researcher reflects pre-action, in-action and on action, can be used to assist the researcher in becoming aware

of any assumptions they may hold prior to analysis, emotional influences they may feel during analysis and as an evaluative process after analysis. If bracketing identifies issues that may bias the analysis in the pre and in action phases, strategies such as visualisation where the researcher visualises placing the issues in imaginary brackets can be incorporated as a means to isolate them from the analysis. It is important to acknowledge that the process of bracketing is one that must be learned and skill is gained as the researcher gains experience (Wall, Glenn, Mitchinson, & Poole, 2004).

### Sourcebook Development

The development of the sourcebook was conducted over the following steps.

Step 1: Prior to reading any of the journals the researcher undertook 'reflection pre-action' bracketing. During this process the researcher reflected upon on issues that may arise within the journal that they had an opinion on or bias about that may impact on the coding. These comments and thoughts were entered into an excel spread sheet. Table 2.10 illustrates examples of these comments from the "Reflection pre-action" bracketing exercise.

Step 2: All journals were read by the researcher to familiarise the researcher with their overall content, making memos on the general feeling of the journals. This comment was then recorded in a few words on the hard copy cover of the journal entry. These comments were also entered into an excel spreadsheet.

Step 3: The journals were then reread a second time by the researcher. During this reading the journals were explored for the topics or categories that were present in the descriptive content of the journals. As the researcher identified a topic or category the section of text was highlighted and the topic name was placed in the right hand margin of the journal.

**Table 2.10 Comments from the reflection pre-action bracketing exercise**

Reflection	How do I see this affecting my reading?
Having 10 years clinical experience in radiation therapy has left me with quite a host of clinical knowledge,	It could be in a positive manner by allowing an easier understanding of the situations described by the students in their journals and enabling me to bridge the terminology gap more readily in my reading of data. However I must be careful not to allow my knowledge to maybe impede on the experience as described by the student in relation to, me making a decision whether I think that is technically right, realistically true, technically possible or professional appropriate etc. At this early stage of the bracketing process, acknowledging that this exists and the potential problems with it is my only way forward. Dealing with it as the first instance of it arises in analysis will be a great challenge.
Having worked with students for so long has given me many ideas and thoughts about students within clinical centres may affect my interpretation of the journals	In reality all that I do with students and all that I have experienced with student could have a profound effect on the transformation that takes place as I begin data analysis. Maybe if I read a situation that can be related to an experience I may have had with a student, the feelings that are attached could directly affect my interpretation of the description given from the participant. In those cases I can only think that acknowledging the feelings, recalling the situation and describing how I am going to set these feelings aside, e.g. Visualisation or discussion with a colleague or a reflective entry might manage the process. Another option may be to seek external objective input on the diary entry as a form of external validation.

No priori of categories or topics were used to guide the coding process or prompt the researcher for what to look for within the personal journals. All categories identified were those that emerged from the data. Whilst the researcher was aware of content analysis completed within other health professions, bracketing was used and this knowledge was set aside to minimise the chance of emergent themes and content from the data being bias or led. When the reading and coding reached a stage where for five to six consecutive journals no new categories or topics emerged from the data, the reading and coding was stopped.

Step 4: For each journal the identified topics were then entered into an excel spreadsheet along with supporting quotations and their location within the text, allowing for an audit trail back to the initial data. This process resulted in the collection of eight major categories and 50 subcategories (Table 2.11).

**Table 2.11 Initial raw emergent categories and subcategories**

Major Category	Subcategory	Major Category	Subcategory
Resources	Rosters Practical issues Lack of planning access Lack of hands on practice Feeling like department fodder	Teamwork	Teamwork Conflict with staff Welcome by staff Gaining staff trust Student/staff relationship Working with docs Staff expectations
	Personal Development		The Patient
Professional		Reflective Learning	
	Assessment		Technical Learning

Step 5: The categories or topics that were identified from all three years of personal journals were then examined holistically for commonalities. The researcher and an independent expert within the field of RT and education reviewed the categories before meeting to brainstorm and collate their ideas. During this session sections of the students' journals were read and discussed as to what category or sub categories they may belong to within the raw framework. This process resulted in overlap and ambiguity across the framework to be identified. This process allowed major categories and subcategories to be defined that were unique and mutually exclusive (Table 2.12). For each major category, a subcategory of "other" was inserted into the framework. This allows for any topics that are identified within the journals during the QDA that do not fit into the developed framework, to be accounted for in the "other" subcategory.

**Table 2.12 Final unique and mutually exclusive emergent categories and subcategories.**

Major Category	Subcategory
1. Clinical Environment	1. Department Structure
	2. Life style
	3. Equipment
	4. Other
2. Personal development in the profession	5. Professional growth
	6. Emotions
	7. Enjoyment/Job satisfaction
	8. Communication
	9. Confidence
	10. Judgments
	11. Technical learning
	12. Other
3. View of the Profession	13. Teamwork
	14. Other
4. The patient	15. Quality of Life
	16. Patient pathways
	17. Building relationships
	18. Other

Step 6: Validity testing - This final category and subcategory framework was then subjected to content and face validity test.

### Content Validity

Content validity is used to assess whether the measures are representative of the full domain of measures for a given situation (Krippendorff, 2004; Neuendorf, 2002). Content validity testing was undertaken using two methods.

Firstly, the framework of major categories and sub categories was compared to a priori of themes available from the literature from similar studies conducted within the undergraduate health professional setting. The priori of themes used for comparison (Table 2.13) consists of a list of categories and topics identified in the journals of students undertaking professional placements in the clinical setting for a variety of health professions, including medicine, physiotherapy, occupational therapy and nursing. The researcher examined the framework against this list of themes to explore any commonalities. Table 2.13, illustrates that although the priori of themes contains no studies undertaken in RT or Medical Radiation Sciences there was a strong concordance between the priori of themes within the

literature and the major categories and subcategories that the framework contains.

Next an independent radiation therapist with extensive experience in the education field was asked to review the category/subcategory framework from a content validity perspective. This expert was selected due to the range of experiences that they have been exposed to over the years in RT and students' experiences on placement. Based on their experience, the RT professional assessed whether the final categories and subcategories resonated with those that they might expect an undergraduate RT student to experience in the clinical setting and was asked to provide feedback accordingly. Feedback indicated that the major categories and subcategories were thought to be extensive and covered all areas of student clinical experience and appropriate to the context of professional placement.

### Face Validity

Face validity is a form of testing that examines whether on the 'face of things' the sourcebook is going to explore the desired concepts. For example in the instance of this study when the face validity check is completed, if the tool has good face validity the person undertaking the assessment will be able to describe the context of the study that the framework is to be applied to, without discussion or information from the researcher involved (Krippendorff, 2004; Neuendorf, 2002).

A second independent content expert with over 10 years experience within the field of RT and student education was selected to undertake this assessment of the framework. They were provided with the framework to review and interviewed by the researcher. During the interview they were asked to describe the setting and context they felt the research was going to be exploring. In this instance the interview revealed a high level of face validity for the framework with the reviewer able to accurately describe the context for the study to be undertaken.

Step 7: A coding sourcebook was developed to be used by independent coders that will undertake the QDA of the journals. It provides the coders with guidelines

and details to follow when completing the coding. The source book was created in available word processing software. There are no strict rules to guide the format of the sourcebook or its layout.

The source book provides the coders with a strict framework to follow and reference in order to maintain consistency and rigor during later analysis. The source book incorporates coding instructions, the category/sub category framework, and a dictionary to guide the coding process. The dictionary was one created from the emergent data, which provided words, phrases and examples for each of the subcategories. Figure 2.7 illustrates the section of the sourcebook that provides an overview of the category and subcategory framework as well as an explanation of the coding guide and dictionary and full coding instructions.

Whilst Figure 2.8 is an excerpt from the source book for the “Clinical Environment” category, “Department Structure” subcategory. For each category the sourcebook provides an over viewing statement, concepts that may be discussed in the subcategory and words and phrases that may be identified with the text for this subcategory.

**Table 2.13 Summary of major priori of themes evidenced from the literature of student professional placements in various health professions.**

Category or Topic Identified	Mackenzie 2002 (OT)	Patton 1997 (N)	Lanbean 1995 (N)	Williams 1999 (PT)	Williams 2004 (PT)	Williams 2002 (PT)	Pitkala 2003 (M)
Expectations whilst on clinical	X						X
Patient Relationship	X	X	X		X	X	X
Long-term professional issues	X				X		
Meaning of final placement on career	X			X			
Increase knowledge and skill		X	X	X	X	X	
Theory - practice connection				X		X	X
Problem solving skill and critical appraisal				X	X	X	

OT-Occupational Therapy, N-Nursing, PT-Physiotherapy, M-Medicine. The shaded categories are those that are present in the final category and subcategory framework.

QDA Sourcebook Journal Analysis				
<b>Coder Name:</b>	At the top of the coding worksheet place your name in the provided space			
<b>Participant name:</b>	At the top of the worksheet place the participant ID for the journal you are about to code eg 2003-10			
<b>Worksheet:</b>	A new worksheet is to be used for each journal coded.			
<b>At completion:</b>	After completing the coding, all journals and worksheets are to be returned to the researcher			
<b>Category Groups</b>	<b>Clinical Environment</b>	<b>Personal development in the profession</b>	<b>View of the Profession</b>	<b>The patient</b>
<b>Key Themes</b>	1. Department Structure	5. Professional growth	13. Teamwork	15. Quality of Life
	2. Life style	6. Emotions	14. Other	16. Patient pathways
	3. Equipment	7. Enjoyment/Job satisfaction		17. Building relationships
	4. Other	8. Communication		18. Other
		9. Confidence		
		10. Judgements		
		11. Technical learning		
		12. Other		
<b>Coding guide/ dictionary:</b>	<p>The following pages contain details of the four groups and subsequent 18 categories.</p> <p>The first column details the group and specific category, the column headed Concepts provides ideas as to what concepts, topics or subjects may be found in each category.</p> <p>The final column titled, Words, Phrases and Comments, provides some words that may be associated with a concept, quotes that demonstrate a concept from the journal, and instructions that will assist coding text in each category.</p> <p>The concepts, words and phrases provided in this guide are not exhaustive. If you identify elements of the text that represent any of the 18 categories regardless of whether it is mentioned in the concept and phrases guide, code it accordingly.</p>			
<b>Coding Instructions:</b>	Before reading each journal, label a new QDA worksheet with your name and the participant number found at the top right hand corner of the journal. Then read the journal in full. Re read and code the journal one, paragraph at a time.			
	As you read each journal identify words, phrases or concepts that represent any of the 18 categories listed above.			
	Find the row that the identified category occupies on the worksheet then in the first column annotate the page and paragraph that the text is located in.			
	For example if the text is on page 1 paragraph 4, write down 1.4. Additionally highlight the text coded and also document the category number in the right hand margin of the journal.			
	Each unit (phrase, sentence, paragraph) can only represent one category on the worksheet.			
If a category is identified more than once simply repeat the documentation process as described above each time you identify it in the text.				

**Figure 2.7 Rules governing the QDA coding process (exert from Sourcebook)**

<p style="text-align: center;"><b>Clinical Environment</b></p>	<p>The section on clinical structure is about how the structure of the clinical placement affected the student's experience. The key themes include Department structure, lifestyle effects and equipment. Included in each of these key themes may be concepts</p>	
<p style="text-align: center;"><b>1. Department structure</b></p>	<p><b>Concepts</b></p>	<p><b>Words, Phrases, Comments</b></p>
	<p>Rosters</p>	<p>I was excited to see I was rostered to different departments within the hospital</p>
		<p>I would have liked more time in the planning room</p>
		<p>this allowed me to get use to it rather than constantly rotating</p>
	<p>Workload</p>	<p>I was surprised to see how many patients were put through...they (RTs) were constantly run off their feet.</p>
		<p>They are always so busy</p>
	<p>Lack of planning access</p>	<p>I did not get much of a chance to practice or do things on the computer</p>
		<p>I would have liked more time in there (planning) as I don't really think I gained as much as I could have.</p>
		<p>I felt like there was a lot of time with nothing to do ...because I could not get access to a terminal</p>
	<p>Accessing patients and resources</p>	<p>because there was a PDY, student and therapist,...the other therapists spent more time with them (PDY) and kinder gave the more to do</p>
		<p>This concept is where students feel that maybe the staffing, workload or other departmental factors effected their access to patients and resources on clinical placement</p>
	<p>Student mentoring, asking questions</p>	<p>I found it difficult to ask questions as they were always so busy</p>
		<p>Its really hard when my buddy is away on RDO</p>
<p>I wish they had a buddy system.....</p>		
<p>Department expectations</p>	<p>There were higher expectations of me to show new found knowledge and apply this knowledge</p>	

**Figure 2.8 Category 'Clinical Environment', subcategory 'Department Structure' description and dictionary extracted from the Source book.**

## Summary

Qualitative research methods allow researchers to analyse and describe the qualitatively different ways that humans experience and describe life-world events. QDA is an analytical method that can be used to explore the experiences and issues that impact on health science students as documented in student's personal journals.

Integral to the rigour of the research is the selection of an appropriate qualitative methodology. This paper has discussed qualitative descriptive analysis and its suitability to the sample of personal journals being studied.

In the context of a qualitative descriptive analysis, a source book is essential to the content analysis process. Development of a thorough and valid sourcebook will promote quality coder training and inter-coder reliability. Within the context of this study the analysis of the journals using the sourcebook developed and the results of the analysis will be available in a future publication.

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## Chapter Three

### Paper Four

### 3.1 DEVELOPMENT OF THE NEWCASTLE REFLECTIVE ANALYSIS TOOL

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#### **Abstract**

The need for health professionals to reflect on practice and incorporate reflection into their lifelong learning repertoire is not new. Many health professional programs at Universities use journaling as a tool to facilitate, encourage and foster insightful and reflective thinking, with an aim to develop future health professionals with skills to become reflective practitioners in the workplace.

During their professional placements, undergraduate radiation therapy (RT) students at the University of Newcastle, Australia, write a personal development journal, describing their journey from novice to graduate practitioner. The full three year set of journals from one intake of students have been subjected to both qualitative descriptive analysis to describe the professional practice situations that students report on, and reflective analysis to describe the evidence of reflection.

This paper focuses on the development of the Newcastle Reflective Analysis Tool (NRAT) to analyse the journals for evidence of reflection. Deep analytic and broad classification tools are described as methods that can be used to assess student reflective writing for levels of reflectivity.

#### **Introduction**

The importance of health education graduates being competent and prepared for practice in a rapidly changing clinical environment is an important issue facing many universities (Edwards, et al., 2004; 1990). To meet these requirements the delivery and content of health education programs are geared towards producing

graduates who are: orientated towards lifelong and experiential learning, skilled as clinicians, administrators, educators, consultants and researchers, and able to foster inter professional learning (Shepard & Jensen, 1990). The Radiation Therapy (RT) program at the University of Newcastle, Australia, is one such program that has been designed to meet the requirements described above. The program aims to develop lifelong learners, who have general and specific understanding and skills in RT, who are self directed and employ evidence based practice principles in a multidisciplinary health care team.

The RT degree at Newcastle is three years / six semester duration, and consists of two primary components, on campus semester based course work, or 'academic work', and professional placement or 'clinical experience'. The professional placement component consists of 26 weeks placement in a clinical radiation oncology department under the direct supervision of qualified radiation therapists, and is broken down into six placements, one each semester. The clinical component aims to assist in bridging the theory practice gap between professional knowledge, and theory and professional practice. The RT degree at the University of Newcastle utilises an integrated approach to health care education cycling between these two components so that students work, and develop knowledge and skills, utilising the abstraction-concrete experience, reflection-experimentation nexus best described by Kolb (1984). A range of typical clinical evaluation tools are used to assess students during placement including the use of reflective journals. As a tool to facilitate the development of reflective practice, the effectiveness of the reflective clinical journals has not been assessed within the University of Newcastle's curriculum. Before this can be achieved a tool to assess the evidence of reflection needed to be developed.

This paper describes the development of the Newcastle Reflective Analysis Tool (NRAT) - a deep analytic and a broad classification tool for assessment of students' reflective writing, and application of the NRAT to summative and formative assessment settings for professional placement student journals. Within this research the term, 'student journal' is used. However, students' reflective writing can take on many forms, including diaries, logs or portfolios. This research can be applied to each of these contexts.

The literature demonstrates a handful of studies that have employed four frameworks for assessing the levels of reflection in student's personal/professional journals. These frameworks are from the work of Usher (2001), Williams et al (2001), Wong (1995) and Powell (1989). The reflective models underpinning these frameworks originated in the works of Boud (1985), Mezirow (1981, 1990) or Van Manen (1977). The work of Wong (1995) will be discussed as it is fundamental to the development of the NRAT.

### Wong's Phase 1 Framework

This framework, based on Boud's model, has three stages, constituting six steps or levels to the reflective process as outlined in Table 3.1 Wong et al, (1995), used this model in the first phase of a study of reflective scripts completed by undergraduate nursing students (Table 3.2). Here Boud's six level model was adapted on the principle that students were required, for the purpose of journaling, to "return to the experience", hence negating the need for this to be assessed again. Wong then included a final coding category for "outcome of reflection", although Validation (Boud - level 5) and Appropriation (Boud - level 6) are elements of reflection, the reflective process does not adhere to a linear model, nor are all steps completed sequentially to reach the end point of reflection. This difficulty in assessing a spiralling behaviour with a linear tool is well recognised by many authors (Williams, et al., 2000; Williams & Wessel, 2004; Williams, et al., 2002). Hence coding for "outcome of reflection", which is defined by Boud et al, (1985) as, the development of new perspectives or changes in behaviours, attempts to counter the problematic spiralling model of reflection for the purpose of assessment in clinical journals, with a linear tool.

Wong's study discusses in detail the difficulty in assessing levels of reflection as discriminate processes, when often they are inseparable and interrelated stages of a larger process. Wong (1995) measured the intercede reliability by dividing the total number of agreements by the total number of agreements plus disagreements. The initial phase one coders obtained intercoder reliability scores between 0.5 and 0.75, a secondary set of coders however we unable to reach even this level of agreement.

Wong’s Phase 2 Framework

To improve the reliability of the assessment and counter the difficulties of coding for narrow discriminate categories of reflection, Wong (1995), completed the assessment of levels of reflectivity by incorporating a second phase of analysis. Phase two utilised the results from the initial phase and categorised the participants into one of three broader levels of reflectivity, based on the work of Mezirow (1990), non reflector, reflector and critical reflector. The non reflector was categorised as one who shows no levels of reflection as assessed in phase one. The reflector was classified as a participant who demonstrated one or more of the first three levels (Boud – level 2,3 and 4) of reflection as determined in phase one, and the critical reflector demonstrated validation, appropriation or outcome of reflection. Intercoder reliability for phase 2 obtained a score of 0.88, a much more acceptable level of agreement.

**Table 3.1 Boud’s model of reflection (Boud et al., 1985).**

Stage 1	Level 1	Stage one considers that as an individual undertakes the process of reflection, first they return to experience. At this stage the individual is able to recollect the experience and replay it in their mind or written format, allowing all the events and reactions, of themselves and those involved to be considered.
Stage 2	Level 2	Stage two involves attending to feelings, in this stage the importance of acknowledging and dealing with the emotions that an experience evokes is discussed. Hence harnessing the power of positive emotions or setting in abeyance the barriers that may accompany negative emotions is essential to this stage.
Stage 3	Level 3	Association, during this stage feelings and knowledge for the experience are assessed for their relationship to pre existing knowledge and feelings of a relevant nature.
	Level 4	Integration, involves the process of assessing whether the feelings and knowledge are meaningful and useful to us, bringing together ideas and feelings.
	Level 5	Validation, requires the individual to determine the authenticity of the new feeling and ideas that have emerged.
	Level 6	Appropriation, is the final stage where the process of making the knowledge our own occurs. Where the individual appropriates the knowledge into ones identity and in some cases can make a significant impact on their lives.

Wong (1995) concluded that coding to the finer levels of Boud’s model may not be useful, as at these levels it can be difficult to categorise textural data into one category or another with accuracy. However, she believes that there can be a

distinction made between reflectors and non reflectors as the discrimination of levels one to three (Attending feelings, association and integration) and the higher levels (validation, appropriation and outcome of reflection) is possible. These conclusions are supported by the results of the intercoder reliability scores that were calculated during each phase of the study (Wong, et al., 1995).

**Table 3.2 Boud's Model adapted for Wong's phase 1 framework (Wong, et al., 1995)**

Level	Bouds Reflective Model	Level	Wong's Phase 1 Framework
1	Return to experience		
2	Attending to feelings	1	Attending to feelings
3	Association	2	Association
4	Integration	3	Integration
5	Validation	4	Validation.
6	Appropriation	5	Appropriation
		6	Outcome of Reflection

### Reviewing Available Models

Authors of the studies that have utilised the above mentioned (Table 3.1) describe the difficult nature in accurately assessing the levels of reflection when using a definitive linear tool, due to the spiralling and often random nature of the reflective process. The only author that addressed this limitation was Wong (1995), with the suggestion of coding for broader categories rather than finer discriminate ones. Williams et al., (2000) criticise the use of these three simpler categories as not describing the true process of reflective thinking. Wong continues to validate her choice to complete a two phase analysis by demonstrating that the intercoder reliability of coding for these broader categories of non reflector, reflector and critical reflector to be much higher and accurate than that of the narrower categories.

Many authors in the area of research and reflectivity have recognised the valuable work of Wong's study (Burton, 2000; Duke & Appleton, 2000; Hargreaves, 2004; Spencer & Newell, 1999; Wong, et al., 1997), with some commenting on the reliable and convincing nature of the study (Milinkovic & Field, 2005). When Spencer and Newell (1999) adopted the tool developed by Wong in their study of nurses exhibited levels of reflectivity in written accounts of

incidents related to their professional life, they report Wong's (1995) tool, to be the only reasonably valid and reliable tool to be used when assessing for levels of reflectivity in written materials. They highlight that although coding for levels of reflection to be a subjective activity, utilising a structured framework such as Wong's, attempts to establish a consistent approach. From this evidence, the two phase framework of Wong (1995), has been adapted to provide two separate tools that can be used to analyse students reflective writing on either a deep analytic or a broad classification platform.

### **Assessing Students Reflective Writing**

There is acknowledgement in the literature of the importance of feedback to assist students in decreasing the gap between their actual performance and the reference level performance (Rushton, 2005). Similarly the impact that assessment has on learning is also well recognised (Gipps, 1994). It is therefore important that the outcomes of a reflective writing exercise are evaluated and clear feedback provided to students, allowing them to use this to further develop their reflective writing skills.

Results of an assessment of student reflective writing using a Deep Analytic or Broad Classification NRAT can provide essential information on the students skill progression in, and understanding of, reflective writing. It also provides a great source of feedback to help support students in developing their reflective writing ability.

### **Newcastle Reflective Analysis Tool – A Deep Analytic Tool**

The Newcastle Reflective Analysis Tool (NRAT) has been developed for assessing students reflective writing, based on Wong's (1995) Phase 1 Framework. This method is very specific and calls for coders/assessors to be trained in the use of the coding tool (Table 3.3, p117) and have low to medium level of knowledge on reflective practice and writing within the context of health care. Specific worksheets to document the coding results are also necessary, as is training in their use. Additionally the coding duration is much greater than that of the broad classification technique. This method provides a system that allows scores to be assigned to various levels of the tool and provide a rigorous process

to follow in order to obtain a summative assessment of the student's reflective writing.

## Newcastle Reflective Analysis Tool – Broad Classification Tool

Applying the deep analytic approach to assessing students reflective writing may be a difficult and time consuming process due to the difficulties of assessing journals against narrow categories of reflection as in Wong's Phase 1 analysis. It is far more practical to adopt a more robust, broader classification method when the results are not used for summative assessment purposes. Little coder training is needed to use the Broad Classification tool, as opposed to that required for the Deep Analytic tool. Issues of intercoder/assessor reliability are greatly reduced as discussed in critique of Wong's (1995) phase 2 analysis.

Important things that have been included into the NRAT to assess the reflective writing of RT students include, clear description of each category of reflector including the expected outcomes and multiple examples of these levels in contextualised examples from the clinical RT environment (Table 3.4).

**Table 3.4 NRAT - Broad classification tool for analysis of students reflective writing**

Category	Expected Outcome	Example 1
<b>Non Reflector</b>	Descriptive report only	"Today I talked a lot to patients about how they were going"
<b>Reflector</b>	How they felt about the event and their reaction	"I found it kinder sad at first since I know she will die at first, but so happy that she has such a supportive family"
	How the event or knowledge differs to previous knowledge or experience	
	Connections with existing practice	"I have not really felt that mix of feelings before it was a bit confusing"
	Do they see any value in this new knowledge?	
	Is there a new knowledge or understanding?	"It is always good to have moments in your career that you truly get a snapshot of what it is like for the patient it humanises them."
<b>Critical Reflector</b>	Questions or discusses the validity or authenticity of emotions or knowledge	"Although it felt odd to have such emotions I think it is appropriate and valid to have them."
	Discusses how will this effect future behaviour	
	Discusses how will this effect future practice	"This will change my practice as I my view on patient care has been really refreshed."

## **Conclusion**

Although journaling whilst on clinical placement is utilised by many universities to encourage the development of reflective practice, it is equally important to assess whether the journals have evidence of reflection . This paper has presented the Newcastle Reflective Analysis Tool (NRAT) containing a Deep Analytic and Broad Classification tool for assessment of student reflective journals. Both the Deep Analytic and Broad Classification NRATs can provide essential insight into the quality of student reflective writing. By providing a tool that can assist the identification and classification of reflective writing into specific levels the effectiveness of the journal writing exercise for promoting and facilitating reflective writing in the undergraduate professional placement context can be explored. The NRAT has been validated using 96 journals and four independent, blinded coders. The results of this study will soon be published.

Although assessment of student reflective writing is not a simple task it is essential in monitoring the development of students skills in reflective writing and practice, as we foster the reflective practitioners and lifelong learners of the future.

**Table 3.3 NRAT - Deep analytic framework for assessment of student's reflective writing – sample only not complete tool**

2	Association	Are these similar feelings to ones you have had previously?	I have felt similar feelings towards a patient such as admiration and respect but in a slightly different way and probably to a slightly lesser extent.	The student will validate the knowledge as similar to what they expected or that it differs from knowledge that the practice on. Alternatively they may identify it as new knowledge.
		Can you see any connections between this new experience and previous experiences?	However, I don't believe that I have had such strong feelings before as I have never had a patient that has 'opened-up' to me that much.	
3	Integration	Do you see any value in the knowledge gained from this experience?	The experience gave me a greater understanding of some of the emotions and hurdles that patients may experience during their cancer treatment.	As the examples describe this stage would see the students describing new knowledge or understanding from the experience.
		What is your new understanding as a result of this experience?	It also gave me an even greater respect and admiration for our patients due to these experiences that they have to face and overcome.	
4	Validation	Is the new knowledge correct?	I definitely feel that these feelings are valid and furthermore, that we all need a similar experience every now and then to ensure that that respect and understanding does not disappear from our daily working life.	
		Are the feelings authentic?		
5	Appropriation	How will you approach this situation if you come across it again	I don't think that I would approach this situation much differently. If faced with the situation again I would still sit and listen to the patient and learn from their experience that they are sharing with me.	Here the student will display a change in perspective or knowledge that may result in a change in behaviour or decisions about how to act if the situation arose again
		Will this new knowledge change your practice?		
		Should you take this new knowledge back to your clinical setting and assess its appropriateness in you	However, my initial reaction would change from one of dread to one of willingness to listen, learn and reassure if necessary.	
		Could you investigate the area of this new knowledge further and how?		

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## Chapter Four

### Paper Five

#### 4.1 VALIDATION AND USE OF THE NEWCASTLE REFLECTIVE ANALYSIS TOOL: A THREE YEAR LONGITUDINAL STUDY OF RT STUDENTS' REFLECTIVE JOURNALS

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The Co-Authors of this paper are supervisors of the PhD.

##### **Abstract**

Freeform written personal development journals are used within the Radiation Therapy (RT) program at the University of Newcastle to promote reflection on practice. The journals are developed by students on completion of each semester based professional placement (clinical placement). To evaluate the level of reflection within journals the Newcastle Reflective Analysis Tool (NRAT) was developed. The NRAT allows for both narrow and broad classification of reflective writing, useful for formal and informal reflective writing assessments. This paper provides validation of the NRAT in the assessment of freeform reflective writing and its use in the assessment of reflection in RT student journals.

##### **Method:**

Assessment of the journals for evidence of reflection and validation of the NRAT involved ninety seven freeform journals. These were assessed for evidence of reflection using both the Deep Analytic and Broad Classification NRAT by four blinded coders. Assessment for agreement was determined using Kappa, absolute and consensus agreement.

##### **Results:**

The level of agreement achieved between four coders ranged from Kappa 0.53 – 0.63 for the 6 levels of reflection (Deep Analytic), and Kappa 0.65-0.93 for 3 levels (Broad Classification) of reflection.

The results indicated that a large proportion of the students freeform writing were reflecting to a low degree with few reaching the higher levels of critical reflection. Whilst there was an increase in the number of critical reflectors from Year 1 (mean 4.2%), Year 2 (mean 9.4%) to Year 3 (mean 17.2%); this difference was not statistically significant.

#### Discussion:

The assessment of reflection in the freeform journals shows that the NRAT is a reliable and valid tool for assessing freeform reflective writing for evidence of reflection and categorization into six narrow or three broad levels of reflection.

The results also indicate the need to introduce interventions to foster students reflective writing ability within the RT program. As a result of these findings the Newcastle Reflective Inventories (NRI) have been developed. The NRIs are short form guided inventories aimed at assisting students with their reflective writing development.

## **Introduction**

### The origins of this project

The literature suggests that the incorporation of reflection into a health professional practice allows practitioners to methodically discover new insights and apply them to their daily practice (Waldo & Hermanns, 2009). There is a large amount of research that supports the integration of reflective writing into a health science program (Waldo & Hermanns, 2009). Turley (2009) suggests, to develop into reflective practitioner it is important that students reflect during and after their professional placement within a clinical facility.

Reflection can be demonstrated in many different mediums, from guided journals, debriefs and dialoguing to poetry and art (Turley, 2009; Van Horn & Freed, 2008; Waldo & Hermanns, 2009). In radiotherapy departments where often staff and resources are stretched, using journaling to facilitate reflection can minimise the burden on staff and resources (Cole, 2005; Milinkovic & Field, 2005).

The University of Newcastle (UoN) has incorporated freeform reflective journals as a component of the Professional Placement courses within the Bachelor of

Medical Radiation Science (Radiation Therapy) degree for over 15 years. Up until 2008 the requirements for the journal were to, “write a report assessing your achievements and progress in this block. Include new or different techniques you took part in or observed, your progress in communication skills and team work, any problems you experienced and how you feel these could be addressed. Do not make this a critique on the centre but address it to your own personal performance.”

The freeform journals provided insight into many aspects of the students’ professional placement that could not be identified in the structured professional or clinical skill assessment activities. The freeform journal served as a means for the academic staff to obtain personal feedback on the issues that effected the students on clinical placement, not only those issues that they found difficult but also rewarding. It has also allowed for course coordinators to view details on technical practices being undertaken in the professional environment and feedback on the quality of the placements some centres offer from a students’ perspective. Whilst it is valuable that students have the forum to describe their experiences in an uninhibited and confidential manner, this was not the intention of the freeform journal task .

These freeform journals were not used as part of summative assessment, and often provided confidential feedback to the university on issues that effected the student on placement. These issues often involved relationships and interactions between student and staff, as well as students and patients.

Over the past two decades the literature provides many examples of the use of journaling or reflective assignments as a tool to promote reflective thinking skills in health science students and professionals; such as nursing (Fakude & Bruce, 2003; Ibarreta & McLeod, 2004; Riley-Doucet & Wilson, 1997; Wong, et al., 1997), physical therapy (Williams & Wessel, 2004; Williams, et al., 2002), occupational therapy (Tryssenaar, 1995) and dentistry (Pee, Woodman, Fry, & Davenport, 2002).

Journaling is said to assist in reflection, as writing is a conscious practice and insists on deliberate and tangible action being undertaken in reference to an

event or situation (Harris, et al., 2001; Kerka, 1996). Allowing the student to explore reactions, discover relationships and connect new meaning with past experiences (Metrick Kennison & Misselwitz, 2002). Authors such as Williams et al. (2002), Usher (2001), Smith (1998) and Winnie and Palmer (2004), discuss the link between student journal writing and its ability to decrease the gap between theoretical knowledge and clinical practice. Shepard and Denton (1990) suggest that reflective journal writing whilst on professional placement assists not only to integrate perception, knowledge and experience gained, but also allows cognitive and affective aspects of their experiences to be explored. However caution must be taken as it is well documented that journal writing does not guarantee reflection, with some students writing more descriptively than reflectively (Kerka, 1996).

The freeform journals developed by the students at the UoN were more akin to a personal development journal rather than a 'reflective journal'. In discussion the academic staff involved commented that the writing produced by students in the freeform journals was noticeably more descriptive than reflective. Students rarely questioned 'Why?', 'How can this change my practice?' or made links between the university acquired knowledge and experience gained on placement.

Holm and Stephenson (1994) detail how the reflective process can be difficult for some and not all students possess the skills to be reflective. It is these skills that need to be fostered and coached early in degree programs. Varying levels of reflective ability among students could impact on their ability to complete their experiential learning cycle whilst on clinical placement. Hence it is important to actively investigate their reflective ability.

Although feedback from the freeform journal is invaluable to academic staff as are the descriptive elements of additional assessments that students undertook whilst on placement. Additional assessments undertaken whilst on placement included, technology assessments, patient assessments and competency reports, however none met the requirements of promoting reflective writing, thinking or practice. Due to the volume of assessment students were inundated with descriptive academic work that did not really enhance the experience and learning that reflection on action facilitates during professional placement.

Assessing the journals for evidence of reflection would allow the modification of the freeform journal task to promote reflective writing and thinking. Allowing the reflective writing task to be completed and also allowing for formative feedback to be provided to students. To develop students writing skills to higher levels of reflection it is important that the reflective writing of students is assessed and the student provided with appropriate feedback. There is however little published research in the health care setting about the processes and the reliability of the process and tools of assessing reflective writing (Dunfee, Rindflesch, Driscoll, Hollman, & Plack, 2008).

### Development of an Assessment Tool

The authors of this paper have developed an assessment tool to evaluation of reflective writing within allied health. A full narrative of the tools development is available in a previous publication by Findlay, Dempsey and Warren-Forward (2009). The NRAT consists of two assessment tools termed the Deep Analytic NRAT and Broad Classification NRAT that can either be used as standalone tools or in combination as a two phase system. The Deep Analytic NRAT is a six level finely demarcated classification system that can be used for formative assessment of reflective writing. The Deep Analytic NRAT contains a concise description of 6 levels of reflection, contextualised examples (in this case to radiation therapy), expected outcomes and questions for each of the six levels of reflection that assist educators or coders to identify the level of reflection. The Deep Analytic NRAT is particularly useful in the academic appraisal of reflective writing.

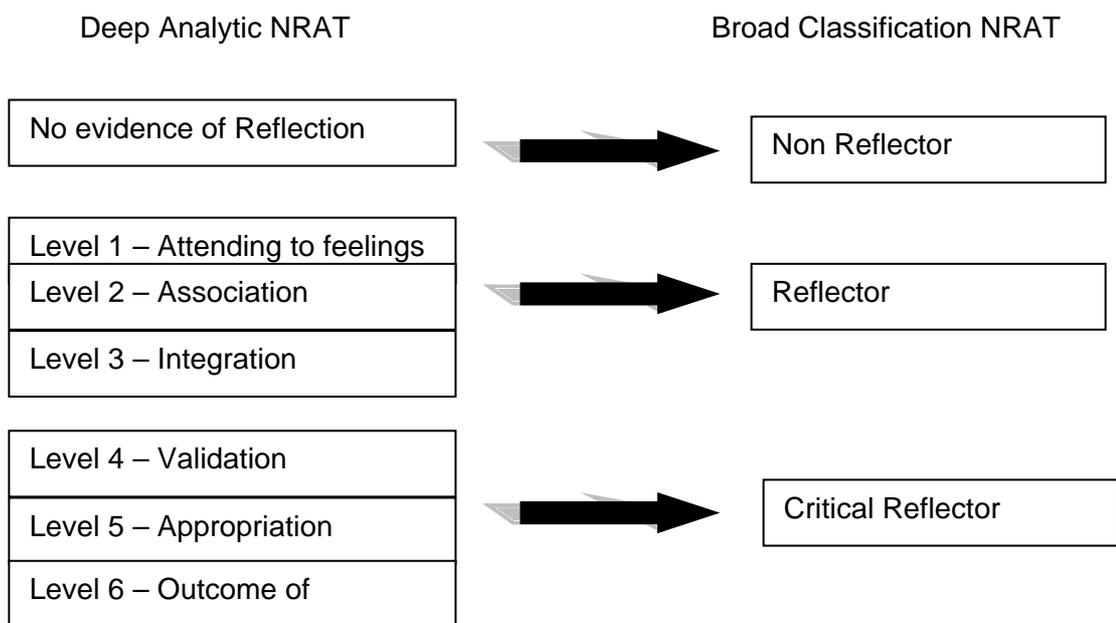
The Broad Classification NRAT has three levels of reflection that can be used more readily in clinical setting or as part of a self evaluation framework. This tool has clear and concise descriptions of each level of reflection (non reflector, reflector and critical reflector) and examples of each level contextualised to the RT clinical environment.

To use both stages of the NRAT sequentially the results from the Deep Analytic NRAT coding are integrated into the Broad Classification NRAT (Figure 4.1). If the findings of the Deep Analytic evaluation reveal that there was no evidence of

reflection identified within the writing then the participants are categorised as non reflectors for that entry. When low levels of reflection (levels 1 to 3) are identified the participants are reflectors, or if higher levels are evident (levels 4-6) participants are placed into the critical reflector category.

The current research aims to:

- Validate the NRAT as a tool to evaluate freeform reflective writing
- Identify evidence of reflection in the students personal development journals
- Assess if there are any changes in the evidence of reflection as the students progress through the program
- 
- 



**Figure 4.1 Integration of the results from a Deep Analytic analysis to the Broad Classification NRAT when using the tools in combination**

## Method

The method described below was used to produce results that address all three aims of this project. The sample consisted of personal reflective freeform journals completed by undergraduate RT students at the completion of each 4-5 week professional placement within a clinical radiation oncology treatment centre.

Each student completed one journal for each professional placement undertaken over three consecutive years of the program.

### Coder training and Coding process

Four coders blinded to the research question were recruited and the researcher conducted coder training on the use of the Deep Analytic NRAT. Coder training covered the following areas:

Interpretation of the Deep Analytic NRAT descriptions, examples and questions

Unitisation of the data within the freeform journals to be assessed

The frequency of the coding if evidence is identified multiple times

How to record the coding results

Pilot coder training involved all coders analysing five journals from each year of the program, coder profiles and kappa coefficients were calculated for both groups. Once acceptable levels of agreement were obtained no further training was required.

The full set of journals were then analysed by all four coders independently from one another using the Deep Analytic NRAT. Each journal was read and any evidence of reflection was recorded in the specifically designed coding worksheets. The results of this analysis were transferred to an excel spreadsheet.

The results produced from the analysis using the Deep Analytic NRAT allowed the students to be categorised by the researcher into the Broad Classification NRAT of, non reflectors, reflector and critical reflectors by the highest level of reflection achieved during the deep analytic analysis, in accordance with the work of Wong (1995). These results were then entered into an excel spreadsheet.

### Analysis of the coding results

The different levels of reflection identified in the journals were displayed as percentages of the total number of students in each year. All data was entered into a contingency table and categorical statistical analysis was undertaken using GraphPad Instat version 3 to investigate the statistically significant differences in: The evidence of reflection identified in each year of the program for each coder

Any changes in the evidence of reflection identified within the journals as the students progress through the program

Following the completion of the coding, intercoder reliability calculations were completed for the entire sample. This was done using coder profiles and Kappa (K) Coefficients, absolute agreement and consensus agreement for the results from the Deep Analytic analysis (six levels) and the Broad Classification (three levels) of the journals.

Absolute agreement was defined as the agreement achieved when all four coders were in agreement, and consensus agreement required three out of the four coders agreeing on the coding results.

## **Results**

The sample consisted of 97 journals in total from an RT undergraduate intake; 36 year 1, 32 year 2 and 29 year 3 journals making up the sample.

### Validation of the NRAT.

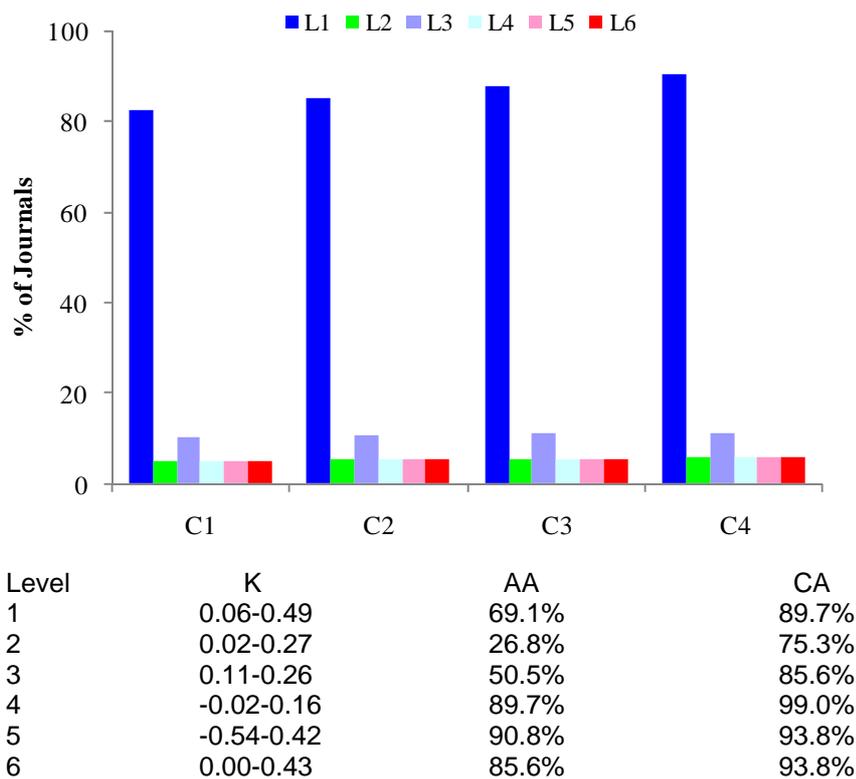
The pilot coder training produced moderate to substantial levels of agreement between the coders, achieving Kappa of 0.49 ( $p < 0.0001$ ) for the Deep Analytic NRAT (6 levels combined) and Kappa 0.67 ( $P < 0.0001$ ) for the Broad Classification NRAT (3 levels combined). No further training was considered necessary.

The coding results shown in Figure 4.2 displays the distribution of evidence of reflection categorised into six levels within the journals, as identified by each of the four coders (C1, C2, C3, C4).

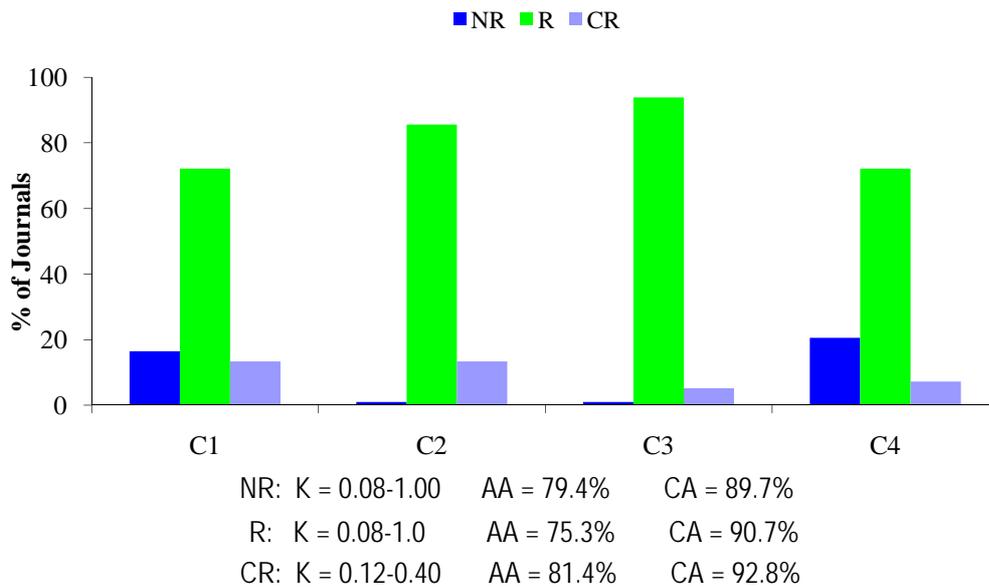
When coding for evidence of level 1 reflection, the four coders achieved moderate absolute agreement (69.1%), and very high consensus agreement (89.7%). The coding for levels 2 and level 3 of reflection provided poor absolute agreement (26.8% and 50.5%), but good consensus agreement (75.3% and 85.6%). The absolute and consensus agreement for levels 4, 5 and 6 was also very high (AA 85.6%-90.8%, CA 93.8%-99.0%). Despite the variation of Kappa

results ranging from poor to good agreement across the cohort when each coder was compared with one another, when all four coders were compared together, for all six levels of reflection, the Kappa coefficient indicated good agreement with  $K = 0.55$  ( $p < 0.0001$ ).

Exploring the results of the coding using the Broad Classification Figure 4.3 shows similarities in reader profiles, but varying levels of Kappa for each of the three levels of reflection when coders were compared with one and another. When all four coders were compared, for all three levels the Kappa coefficient indicated very good agreement with  $K = 0.71$  ( $p < 0.0001$ ). All three levels of reflection showed good absolute coder agreement (75.3% - 81.4%) and excellent consensus agreement (89.7% - 92.8%).



**Figure 4.2** Displays the percentage of journals that each coder identified as containing evidence of reflection broken down by the six levels of reflection and four coders (K = kappa, AA = absolute agreement, CA = consensus agreement)



**Figure 4.3** Displays the number of journals that each coder identified as containing evidence of reflection broken down by the three levels of reflection and four coders (K = kappa, AA = absolute agreement, CA = consensus agreement)

### Evidence of the Reflection

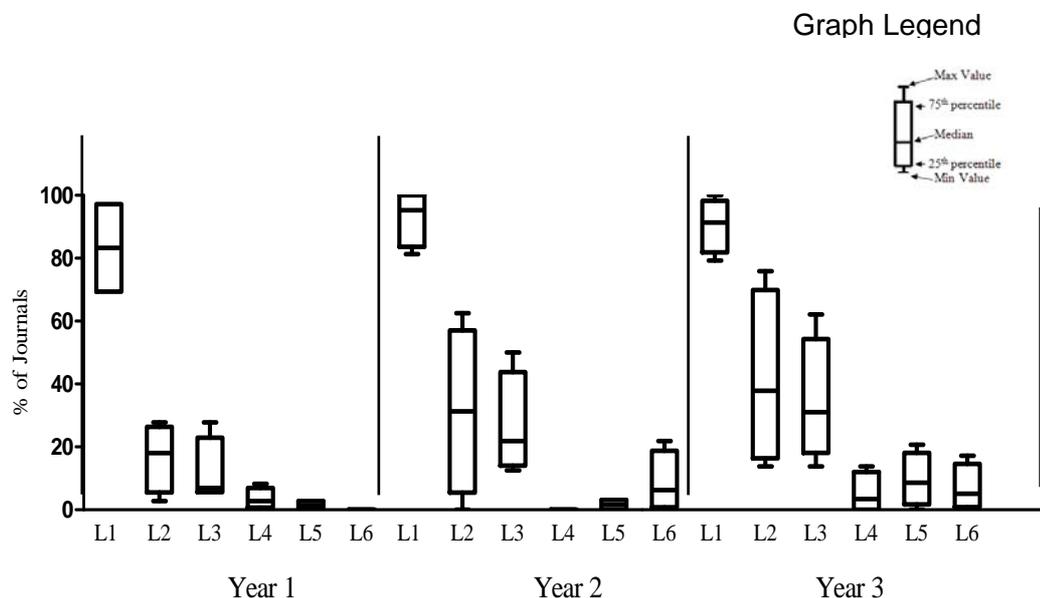
There was a considerable variation in the evidence of level 2 reflection indicated in year 2 journals by the 4 coders (Figure 4.4). Each box on the graph represents the distribution in percentage of each coder for each level of reflection. One coder identified 0% of the journals containing this level of reflection and another coder identified 60% of the journals containing level 2 reflection. Figure 4.4 shows the distribution in the evidence of reflection as identified by the four coders using the Deep Analytic NRAT, broken down by year and level of reflection. Attending to their feelings (level 1), obtained a median of 83.3% (year 1), 93% (year 2) and 90.5% (year 3). Less than half the cohort displayed evidence of 'association', the mean of all four coders ranging from 16.7% in year 1 to 41.4% in year 3, nor 'integration' (level 3) the mean ranging from 11.8% in year 1 to 34.5% in year 3 within their journals. Very few students displayed higher levels of reflective writing within their journals with the evidence of reflection for levels 4 to 6 the mean ranging from 0% to 9.5%.

Although a similar percentage of students in all three years of the program were identified as displaying evidence of level 1 reflective writing, there was a linear

increase in the evidence of levels 2, 3 and 5 as the students progressed through the program. Coding result also identified an increase in the percentage of students that displayed levels 4 and 6 of reflection from year one to year 3 however this was not a linear progression.

The results of the Broad Classification NRAT (Figure 4.5) identified that the majority of students, with a mean across the coders of 8.3% (year 1), 84.4% (year 2) and 76.7% showed evidence of being ‘Reflectors’. A year 3 student shows a good example of reflection as they discuss team dynamics and their communication skills whilst on placement,

“I found it slightly difficult to prioritise myself over the other staff members and ask to gain hands on experience, however the staff were generally good with this and encouraged me to join in when times allowed. I felt that I was able to communicate confidently and friendly to patients and by the end of the week I was fairly confident with simulation procedures” Y3B201.



**Figure 4.4 Evidence of reflection as identified by the four coders using the Deep Analytic NRAT, broken down by year and level of reflection (L = level of reflection)**

Whilst a second year student provides evidence of reflection as they recount their learning experience,

“ I also found this patient’s treatment useful in helping me better understand the whole template process that I learnt at university as I had never before seen the implementation of shadow tray shielding block templates” Y2B112.

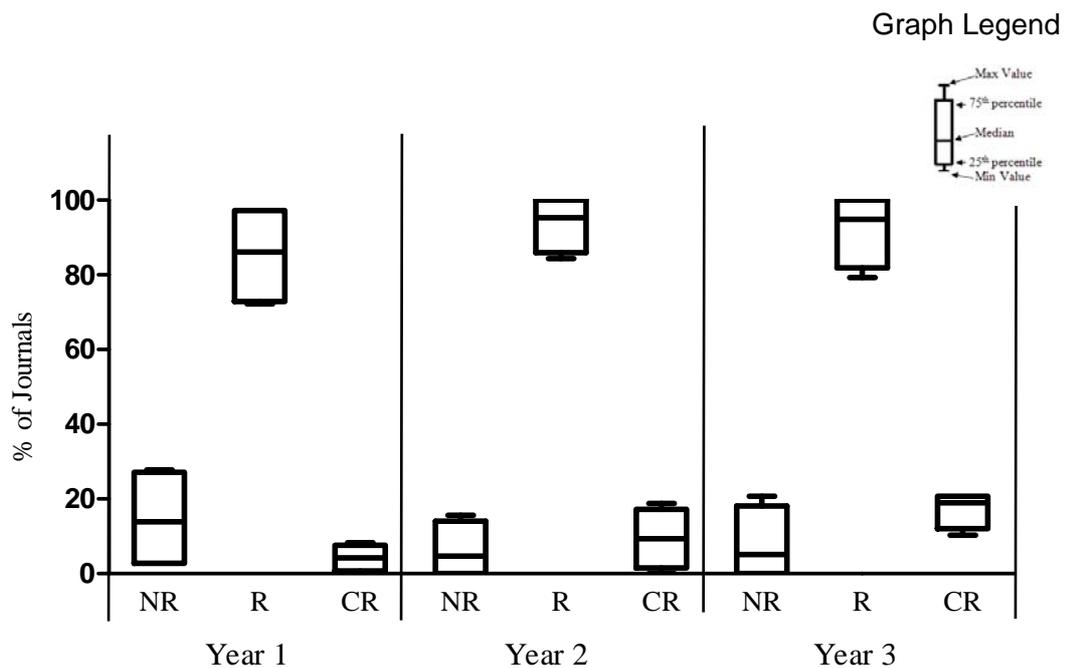
The numbers of students that were identified as ‘Non Reflectors’ decreased from year 1 to year 3 ( mean 14.6% to 7.8%). Non Reflectors writing was typically descriptive, with no acknowledgement of feelings, previous knowledge or questioning why. A first year student provides a classic example of this type or non reflective writing,

“First I went to the doctors clinic. I was with an oncologist that specialised in breast cancer, so I got to see a lot of patients that had already had radiation treatment and were just coming back for checkups” Y1B109.

Those classified at “Critical reflectors” increased over the same period (mean 4.2% to 17.2). An example of Critically Reflective writing from a third year students highlights the change from simple reflection to include evidence of the student acknowledging the transformation of their future practice.

“I was not very confident at the start of the week, but towards the end my skills had improved a great deal. My communication abilities with the patients and staff have improved drastically compared to last week. I felt this was because I persisted.....by the end of this week I really felt I was part of the team and was sad to be leaving. I felt really appreciated and confident. I want to make sure I approach my future placements in the same way” Y3B227.

The difference in levels of reflection for both the six levels and three levels of reflection were not considered statistically significant at the 95% level.



**Figure 4.5 Evidence of reflection as identified by the four coders when classified by the Broad Classification NRAT, broken down by year and level of reflection.**

## Discussion

### Validation of the NRAT

This study shows that the NRAT is a valid tool to assess the freeform writing for evidence of reflection. Exploring the coder agreement results presented in this paper provided great variation in the 'agreement' when considering the Kappa coefficients achieved. Although Kappa is a well used calculation to determine coder agreement beyond chance, it is not always correct to conclude a poor Kappa value indicates poor coder agreement or visa versa (Thomsen, Olsen, & Nielsen, 2002). The resultant Kappa for any calculation can be dependent on the prevalence of the category being measured within the data (Feinstein & Cicchetti, 1990; Thompson & Walter, 1988; Thomsen, et al., 2002). This phenomenon is evident when you consider the range in Kappa reported in figure 3, for the level 4 reflection, where the Kappa between the coders ranges from -0.02 to 0.16, indicating very poor agreement, however the absolute agreement is 89.7% and consensus agreement 99.0%.

With this in mind the four coder profile (Figure 4.2) and consensus agreement when using both the Deep Analytic and Broad Classification NRAT showed excellent intercoder agreement. Absolute agreement for both tools also showed good agreement (0.69-0.91), with moderate agreement achieved for levels 2 and 3 of the Deep Analytic NRAT results. These results are improved on the findings of Wong (1995), where the coder agreement for the six levels of reflection was more problematic. Wong's initial coder agreement using three coders for the 6 levels of reflection was between 0.5 and 0.75, however two subsequent coders were unable to achieve these levels (Wong, et al., 1995). Comparatively this study achieved an absolute coder agreement of 0.69 using four coders and established consensus agreement (three coders) of 0.90. Furthermore the Kappa coefficients calculated when comparing all four coders for both the six levels combined and three levels of reflection combined showed good coder agreement.

When assessing reflective writing for 3 levels of reflection Wong (1995) achieved excellent coder agreement of 0.88 combining all levels of reflection. However there is no clear indication of how many coders this agreement was achieved across. When combining the results of the four coders this study achieved absolute agreement of 0.79 and consensus agreement (three coders) of 0.91 across all 3 levels of reflection.

In the case of the Deep Analytic and Broad Classification NRAT this paper further assessed the validity of the tools by exploring the absolute and consensus agreement for each level of reflection individually, providing evidence that the tool is reliable in each discriminate level to varying degrees (Figure 4.2 and 4.3).

### Evidence of Reflection

The results of this study indicate that there is a statistically significant difference in the levels of reflection achieved by students when writing in their freeform journals on professional placement in each year of the program. With the majority of this cohort apt at writing at low levels of reflection ('attending to feelings' – level 1). Very few of the students in any of the years of the program displayed evidence of their ability to write in a critically reflective manner ('validate, appropriate or outcome of reflection – levels 4 to 6) as defined in the

Deep Analytic NRAT. These results are similar to that found in the literature, where Richardson and Maltby (1995) studied undergraduate nurses reflective journals whilst completing a clinical placement in community health and found that most students were very apt at reflective journaling at the lower end of Mezirow's reflective scale (94% of the total number of scores). Similar evidence of reflection was identified in the studies of Williams (2000; 2004) and Wong (1995), with few students able to reflect at the higher critically reflective levels.

There was no statistically significant change in the evidence of reflection within the freeform journals as the students progressed through the program and only a small percentage increase in the overall levels of reflection seen in the later years of the program. Both of these findings indicate that there is a need for an intervention that supports students to develop their reflective writing ability and continue to progress this ability as they move through the program and after graduation.

## **Conclusion**

As a result of these findings the Newcastle Reflective Inventories (NRIs) have been developed. The NRIs are short form guided inventories, they are simple and concise tools that require students to provide a number of short form responses. These responses are triggers that assist the student to undertake the reflective writing process. The NRIs have been piloted and the results of their validation will be published in a subsequent paper. These NRIs will be incorporated into the RT Professional Placement course at the UoN from 2009 onwards.

The results indicate that the Deep Analytic NRAT alone and combination with the Broad Classification NRAT, are valid tools for assessing freeform reflective journals in the undergraduate RT setting. As a result of these findings the Deep Analytic NRAT will be introduced to assess reflective writing tasks (i.e. NRIs) in the RT Professional Placement course from 2009 onwards.

Further work needs to be undertaken to validate the use of the NRAT when assessing reflective writing in various forms, such as short form and guided inventories such as the NRIs.

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## Chapter Five

### Paper Six

## 5.1 DEVELOPMENT AND VALIDATION OF REFLECTIVE INVENTORIES: ASSISTING RADIATION THERAPISTS WITH REFLECTIVE PRACTICE

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Co-Authors Mr Shane Dempsey, Associate Professor Helen Warren-Forward

Journal: Journal of Radiotherapy in Practice, Vol 10, pp 1-10, 2010

The Co-Authors of this paper are supervisors of the PhD.

### **Abstract**

Freeform reflective writing is one way that radiation therapists can document their development. Barriers to this form of writing include the fact that some radiation therapists do not know what to write or how to begin this writing process.

This paper outlines the development and validation of guided inventories called the Newcastle Reflective Inventories and the validation of the Newcastle Reflective Analysis Tool as an effective tool for assessing short form guided reflective writing.

### Method

The Newcastle Reflective Inventories consist of a series of questions that guides the user through the reflective writing process. Validation of the Newcastle Reflective Inventories involved comparing the evidence of reflection in 14 freeform journals to that of 14 inventories completed on the same topic.

Validation of the Newcastle Reflective Analysis Tool included the assessment of 30 Newcastle Reflective Inventories.

### Results

There was a highly statistically significant difference ( $p < 0.001$ ) in the high levels of reflection evident in the inventories when compared to the lower levels of reflection in the freeform journals. Good levels of agreement were achieved between the coders.

## Discussion

These results show that the Newcastle Reflective Inventories are effective tools in promoting reflective writing when compared with freeform journaling.

## Introduction

Reflective writing is one way that health professionals can document their professional growth, and has become an accepted method for undertaking or participating in continual professional development (CPD) (Chapman, et al., 2009; French & Dowds, 2007).

Reflection and reflective writing can take shape in many different mediums, from guided journals, debriefs and dialoguing to poetry and art (Turley, 2009; Van Horn & Freed, 2008; Waldo & Hermanns, 2009). Journaling is often used to facilitate reflection in radiotherapy departments where staff and resources are often stretched (Cole, 2005; Milinkovic & Field, 2005). However traditionally reflective writing is associated with freeform writing, where authors document professional experiences, personal thoughts and learning outcomes in unstructured and unguided journal or diary entries. There is no specific template in freeform writing and the triggers for writing come from personal experience.

The literature provides a broad range of examples within health science where reflective writing has been used to support undergraduate students and qualified staff; such as nursing (Fakude & Bruce, 2003; Ibarreta & McLeod, 2004; Riley-Doucet & Wilson, 1997; Wong, et al., 1997), physical therapy (Williams & Wessel, 2004; Williams, et al., 2002), occupational therapy (Tryssenaar, 1995) and dentistry (Pee, et al., 2002).

Recognised problems associated with unstructured freeform writing include that writing can be time consuming due to its lack of direction. Researchers have commented that authors are often unsure what to write and may feel awkward writing about personal issues. Barriers to reflective writing can include a lack of mentoring and support of practitioners wanting to engage in reflective writing for their CPD within the workplace (Brackenridge, 2007), as well as the large workload that clinicians and students already carry, limiting the time to engage with freeform writing. Reflective writing is often seen as having less priority assigned than other professional development activities. The problems

associated with freeform writing lend itself to the development and investigation of guided methods of short form writing.

To assist practitioners to better develop their reflective writing skills it is important that they are provided with feedback on their writing in the form of evaluation or assessment. This may be in the form of self evaluation, formal or informal assessment. In order to evaluate freeform or short form guided reflection a simple and valid tool is required such as the Newcastle Reflective Analysis Tool (NRAT) For a full description of the development and theoretical underpinning of the NRAT please refer to the previous publication by Findlay et al., (2009).

In brief the NRAT consists of two assessment tools termed the Deep Analytic NRAT and Broad Classification NRAT that can either be used as standalone tools or in combination as a two phase system. The Deep Analytic NRAT is a six level finely demarcated classification system that can be used for formative assessment of reflective writing in academic or research setting. The Broad Classification NRAT has three levels of reflection that can be used more readily in clinical setting or as part of a self evaluation framework. The NRAT has been previously validated for use in assessing freeform writing for evidence of reflection. For full details of the validation process for use in assessment of freeform writing please refer to Findlay et al., (2010).

This research reports the development of short form written guided inventories, known as the Newcastle Reflective Inventories (NRIs) that facilitate the process of reflection for radiation therapists. The validation of the NRIs involved the use of the NRAT, which allowed for the determination of the level of reflection documented in the short form written inventories. The context for this development and validation was within the field of RT. The NRIs were implemented into the CPD protocol of a clinical radiation oncology centre within Australia and used by intern and qualified RT staff as part of their personal and departmental CPD.

This research aims to:

- Describe the development of the Newcastle Reflective Inventories
- Validate the NRAT as a tool to evaluate short form reflective writing such as the NRIs, and
- Validate the NRIs as effective tools to assist practitioners reflective writing ability.

## **Method**

### 1. Development of the NRIs

The NRIs consist of a series of questions that prompts or guides the user through the reflective writing process. To provide for the various professional development activities that health professionals may work within, NRIs have been developed for the following three situational contexts:

- post workshop reflection
- significant clinical event reflection
- post journal reading reflection
- 

The NRIs were developed based on the authors wide reading of the literature on reflective writing in health care and Boud's (1985) three stages and six levels of reflection (Table 5.1). For each of the six levels of reflection, expected outcomes were defined by developing short form written descriptions of what a practitioner may document for any given situation, in a written reflective piece for each level of reflection, as stated in Boud's model.

Questions were then written that could guide reflective responses (Table 5.2).

These were developed by identifying examples of the various levels and outcomes of reflection within previously completed reflective writing of undergraduate RT students and creating the questions that would require a response similar to the example at each level. These questions were then compiled into simple and concise inventories that could be used in either hard copy or electronic format. This process was followed for each of the three situational contexts listed above.

## 2. Validation of the Deep Analytic NRAT for assessing NRIs

Two coders used the Deep Analytic NRAT to independently evaluate a set of completed NRIs. The NRIs used in the validation of the NRAT when assessing short form guided writing were obtained from the CPD work of five intern radiation therapists. Each intern completed a NRI after attending a professional development workshop, reading a professional journal article or an experience in their clinical work that they felt was significant to them. No restrictions were placed on the stimulus for the significant clinical event, which could have been a clinical, technical, patient or staff focused event. The five interns simply documented their experience using the NRI appropriate to the context. The interns were able to complete the NRI in hard copy or electronic form. All NRI's were completed as part of routine CPD whilst working in the clinical environment over a period of six month.

**Table 5.1 Boud' s Six Levels of Reflection (Boud, et al., 1985)**

Level 1	Stage one considers that as an individual undertakes the process of reflection, first they return to experience. At this stage the individual is able to recollect the experience and replay it in their mind or written format, allowing all the events and reactions, of themselves and those involved to be considered.
Level 2	Stage two involves attending to feelings, in this stage the importance of acknowledging and dealing with the emotions that an experience evokes is discussed.
Level 3	Association, during this stage feelings and knowledge for the experience are assessed for their relationship to pre existing knowledge and feelings of a relevant nature.
Level 4	Integration, involves the process of assessing whether the feelings and knowledge are meaningful and useful to us, bringing together ideas and feelings.
Level 5	Validation, requires the individual to determine the authenticity of the new feeling and ideas that have emerged.
Level 6	Appropriation, is the final stage where the process of making the knowledge our own occurs. Where the individual appropriates the knowledge into ones identity and in some cases can make a significant impact on their lives.

**Table 5.2 An example of an expected outcome and required questions for the ‘Association’ level of reflection.**

Level of Reflection	Expected Outcome	Questions to elicit outcome
Association	The student will validate the knowledge as similar to what they expected or that it differs from knowledge that the practice on. Alternatively they may identify it as new knowledge.	Does this knowledge differ from previous knowledge?
		Can you see any connections between this new experience and previous experiences?
		Are these similar feelings to ones you have had previously?

Coder training in the use of the NRAT was provided to the independent coder prior to commencement of the analysis. Each coder then completed independent coding of the full set of NRIs. Absolute agreement and Cohen’s Kappa statistics were calculated for both the deep analytic and broad classification, results for coder agreement were compared with Wong’s (1995) work.

**3. Validation of the NRIs**

The NRIs were validated by analysing the qualitative descriptors contained within the written responses of the NRIs and freeform journals using NRAT. Data was collected from the NRIs and freeform journals of six qualified radiation therapists with varying levels of experience, from recently qualified to very experienced senior staff. Accordingly the sample had large age and qualification variation.

Each was asked to read at least one article from a professional journal of their choice and consider a clinical event that they felt was significant or document their experience following a workshop or course they had attended.

Initially six participants completed a freeform entry for each of the context. Immediately after completing the freeform journal the participant was provided with the appropriate NRI to complete using the same event as the stimulus. The writing within the NRI was not governed by academic prose or grammatical restrictions, allowing each participant to express themselves in a personal and unrestricted manner. No training or instruction was provided to the participants on reflective writing. Participants were able to complete the NRI in hard copy or electronic form. All journals were completed whilst working in the clinical environment as part of an embedded CPD program over a one month period.

Two coders independently analysed the written response in the freeform journals and NRIs for the levels of reflection using the Deep Analytic NRAT. Coding was not completed for the number of times each journal exhibited a specific level of reflection, rather coding illustrated the different levels of reflection that were evident in the writing.

The results of the coding were examined descriptively and categorical statistical analysis was completed to identify whether there was a statistically significant difference in the levels of reflection within the freeform journals, compared the written responses within the NRIs. Absolute agreement and Kappa statistics were also calculates to determine coder agreement.

## **Results**

### **1. Development of the NRIs.**

Figure 5.1 - 5.3 display the resultant NRIs developed for the three contexts; workshop, significant event and journal reading used in this research.

**Newcastle Reflective Inventory  
Workshop or Course**

Who facilitated the course or workshop and what was the subject area?

What were the three main things you learnt from the event?

Does this differ from your previous knowledge of these areas?

Do you see any value in the knowledge gained, is it accurate and why?

Will this new knowledge change you practice? Should you take this clinical knowledge back to your department and assess its relevance in your clinical setting?

**Figure 5.1 Newcastle Reflective Inventory that can be used after completing a workshop or course.**

**Newcastle Reflective Inventory  
Journal Reading**

What journal did you read, where was it published and what did it discuss?

Did you learn anything different to what you already knew on the topic? If so what?

Do you think this new knowledge is accurate and why?

Can this new knowledge be used in your clinical practice?

If not can you investigate this further to assess its clinical application?

**Figure 5.2 Newcastle Reflective Inventory for use when discussing a journal article that has been read.**

**Newcastle Reflective Inventory  
Significant Event Entry**

Clinical	<input type="checkbox"/>	Non clinical	<input type="checkbox"/>		
With a patient	<input type="checkbox"/>	With Staff or student	<input type="checkbox"/>	Technically orientated	<input type="checkbox"/>

Describe the event? Why did it happen and what was your initial reaction to the event?

Have you ever had these feelings before?

What is your understanding of the outcome of this experience or your feelings about it?

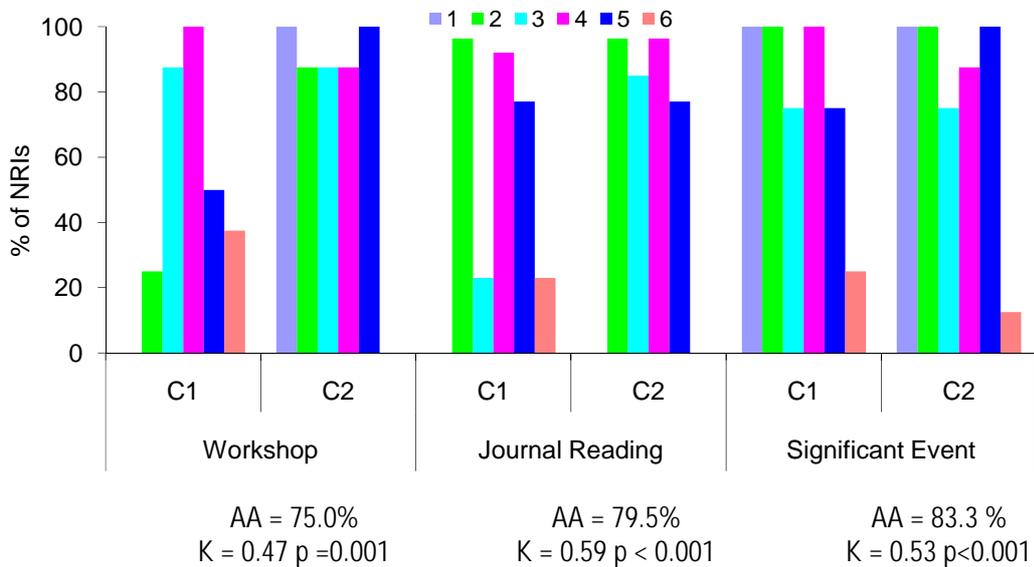
Are these feelings valid and why?

How would you approach this situation if it arose again?

**Figure 5.3 Newcastle Reflective Inventory for use when documenting a significant event experienced.**

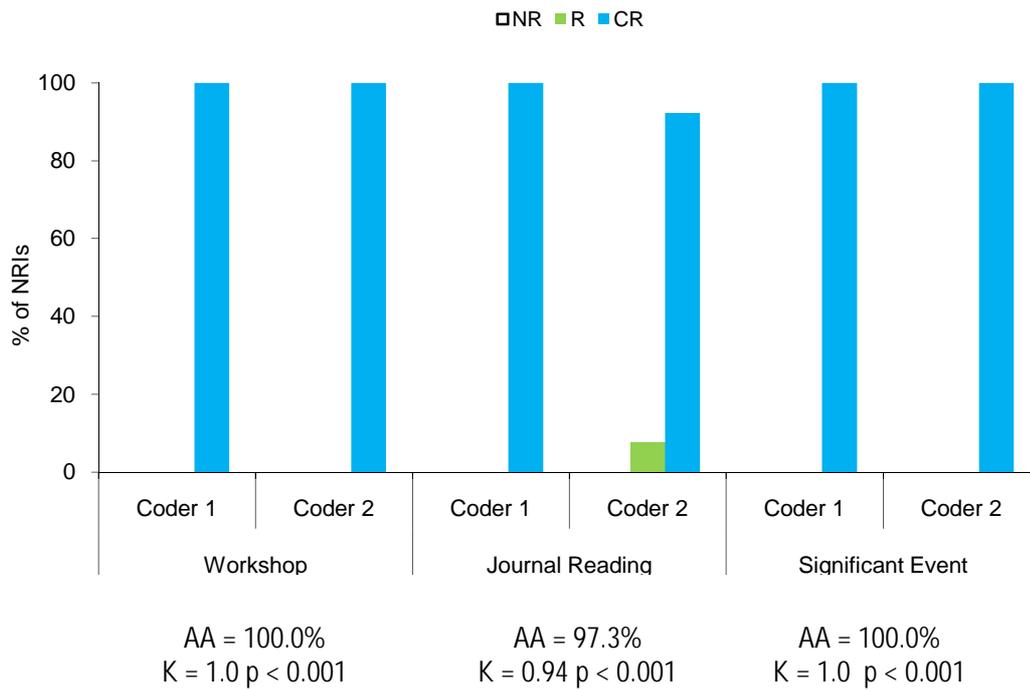
**2. Validation of the Deep Analytic NRAT for assessing NRIs**

The sample for this analysis consisted of 5 interns who completed 30 NRIs in total, (14 Journal Reading NRIs, 8 Significant Event and 8 Workshop NRIs). Figure 5.4 illustrates the coder profiles of the evidence of reflection found in the NRIs by both coders, broken down by the NRI used and six levels of reflection. For all of the NRIs the coder profiles show good coder agreement with the exception of the ‘workshop NRI’. The absolute agreement between the two coders when using the Deep Analytic NRAT ranged from 75.0 - 83.3 % and Kappa values ranging from 0.47 -0.59 ( p = 0.001), both measures indicating good intercoder agreement (Figure 5.4).



**Figure 5.4 Results of the Deep Analytic NRAT analysis (six levels of reflection) of the NRIs, broken down by coders and NRI used. (AA = Absolute Agreement, K = Kappa, C1 = coder 1, C2 = coder 2)**

When the results of the Deep Analytic NRAT assessment were integrated into the Broad Classification Tool there was a high level of evidence of reflection within the NRI descriptors and excellent intercoder agreement (Figure 5.5) . Coder profiles in all three contexts of the NRI were extremely similar, supported by the excellent absolute agreement (97.3 – 100.0 %) and Kappa statistics (K 0.94- 1.00 p < 0.001).

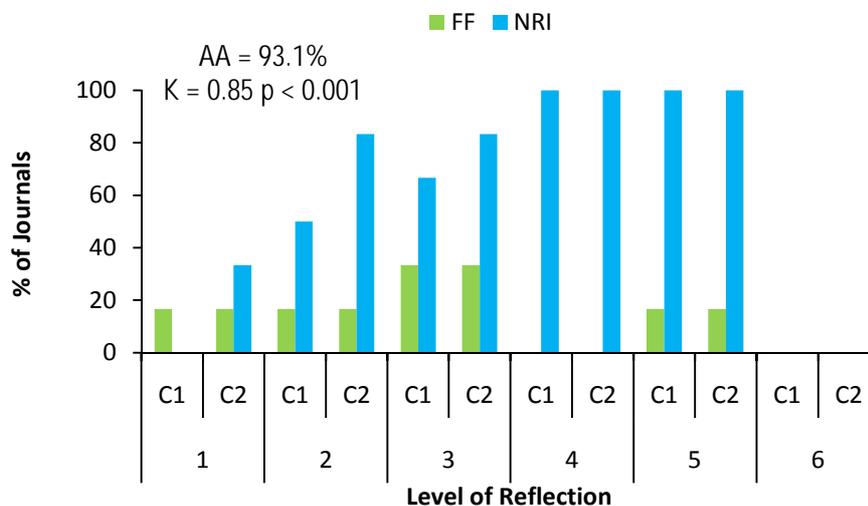


**Figure 5.5 Results of the Broad Classification NRAT analysis (three levels of reflection) for all three NRIs, broken down by coders (AA = Absolute Agreement, K = Kappa)**

### 3. Validation on the NRIs

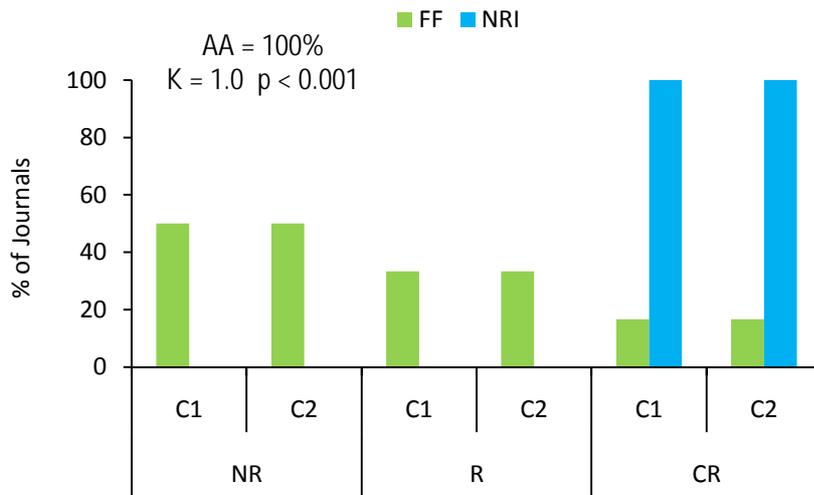
Six participants completed a total of 28 journal entries. Of these 16 were significant event entries (8 freeform and 8 NRIs) and 12 journal reading entries (6 freeform and 6 NRIs). When interpreting these results it is important to note that level six (outcome of reflection) of the Deep Analytic NRAT is not a higher level of reflection than that of level 5, as the reflective process does not adhere to a linear model, nor are all steps completed sequentially to reach the end point of reflection. Hence when assessing written material for evidence of reflection it is important to remember that when there is evidence of level 5 and 6, the practitioners are both reflecting at a critical level of reflection. Interpreting this in relation to this project, Figure 5.8 illustrates that for coder 1, there was no evidence of level 6 reflectivity using the NRI, compared with 12.5% of entries exhibiting level 6 reflectivity using the freeform method. This does not mean that the freeform entry was more successful at eliciting critical levels of reflection than the NRI.

Figure 5.6 and Figure 5.7 illustrates the percentage of participants exhibiting evidence of reflection in the freeform and Journal Reading NRI broken down by coder and level of reflection. The difference in the levels of reflection in the journal reading NRI to that of the freeform entry for both the six and three levels of reflection was highly statistically different. When completing the free form entry 50% were classified as non reflective and 33.3% reflective, with less than 20% being critically reflective. In contrast, the NRI demonstrated 100% of the participants were classified as critically reflective, with this difference in the evidence of reflection from the NRI to the freeform journal being highly statistically significant ( $p < 0.001$ ).

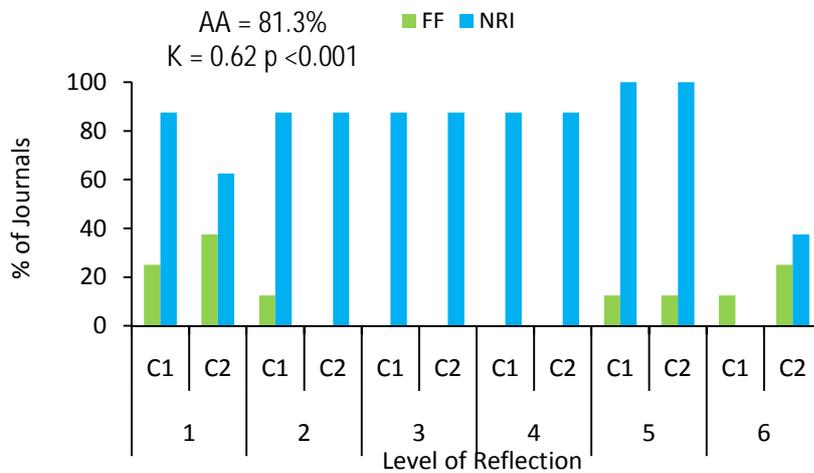


**Figure 5.6 Displays the percentage of Journal Reading NRIs and freeform journals that each coder identified evidence of reflection within, broken down by coder and six levels of reflection (K = kappa, AA = absolute agreement, C1 = coder 1, C2 = coder 2)**

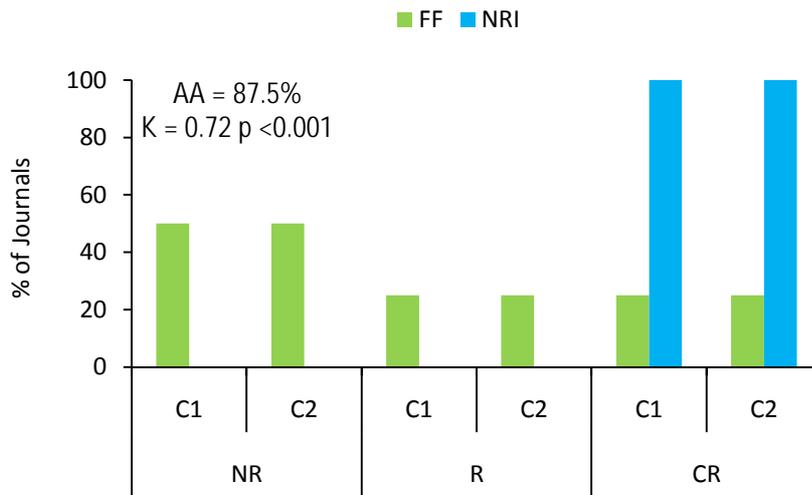
Analysing the results for the freeform and Significant Event NRI (Figure 5.8 and figure 5.9) also revealed a large difference in the evidence of reflection that was highly statistically significant different when assessed using both six and three levels of reflection. When considering the broad three levels of reflection 50% of these freeform journals were classified as having no evidence of reflection (non reflectors), 25% low levels of reflection and 25% as critically reflective. This is contrasted against 100% of journals that showed evidence of critical reflection when completed using the significant event NRI.



**Figure 5.7** Displays the percentage of Journal Reading NRIs and freeform journals that each coder identified evidence of reflection within, broken down by coder and three levels of reflection (K = kappa, AA = absolute agreement, C1 = coder 1, C2 = coder 2)



**Figure 5.8** Displays the percentage of Significant Event NRIs and freeform journals that each coder identified evidence of reflection within, broken down by coder and six levels of reflection (K = kappa, AA = absolute agreement, C1 = coder 1, C2 = coder 2)



**Figure 5.9** Displays the percentage of Significant Event NRIs and freeform journals that each coder identified evidence of reflection within, broken down by coder and three levels of reflection (K = kappa, AA = absolute agreement, C1 = coder 1, C2 = coder 2)

## Discussion

Since the completion of this project the Workshop/Conference NRI has been integrated into two large New South Wales teaching hospitals CPD Programs. Whilst this study covered the development and validation of the NRI in three context further work has been undertaken; the NRIs have been adapted for use in the undergraduate Professional Placement setting in contexts of Personal Interactions and Technical Learning Events. These undergraduate NRIs are currently being integrated into all three Medical Radiation Science (MRS) Disciplines at the University of Newcastle; their use and acceptance by students will be reported at a later date.

Intercoder reliability calculated using Kappa coefficients have illustrated that the NRAT is a reliable tool in assessing written material for evidence of reflection. When the intercoder reliability is compared with the work on Wong (1995) on which the NRAT is based, absolute agreement when assessing for the six levels of reflection was 0.83 when utilising the Deep Analytic NRAT compared with 0.5 employing Wong framework alone. The absolute agreement when employing the broader three categories was improved in the study by Wong to achieve 0.88,

however by using the Broad Classification NRAT to guide the assessment of reflective writing achieved an absolute agreement of 0.98.

The results of this study demonstrate that providing radiation therapists with a structured template such as the Newcastle Reflective Inventory is an effective strategy in promoting reflective writing. The study validates the use of the NRI in the context of a significant event journal entry or an entry following the reading of a journal article from a professional publication. However it should be acknowledged that the use of the NRI may not suit all practitioners in the work place. Those practitioners that are skilled and practiced reflectors may find the format of the reflective inventory too restrictive, as would practitioners that prefer to use an alternate medium to document their reflective process, such as poem or illustration. The evidence of reflection in all the freeform journals supports Boud (1985) commentary, that practitioners have varying skills in the reflective domain and in some cases practitioners do not know how to reflect. It is in these cases that the NRI are most effective, where staff either have little or no knowledge on reflective writing or find it difficult to complete reflective writing exercises. The NRI directs the practitioner through the reflective cycle and allows them to focus more on the subject or experience they are reflecting on and less about what they are expected to be writing.

## **Conclusion**

The results of this study validate the Newcastle Reflective Analysis Tool as a reliable method of assessing short form guided reflective writing for evidence of reflection. It also clearly validates the Journal Reading and Significant Event NRIs, as effective tools in promoting reflective writing. There are barriers to the incorporation of reflective writing into a practitioners CPD strategy, including resources, knowledge of reflective concepts and support in the clinical environment, incorporation of the NRI may assist in counteracting each of these obstacles. Further research is being undertaken to assess the effectiveness of the Workshop NRI in the wider RT community, the Personal Interaction and Technical Learning Event NRIs in the undergraduate MRS programs and possibly in other allied health disciplines.

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## Chapter Six

### Paper Seven

## 6.1 A QUALITATIVE ANALYSIS OF RADIATION THERAPY STUDENTS PROFESSIONAL PLACEMENT JOURNALS

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Co-Authors: Mr Shane Dempsey, Associate Professor Helen Warren-Forward

Journal: Submitted

The Co-Authors of this paper are supervisors of the PhD.

### **Abstract**

Student experience on clinical placement is not well captured with traditional program evaluation tools. This study aims to complete a qualitative analysis of the reflective clinical journals completed during professional placement by radiation therapy (RT) students in order to uncover the issues that affect students on placement and how these change as the student's progress through the program.

A Qualitative Descriptive Analysis (QDA) was undertaken on the descriptive content of 97 RT student reflective journals completed by 97 students over three consecutive years whilst undertaking professional placement in Radiation Oncology Treatment Centres within Australia. Two coders used a QDA sourcebook specifically designed for the research to independently analyse the descriptive content of the reflective journals for four defined main categories and 18 subcategories.

The result of this research revealed a statistically significant increased tendency to discuss clinical environment (coder 1,  $p = 0.01$ , coder 2,  $p = 0.03$ ) and a decreased tendency to discuss the patient 92.9% to 12.5% (coder 1) and 85.7% to 18.8% (coder 2) as they progressed through the program.

The results of this study showed some similarities with studies completed in other health professions, however the breadth of issues explored within the content of these RT student journals demonstrates the true diversity of the RT student experience on professional placement.

## Introduction

Most Universities offering health professional programs have two primary components in both undergraduate and post graduate programs. These two components combine the factual or academic component, that provide the scientific and theoretical basis of the profession, and the professional or clinical component of each profession.

The experiences and issues students face when undertaking each of these components can vary significantly. Many tertiary institutions have formative and summative feedback mechanisms in place that provide information on the student experience in the academic component of their programs. Providing feedback on the experiences of students during their professional placement can be more difficult as the experience may vary significantly from program to program, from one clinical site to another, and from student to student.

There is a vast amount of literature that discusses issues and experiences that have been known to affect health professional students during their professional placement. Patient interaction and empathy, increase in practical skill and professional knowledge, as well as concepts linked to making the theory practise connection, have been identified as issues that affect students whilst on clinical placement from professions including; nursing, physiotherapy, medicine and dentistry (L. Boyd, 2002; Landeen, et al., 1995; J. Patton, et al., 1997; Pitkala & Mantyranta, 2004; Williams & Wessel, 2004; Williams, et al., 2002; Williams & Wilkins, 1999). However there is a lack of published literature that focuses specifically on the clinical experiences of radiation therapy (RT) students.

The environment in which radiation therapists routinely work varies greatly from that associated with other allied health professions. The large technical role and its state of rapid change, coupled with the often challenging humanitarian facet of this cancer profession creates a unique environment for radiation therapists to work in. Radiation therapists work in an intimate and unique team environment, relying on colleagues for not only professional competence but also for professional and emotional support. Hence it is potentially not feasible to generalise the findings of studies in health professions that work in a different way with the experience of RT students whilst on professional placements.

Radiation Therapy students at the University of Newcastle are required to complete 24 weeks of professional placement in a clinical facility over five placements. During each of these placement students are required to complete some academic tasks, one of which is a personal reflective journal. This journal is an unguided freeform journal and is assessed formatively. The students are provided with the following instructions:

“Write a report assessing your achievements and progress in this block. Include new or different techniques you took part in or observed, your progress in communication skills and team work, any problems you experienced and how you feel these could be addressed. Do not make this a critique on the centre but address it to your own personal performance” (*University of Newcastle MRS RT, Clinical Education Workbook, 2004, p.16*).

These Personal Reflective Journals are a great source of feedback and insight into the experiences of RT students whilst undertaking professional placement. However the journals have only recently been formally evaluated for feedback they may contain for both the university and clinical centres, as well as rich insights into the issues students face and the experiences they value during their time in clinical facilities. Students are further supported using debriefings after professional placement where placement issues are discussed globally with the entire cohort.

This research aims to:

- Complete a qualitative analysis of the reflective clinical journals of radiation therapy students completed during professional placement to uncover the issues that affect students on placement.
- Investigate how the issues identified within the journals may vary as students progress through the program.

## **Method**

### Participants and Setting

This study included the reflective journals (text based unstructured free form journal entries) from a cohort of Medical Radiation Science RT. The reflective diaries were completed on all 5 professional placements over the three years of

the program and collected with consent for the purpose of quality assurance and evaluation in relation to improvement of the program by the course coordinator. Journals were de-identified and not traceable in relation to individuals or the clinical centres involved for analysis.

### Methodological Framework

A Qualitative Descriptive Analysis (QDA) is the methodological framework of choice for the qualitative analysis of the written journal entries. A QDA is derived from Naturalistic Inquiry and aims to remain as close to the data as possible, with very little interpretation. Due to the predetermined, de-identified and non traceable nature of the data, a phenomenological or narrative inquiry approach was not suitable (Findlay, Dempsey, & Warren-Forward, 2010). Following the principles of a QDA, a descriptive content analysis was undertaken on the sample of journals for this study.

### Sampling Techniques

Purposeful sampling was utilised to define an appropriate sized sample for analysis of the student journals. Purposeful sampling was achieved by the researcher reading all the journals and highlighting the useful, descriptive information provided in each, as well as reflecting on the journal entry. A comment quantifying the level of descriptive content in the journal; low, moderate and good was recorded on the top cover of the journal. If the entry provided little insight into the clinical experience of the student, then the journal was removed from the sample and discarded from the QDA section of the project.

### Sourcebook Development

Essential to descriptive content analysis is a thorough Sourcebook and Worksheet to facilitate the coding process. A sourcebook was developed which includes the framework of categories and subcategories to be coded (Table 6.1), a coding guide and coding instructions. The hard copy worksheet consisted of a simple table that allowed coders to document each subcategory when it was identified within the text. Full details of the sourcebook development are available in a previous publication (Findlay, et al., 2010)

### Coder training

Two coders were selected to independently code the journals. Coder one was a 22 year old female graduate with a BMRS RT in 2006 and Coder two was a 23 year old male, also graduate with a BMRS RT in 2006. Both coders are currently working in Radiation Oncology Treatment Centres within Australia.

Training consisted of orientation to the sourcebook, worksheets and discussion concerning the importance of bracketing and confidentiality. The training ensured that the coders were fully aware and understood the variables of the study and their measures, but were unaware of the purpose of the analysis. Initial coder training involved five student journals being randomly selected and both coders coded the journals. The level of agreement of the initial coder training was assessed using Kappa co-efficient and absolute agreement. Kappa coefficients were calculated using STATA 11 by StataCorp.

No revisions of the sourcebook was required as a result of the initial coder training results. The pilot coding was repeated on another randomly generated sample of 12 journals, excluding the initial five journals used. Again inter-coder reliability was again assessed using Kappa and absolute agreement, providing pilot inter-coder reliability results.

### Journal Analysis

The unit of data to be evaluated were the text response of students structured into sentences and paragraphs within the journals. The journals could contain a single or multiple units that represented one of the categories or subcategories within the framework.

The two independent coders completed the descriptive content analysis of the journals. The coders remained blinded to minimise the chance of being affected by what they thought the researcher wanted from the analysis and they were able to make judgement calls independent of the researcher's opinions and biases. The coding was governed by a set of rules outlined in the QDA source book (Table 6.1).

The results of the analysis were entered into an excel spreadsheet and descriptively analysed across the four categories; Clinical Environment, Personal

Development within the Profession, View of the Profession and The Patient and 18 subcategories. Results were entered into a contingency table and chi-square analysis was undertaken to identify the:

Statistically significant differences in the evidence of each category and subcategory as the students progressed across the three years of the program.  
Statistically significant linear trend in the evidence of each category and subcategory as the students progressed across the three years of the program.  
Expecting some to decrease and other to increase.

Following the completion of the coding inter-coder reliability, calculations were completed over the entire sample for each category and for all categories combined, providing final validity results for the QDA. Absolute agreement was also calculated for all categories and subcategories between the coders.

## **Results**

### Sample size

The original sample size of 97 Personal Reflective Journals was subject to a purposeful sampling process. This process removed those journals that did not provide rich description, whilst providing a more appropriate sample size for a QDA. The total number of journals was reduced following the purposeful sampling, year 1 journals decrease by 60%, year 2 by 52% and year 3 by 45% (Figure 6.1).

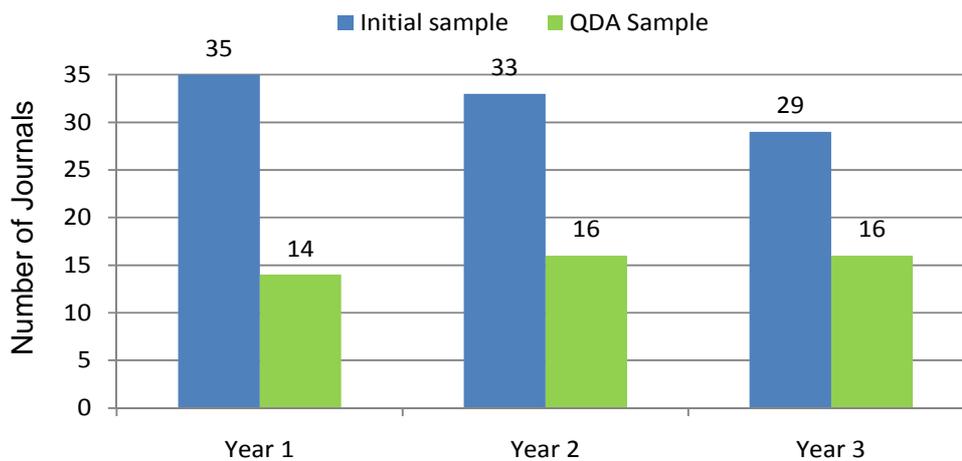
### Coder Training

This initial coder training provided an absolute agreement across the 4 categories and 18 subcategories of 80%. Kappa co-efficient of 0.69 ( $p < 0.001$ ) and 0.53 ( $p < 0.001$ ) for the 4 categories and 18 subcategories respectively was achieved during initial coder training.

Pilot coder training on the 12 randomly selected journals had an absolute agreement of 60.3% and Kappa co-efficient of 0.49 ( $p = < 0.001$ ) across all four categories. For the 18 subcategories absolute agreement of 73.1% and Kappa co-efficient of 0.48 ( $p = < 0.001$ ) were achieved.

**Table 6.1 Rules governing the QDA coding process (exert from Sourcebook) (Findlay, et al., 2010)**

QDA Sourcebook Journal Analysis				
<b>Coder Name:</b>	At the top of the coding worksheet place your name in the provided space			
<b>Participant name:</b>	At the top of the worksheet place the participant ID for the journal you are about to code eg 2003-10			
<b>Worksheet:</b>	A new worksheet is to be used for each journal coded.			
<b>At completion:</b>	After completing the coding, all journals and worksheets are to be returned to the researcher			
<b>Category Groups</b>	<b>Clinical Environment</b>	<b>Personal development in the profession</b>	<b>View of the Profession</b>	<b>The patient</b>
<b>Key Themes</b>	1. Department Structure	5. Professional growth	13. Teamwork	15. Quality of Life
	2. Life style	6. Emotions	14. Other	16. Patient pathways
	3. Equipment	7. Enjoyment/Job satisfaction		17. Building relationships
	4. Other	8. Communication		18. Other
		9. Confidence		
		10. Judgements		
		11. Technical learning		
		12. Other		
<b>Coding guide/ dictionary:</b>	<p>The following pages contain details of the four groups and subsequent 18 categories.</p> <p>The first column details the group and specific category, the column headed Concepts provides ideas as to what concepts, topics or subjects may be found in each category.</p> <p>The final column titled, Words, Phrases and Comments, provides the you .with some words that may be associated with a concept, quotes that demonstrate a concept from the journal, and instructions that will assist coding text in each category.</p> <p>The concepts, words and phrases provided in this guide are not exhaustive. If you identify elements of the text that represent any of the 18 categories regardless of whether it is mentioned in the concept and phrases guide, code it accordingly.</p>			
<b>Coding Instructions:</b>	Before reading each journal, label a new QDA worksheet with your name and the participant number found at the top right hand corner of the journal. Then read the journal in full. Re read and code the journal one, paragraph at a time.			
	As you read each journal identify words, phrases or concepts that represent any of the 18 categories listed above.			
	Find the row that the identified category occupies on the worksheet then in the first column annotate the page and paragraph that the text is located in.			
	For example if the text is on page 1 paragraph 4, write down 1.4. Additionally highlight the text coded and also document the category number in the right hand margin of the journal.			
	Each unit (phrase, sentence, paragraph) can only represent one category on the worksheet.			
If a category is identified more than once simply repeat the documentation process as described above each time you identify it in the text.				

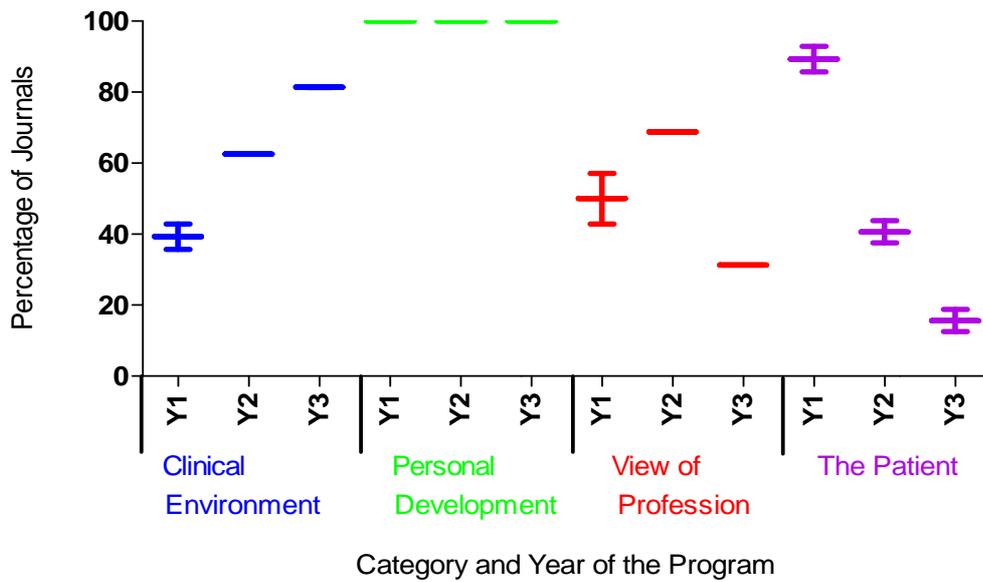


**Figure 6.1 Distribution of the number of journal entries over the years before and after the purposeful sampling.**

### Coding Results

A rich description of each of the categories and subcategories was identified within the journal text. Table 6.2 shows examples of the journal entries completed when students discussed each of the categories and subcategories within the coding Sourcebook from across varying years of the program.

The QDA identified the percentages of students that discussed each of the categories as they progressed from year 1 to year 3 of the program (Figure 6.2). There was an increasing tendency of students to discuss clinical environment 35.7% to 81.3% (coder 1, first to third year) and 42.9% to 81.3% (coder 2, first to third year). Both coders results demonstrated a statistically significant linear trend in the increasing incidence of this category as the student moves from year 1 to year 3 of the degree (coder 1,  $p = 0.01$ , coder 2,  $p = 0.03$ ). Student's had a decreased tendency to discuss the patient 92.9% to 12.5% (coder 1) and 85.7% to 18.8% (coder 2) as they progressed through the program. A statistically significant difference (coder 1,  $p < 0.001$ ; coder 2,  $p = 0.001$ ) and linear trend (coder 1,  $p < 0.001$ ; coder 2,  $p = 0.001$ ) was identified in the number of students discussing this category within their clinical journals. All students discussed personal development in the profession through every year of the program.



**Figure 6.2** Box and Whisker plot showing the percentage of students that wrote about each of the four categories, broken down by years of the program (data combined for both coders).

The four main categories were expanded to the 18 subcategories and the percentage of students that discussed these in their journals over the three years of the program was calculated. Both coders indicated an increasing amount of students commenting on the department structure as they progress through the program 14.3% to 81.3% (coder 1) and 28.6% to 75.0% (coder 2). There was a decreased trend to comment on the lifestyle impacts of professional placement from first to third year 21.4% to 6.3% (coder 1 and 2).

In the category of personal development within the profession, both coders identified an increasing occurrence of comments on professional growth 85.7% to 93.8% (coder 1) and 64.3% to 93.8% (coder 2) and making judgements 14.3% to 68.8% (coder 1 and 2, first to third year). Within the same category, a decreasing trend in discussing job satisfaction and enjoyment 100% to 87.5% (coder 1) and 100% to 37.5% (coder 2) were evident. The journals revealed that students discussed the concepts surrounding teamwork more in year 2, than in other years of the program (Coder 1, 42.9% year 1, 68.8% year 2, and 31.3% year 3 and Coder 2, 57.5% year 1, 68.8% year 2 and 31.3% year 3).

**Table 6.2 Example of student’s descriptors for both the categories and subcategories.**

Category	Subcategory	Example 1	Example 2
Clinical Environment	Department Structure	"I was surprised to learn how many patients the RT(s) put through in a day, they were constantly run of their feet. I didn't expect the pace of the work..." (0110)	"..I was on the older machine in the mornings and back in planning in the afternoon. I could only work on the 600c in the mornings because this is the only time that it is treating patients as there was not enough staff to keep it operating all day." (0221)
	Lifestyle	"Apart from being sick for 2 days , and having accommodation worth \$85 a night, I enjoyed my time..." (0101)	" I was very tired by the end of this second week from travelling..." (0221)
	Equipment	"The first two weeks of my placement ...was spent in treatment on LA1. I had never used Varian machines before so this was something new I had to learn." (0302)	"One is a Varian 600 and the other a Varian 2100, the 600 was the one that I was on first .....whilst the 2100 was a dual energy machine with electrons dealt with all electron boosts..." (0321)
Personal Development in the Profession	Professional Growth	"I did however get a better understanding of tangential fields and assisted in planning a four field pelvis that was simulated with a manual outline." (0111)	"Another method of becoming more involved was when the patient was in the bed to position myself so that I would be in a location to do the straightening and levelling." (0201)
	Emotions	"This clinical was the first time I experienced a patient die that I had treated, it was upsetting to hear as I did not think she would die so soon. But I realised that ....I could deal with it, I could grieve for the loss but not get too attached, that it affected my job but more importantly my life outside of work." (0203)	" The most draining and difficult situation was a patient starting treatment, her emotions flowed freely, crying uncontrollably. I have never come across anything like that and it was hard to control my emotions...I felt I wanted to cry with her." (0102)
	Job Satisfaction/ Enjoyment	"This clinical had reaffirmed my choice in wanting to become a Radiation Therapist" (0102)	"This clinical block has been very successful for me and I have enjoyed it." (0321)
	Communication	"I felt I learnt most about how to communicate with patients and the way in which each individual reacted differently to their illness." (0108)	"I felt that my biggest progress this clinical block was in communication skills with patients. I felt I took a more active role with patients and was able to see and talk to them in a variety of settings." (0304)
	Confidence	"I think my lack of confidence in other clinical was due to not understanding what was happening a lot of the time." (0214)	"I found this week to be very productive as I had enough confidence to be involved in all CT and simulation procedures." (0323)

Personal Development in the Profession	Judgements	"I found it really hard at first in simulation as we have not really done anything on it at uni. I feel we need to have more practice or an explanation of the simulation procedure at uni before we go on prac." (0201)	"From my clinical experience I have seen a range of different technologies, procedures and patient cases and difference centres opinions on dealing with skin care. I have noticed there are many differences as well between centres." (0304)
	Technical Learning	"In the middle of the second week I gave my first tattoo. They all turned out fine." (0201)	"I was shown how to develop films, which soon became my daily duty along with labelling." (0127)
View of the Profession	Teamwork	"I was shown through chemo and ...this was very helpful and helped to put into perspective the roles of chemo and RT....and the importance of the two departments working together." (0312)	"Also through becoming more confident in techniques I was able to participate more in teamwork, I think that other therapist's also accepted me as part of their team." (0201)
The Patient	Quality of Life	"The patient was clearly distressed by the treatment and I believed along with the other radiation therapists that the treatment was causing the patient more distress than was justifiable in terms of the benefits of treatment." (0213)	"One of the most satisfying aspect of being on treatment is the patient therapist interaction. It is very rewarding knowing that you have the ability to make someone's quality of life a little better." (0225)
	Patient Pathways	"Also throughout my clinical experience I visited several other areas that were relevant in gaining an overall understanding of what the oncology patient experiences." (0129)	"Time spent in the patient clinics was of great benefit to me because I felt that I gained a greater understanding of the patients path to diagnosis." (0210)
	Building Relationships	"This clinical was very rewarding, not only from a learning view, but also form developing friendships with patients." (0215)	"Getting to know patients and learning about aspects of their lives is important when you are part of the treatment team, because the patient must be able to feel that they can trust their therapist." (0225)

**Code 0110 means year 1 student 10, 0221 year 2 student 21 and 0302 year 3 student 2**

In the Patient category, the subcategories of patient pathway and building relationship decreased in frequency within the journals as students moved through the program; Patient pathways 64.3% to 12.5% (coder 1) and 42.9% to 6.3% (coder 2), building relationships 78.6% to 0% (coder 1) and 64.3% to 6.3% (coder 2).

Of these changes the subcategories of 'Department Structure', 'Confidence' and 'Judgements' showed a statistically significant change in their incidence within the journals and also a statistically significant linear trend increasing as the students progressed through the program. Whilst the subcategories of 'Enjoyment/Job Satisfaction', 'Patient Pathways' and 'Building Relationships' also showed a statistically significant decrease in incidence as students progressed through the program.

**Coder Agreement**

Absolute agreement between the coders was good to excellent (73.9% - 100%) (Table 6.3 and 6.4) for both the four categories and 18 subcategories, excluding the subcategory of 'Communication' (58.7%). The Kappa co-efficient illustrated good to very good agreement across the four categories 0.57 - 0.71 (Table 6.3). Despite the good absolute agreement within the 18 subcategories the Kappa co-efficient displayed a range of values from 0.00 - 1.00 (Table 6.4).

**Table 6.3 Inter-coder reliability between Coder 1 and Coder 2, broken down into absolute agreement and Kappa co-efficient for the 4 categories.**

Category	Absolute Agreement	Kappa	Prob
Categories Combined	86.96%	0.71	< 0.001
1. Clinical Environment	84.78%	0.68	< 0.001
2. Professional development	100%	*	*
3. View of the Profession	78.26%	0.57	< 0.001
4. The patient	84.78%	0.70	< 0.001

(\* = too few categories to calculate)

**Table 6.4 Inter-coder reliability between Coder 1 and Coder 2, broken down into absolute agreement and Kappa co-efficient for the 18 subcategories.**

Sub Category	Absolute Agreement	Kappa	Prob
Subcategories Combined	86.09%	0.71	< 0.001
1. Department Structure	82.61%	0.65	< 0.001
2. Life Style	100%	1.00	< 0.001
3. Equipment	84.78%	0.44	0.001
4. Other (Clinical Environment Category)	100%	*	*
5. Professional Growth	84.78%	0.38	0.01
6. Emotions	76.09%	0.02	0.46
7. Enjoyment / job satisfaction	73.91%	0.16	0.06
8. Communication	58.70%	0.16	0.13
9. Confidence	78.26%	0.56	< 0.001
10. Judgements	91.11%	0.82	< 0.001
11. Technical learning	93.33%	0.00	< 0.001
12. Other (Professional Development Category)	100%	*	*
13. Teamwork	78.26%	0.56	< 0.001
14. Other (View of the Profession Category)	100%	*	*
15. Quality of Life	86.96%	0.50	< 0.001
16. Patient pathways	82.61%	0.14	< 0.001
17. Building Relationships	80.43%	0.56	< 0.001
18. Other ( The Patient Category)	100%	*	*

(\* = too few categories to calculate)

## Discussion and Conclusion

### Reflective Journal Analysis

This study showed that as RT students progressed through the program the issues that they found important and document in the professional practice reflective journals varied in relation to their patients and the clinical environment they are working within. Students have been noted to discuss their 'clinical

environment' more as they progress through their program and discuss their 'patients' less. In relation to their 'personal development within the profession' and their 'view of the profession' their discussion of this remained unchanged.

This variation is not unexpected; often during the first year of professional placement, students are confronted for the first time with the hospital environment and the concepts of illness, quality of life and dying. The decrease in this content during the program may be due to a shift of focus for the students towards more technically orientated concepts, or it may be a sign of developing professional resilience with the increased exposure to the health care setting. Although this trend is not unexpected it does require further investigation.

This finding should prompt Universities to align the 'actual curriculum' being delivered with the students needs to support the 'workplace learning' that occurs on professional placement. It is therefore important that early in the degree program students are provided with information and activities that support the patient focused learning that occurs in these initial professional placements. This will assist in preparing students emotionally, ethically and morally for 'workplace learning' that occurs at this stage. A lack of alignment in the 'actual curriculum' and the 'workplace learning' that occurs could have a significant impact on student skill development. For example, a program that is solely technology focused in the early stages and hence poorly aligned with the heavy patient focus of the workplace learning component, may risk underdeveloping the patient focused skills of students. At the same time it is important for Universities to review the teaching and assessment mechanisms within degree programs to ensure that both are aligned with a patient centred focus for the entire duration of the program. This will assist students in developing technical competence whilst maintaining continual patient focus.

The increased incidence of discussion surrounding the 'Clinical Environment' may be as a result of increased technical knowledge and ability to critique the clinical centres they attend.

No conclusion can be drawn as to whether the decrease in incidence of 'job satisfaction' as a category is an actual decrease in job satisfaction or simply a

lack of incidence within the journals. Early in the program students discussed 'job satisfaction' and satisfaction with the choice of program they were undertaking. As students progress should we expect to see this change or is continuing in the program a sign of satisfaction with the chosen career path? During professional placements students are subject to continual clinical supervision and academic constraints, should we more expect to see an increased incidence of job satisfaction and level of satisfaction once students graduate and the full scope of practice is realised? Individual and anecdotal feedback from final year students support this idea as they report frustration with the level of autonomy students can be afforded on professional placement and the eagerness to be working in a qualified capacity. This requires further investigation with the current RT cohort and recent graduates as it has obvious implications for career longevity and staff numbers.

Although studies in other health professions have not tracked the changes in issues facing students, similarities can be drawn between the emergent themes and the categories used within this study. Previous studies involving, dentistry, physiotherapy and medicine students have all identified content similar to that included in 'Personal Development in the Profession' category ( Boyd, 2002; Pitkala & Mantyranta, 2004; Williams & Wessel, 2004; Williams & Wilkins, 1999). Only the work of Boyd (2002) and Pitkala and Mantyranta (2004) clearly identify 'The Patient' as an emergent category in their research of medical students. With Williams and Wilkins (1999) physiotherapy students showed strong similarities with the category 'View of the Profession.'

Although the results of this study show similarities between the RT cohort and other allied health disciplines, the breadth of issues documented by RT students range from highly technical and environment focused to issues of empathy and grieving, illustrating the truly diverse and unique nature of the profession.

### Coder Agreement

The good to excellent absolute agreement between the coders for the categories and subcategories supports the well developed and validated source book. Although the Kappa coefficients for the four categories showed good to very good agreement (0.57 - 0.71), there was a large variation in the values obtained

for the 18 subcategories. This phenomenon can be explained by the fact that it is not always accurate to conclude that a poor Kappa indicates poor inter-coder agreement (Thomsen, et al., 2002). Prevalence of a category within a data set can effect the resultant Kappa coefficient (Feinstein & Cicchetti, 1990; Thompson & Walter, 1988; Thomsen, et al., 2002). This can be illustrated when you consider the Kappa value for the subcategory of 'Emotions' (K =0.02) and 'Technical Learning' (K = 0.00) where the absolute agreements for 'Emotions' was good (76.09%) and 'Technical Learning' was excellent (93.3%).

This study has demonstrated the diverse and unique range of experiences and issues that RT students are exposed to during professional placement. The study has highlighted the need for further investigation into graduating students levels of job satisfaction and the level of students actual patient centred practice during the degree program. It has confirmed that when analysed, Personal Reflective Journals can be a rich source of feedback for universities and clinical centres on the experiences that effect students.

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## Chapter Seven

### Summary and Impact of Research

## 7.1 REFLECTIVE ANALYSIS

### 7.1.1 OVERALL SUMMARY

The undergraduate RT university program is designed to develop graduate skills and in the final semester of the program begin their transition to professional practice. For approximately 15 years the University of Newcastle has incorporated reflective journaling into the undergraduate RT professional placement courses. The students completed the journals at the completion of each professional placement in a clinical radiation oncology department. The format of these journals had always been a long form freeform entry where the students were not directly promoted or lead through the writing process.

It is important to note that since 2005 when the analysis of data and writing of publications commenced for this thesis, there has been additional research published in the area of reflective writing in health care. Although some of this more recent literature may have influenced the design of this research, it was unavailable at the time this research was designed and the data analysed. The most significant is the work of Kember, McKay, Sinclair and Wong (2008) which further the work of Wong et.al (1995).

### 7.1.2 REFLECTIVE ANALYSIS

Although the freeform reflective journals have always been reviewed and issues arising within the journals addressed with students during a clinical debrief session, the freeform journals had never been previously analysed for evidence of reflection. Nor has there been a preconceived idea of what proportion of students would be apt at writing reflectively. Although it was presumed that there may be an increase in the evidence of reflective writing ability as the students progressed through the program. One barrier that impeded the analysis of the journals for evidence of reflection was the availability of a validated assessment tool. The literature contained many models and frameworks of reflection but very few assessment tools that had been used in health science specifically and no published literature was available for radiation therapy.

One objective of this research was to develop and validate an assessment tool for use when analysing reflective writing to be known as the Newcastle Reflective Analysis Tool (NRAT). The NRAT contained a Deep Analytic NRAT (six narrow levels of reflection) and a Broad Classification NRAT (three broad categories of reflection). Each of these tools can be used alone or in sequence from Deep Analytic to Broad Classification. The establishment of these two tools provided this research with a validated tool that can be used for the analysis of freeform reflective writing within RT and indeed within the realm of health sciences.

A longitudinal analysis of these freeform journals was subsequently undertaken using the validated NRAT. This analysis initially explored the validity of the NRAT for assessment of freeform writing for evidence of reflection. Using four independent coders the NRAT was identified as a valid tool for this purpose. The research then went on to explore the evidence of reflection within the reflective freeform journals. This reflective analysis illustrated that whilst many of the students were writing at low levels of reflection, few of the students were writing at higher critically reflective levels.

The literature suggests that writing reflectively can enhance student learning (Moon, 1999) and assist students in making the theory practice gap that exists in many health professional education settings (Mann, et al., 2009; Smith, 1998; Usher, et al., 2001; Winnie & Palmer, 2004). Once graduated practicing reflectively is said to provide benefits in many professional areas such as; maintaining currency of skills and a patient centred focus to practice, as well as ensuring practitioners continue to question practice and learn from their work. Some suggest that in order to produce graduates that are equipped to practice reflectively, learning and teaching on reflection must occur at an undergraduate level (Baird, 1996; Turley, 2009).

Although the research identified the level of reflection evident in the student's journals into the categories of Non Reflector, Reflector and Critical Reflector, each student may demonstrate more or less evidence of reflector in subsequent or previous journals written on professional placement. As it must be acknowledged that there are a range of environmental, personal and emotional

factors that may affect the level of reflection in the analysed journals and inventories for some students.

This research identified that the freeform journals were not encouraging the students to reflect at a high level, thus this analysis identified the need to support and facilitate the students during this reflective writing process further. This initiated the development of the Newcastle Reflective Inventories (NRIs).

During the development of the NRIs the literature revealed that there are few available tools and frameworks available to support clinicians working in allied health professions, and none for radiation therapist's working clinically in their reflective writing experiences. Despite the fact that reflective writing is a well recognised form of continual professional development within health professions. In order to meet this need NRIs were also developed and validated for a variety of context to be used by health professionals working clinically. The NRIs were developed for use in the following situations, following reading a peer reviewed journal article, attending a conference/course or workshop and following a significant clinical event from the practitioner's everyday work.

The NRIs were developed to foster and support undergraduate student's and radiation therapist's reflective writing in a short form guided process. The NRI were developed for two undergraduate settings, "Technical Learning" and "Personal Interactions" whilst on clinical placement. The NRIs contain a series of questions that assist the progression of the student from non reflective, to reflective and critically reflective written responses. The NRIs provide the students with the support to think and write critically whilst remain focused on the clinical event that they are writing about and reflecting on. When the NRIs were validated against the levels of reflection in freeform writing, the NRIs supported significantly higher levels of reflection and also critical reflection.

The NRAT was used in the validation processes for the NRIs in both the undergraduate and clinical settings. As part of this research the validity of using the NRAT to assess short form guided writing as well as the freeform writing was established.

### 7.1.3 CHANGES TO THE RT PROGRAM

As a direct result of this research there have been changes to the professional placement academic requirements for undergraduate RT students at the University of Newcastle. There are five professional placements within the RT program; one in semester two first year and then one in each semester of the three year program after that. The initial professional placement in semester two first year has retained the freeform reflective journal task, which requires the students to write freely, to document their experiences without prompting and explore their reflective writing ability. The final semester in year three has retained the personal narrative, which is a freeform experience based description of personal and professional growth over the degree program.

During the remainder of the placements within the RT program the undergraduate NRIs have been embedded into the written component of the professional placement courses. The assessment of the written descriptors documented within the NRIs varies as they progress in the program. In second year first semester the responses produced by the students are assessed for evidence of reflection using the Broad Classification NRAT. Student displaying evidence of a reflector or critical reflector are awarded a satisfactory and those given a non reflector a non satisfactory for that component of the assessment. A student receiving a non satisfactory result would then receive feedback and be given the opportunity to resubmit the NRI. The assessment of the NRI responses in professional placement block, three in second and four third year use the Deep Analytic NRAT. There is a total of 10 marks allocated per NRI for this assessment, completion of the two NRIs is worth 20% of the professional placements total mark.

### 7.1.4 CHANGES TO OTHER MRS PROGRAMS AT THE UNIVERSITY OF NEWCASTLE

As a result of this research the NRIs and NRAT assessments have been embedded into the final year of the Nuclear Medicine (NM) and the Diagnostic Radiography (DR) programs.

#### 7.1.5 INFLUENCES IN OTHER ALLIED HEALTH PROGRAMS AT THE UNIVERSITY OF NEWCASTLE

This work has also been the basis of workshops run for the Nutrition and Dietetics and Physiotherapy at the University of Newcastle for their conjoint and clinical staff within NSW.

#### 7.1.6 EXTERNAL IMPACT

The reflective work of this research has been the basis for allied health and RT specific workshops that have been facilitated at clinical centres in Australia such as; Westmead Hospital (NSW) and the State-Wide Allied Health Cancer Care Training And Development Program (QLD Health).

The authors have also been contacted by medical colleagues from a teaching hospital within NSW in regard to using the above mentioned tools in a research project assessing the reflective abilities of anaesthetist registrars across New South Wales. Academics from Health disciplines from Universities around Australia have also contact the authors for permission and support in the use of the NRIs and NRATs within their programs.

International interest has also been indicated with New Zealand universities offering Physiotherapy programs, requesting to explore the use of the NRI and NRAT in their programs to enhance and support their student's reflective abilities.

#### 7.1.7 FUTURE DIRECTIONS

The work of this research has began to develop a solid foundation and tool kit to assist undergraduate RT students to develop their reflective writing and thinking ability. This work can also be used in a multidisciplinary setting, supporting students from other allied health professional programs. Current research is being undertaken to validate the NRIs against the use of freeform journals in a large cohort of RT students, research is also underway to explore any differences in the reflective writing abilities of RT, NM and DR students, as well as individual students as they progress through the programs.

Future research may include exploring students and clinicians reflective abilities from disciplines across the allied health spectrum for not only their ability to reflect but also how this is affected by profession, gender and preferred learning style. As well as investigating if there are specific interventions that can assist in developing and sustaining reflective practice abilities of undergraduate students and clinicians.

Although reflective practice and reflective writing is well discussed in health professional literature (Mann, et al., 2009), there are still many unanswered questions. An area of future research will be exploring the link between a practitioner's ability to write reflectively and practice reflectively in the clinical environment. This research would then lead into investigating and answer to the question of, "what impact does a reflective practitioner have on clinical patient outcomes and patient experience?"

## 7.2 QUALITATIVE DESCRIPTIVE ANALYSIS

The QDA component of this research analysed the freeform journals completed by students in three consecutive years of the MRS RT program. The QDA sought to explore and describe the content of the written descriptors within the freeform journals.

The findings of the QDA indicated that the themes or topics that the student's documents within their reflective freeform journals aligns with the progressive model of the RT program.

At the commencement of the core RT program in first year the focus of learning is on; the oncology patient, patient care, an introduction to the equipment and basic treatment and planning principles. In the second year of the program, the focus shifts towards having teaching embedded by disease sites on a case by case basis. Here RT students focus on the technical and patient care aspects that are required for each disease site, delivered by a variety of teaching methods over two RT specific courses in second year. The third year of the program moves towards developing more analytic skills in the students. Although semesters one, year three still uses disease sites in a case by case framework the teaching mode moves towards more autonomous methods such as Problem Based

Learning. The final semester, third year is specifically designed to begin the student's transition to practice. During this semester students are asked to critically review new emerging technologies and practices within the RT field as well as begin developing their professional CPD plan.

At the onset of the program the student focus is greatly on 'The Patient' whilst as they move through the program the main focus shifts towards 'Their Clinical Environment', and becoming more analytical of techniques and equipment they encounter during professional placement. It cannot be concluded from the decrease in evidence of 'The Patient' category that students are not considering the patient in their practice. This decrease could be due to a shifting focus into more technical element of the profession.

This research has provided key insights into the events and experiences that RT students find significant and document in their personal journals completed following professional placement. It has identified how these events and experiences change as a student moves through the program. These findings will allow Universities to ensure that the adequate and appropriate support is provided to students on professional placement at the various stages of their program. Additionally, it allows for Universities to ensure that there is good alignment between the 'actual curriculum' and the 'workplace learning' that occurs during professional placement. These findings and the future directions (discussed below) will assist in providing quality education in the university setting and clinical setting for RT students, hence aiming to minimise student attrition from RT programs that has previously impacted on the profession as discussed by Baume (2002). Thus ensuring that there are adequate numbers of trained radiation therapists available to service the expanding facilities and demand for radiation therapy services within Australia.

#### 7.2.1 FUTURE DIRECTIONS

The findings of the QDA did identify areas that require further investigation such as, the lack of written description focusing on "The Patient" as the students progress through the program. This research was not able to identify whether this was simply a change in focus for the students to the more technical aspects of

the profession or were students simply not documenting the patient focused aspect of their experiences as they increased the skills base of their practice. This is certainly an area for future research.

Whilst the reflective analysis component of this research did identify evidence of reflection within the student's journals and the QDA identified the content of these same journals, each analysis was conducted independent from the other. Future research will examine the descriptive content of the student's reflections, rather than descriptive content of the journal itself. Although this thesis does not link the work from Aim1 to Aim 2 and 3, future work may highlight a link between the ability to reflect during the experiential learning experience of professional placement, student experience on professional placement and student attrition.

The QDA also identified a need to conduct further research around the concept of "Job Satisfaction/Enjoyment" of final year students and possibly new graduates.

### 7.3 OUTCOMES OF THIS RESEARCH

#### 7.3.1 PUBLISHED PAPERS

**Findlay N, Dempsey S, Warren-Forward H, A qualitative analysis of radiation therapy students professional placement journals. (Submitted).**

**Findlay N, Dempsey S, Warren-Forward H, Developing a qualitative framework for analysis of student journals. *The Radiographer*. Vol 57 (2) pp 34-39, 2010**

**Findlay N, Dempsey S, Warren-Forward H, Development and validation of reflective inventories: assisting radiation therapists with reflective practice. *Journal of Radiotherapy in Practice*. Vol 10, pp 1-10, 2010**

**Findlay N, Dempsey S, Warren-Forward H, Validation and use of the Newcastle Reflective Analysis Tool: a three year longitudinal study of RT students' reflective journals. *Reflective Practice*. Vol 11 (1), pp 83-94, 2010**

**Findlay N**, Dempsey S, Warren-Forward H, Development of the Newcastle Reflective Analysis Tool. *Focus on Health Professional Education: A Multi-Disciplinary Journal*. Vol 11 (1), pp 32-40, 2009

**Chapman N**, Dempsey S, Warren-Forward H, Workplace diaries promoting reflective practice in radiation therapy, *Radiography*, Vol 15 (2), pp 166-170, 2009

**Chapman N**, Dempsey S, Warren-Forward H, Theory of reflection in learning for radiation therapists. *The Radiographer*, Vol 55 (2), pp 29-32, 2008

### 7.3.2 CONFERENCE PRESENTATIONS

**Findlay N**, Dempsey S, Warren-Forward H, Development and validation of the Newcastle Reflective Inventories – Assisting health professionals in reflective practice, RANZCR/AIR/FRO/ACPSEM 2009 Combined Scientific Meeting, Brisbane, Australia, October 2009.

**Findlay N**, Dempsey S, Warren-Forward H, Validation and use of the Newcastle Reflective Analysis Tool, RANZCR/AIR/FRO/ACPSEM 2009 Combined Scientific Meeting, Brisbane, Australia, October 2009.

**Findlay N**, Dempsey S, Warren-Forward H, Development and integration of the Newcastle Reflective Inventories into all three disciplines of the University of Newcastle MRS program, 11<sup>th</sup> Australasian Association of Educators in Medical Radiation Science conference, Brisbane, Australia, July 2009

**Chapman N**, Dempsey S, Warren-Forward H, Validating the Newcastle Reflective Analysis Tool – for guided assessment of reflective writing in health care, ANZAME The Association for Health Professional Education conference, Sydney, Australia, July 2008

**Chapman N**, Dempsey S, Warren-Forward H, Theory of Reflection in Learning for Radiation Therapists, Australian Institute of Radiography Annual Scientific Meeting of Medical Imaging and Radiation Therapy conference, Melbourne, Australia, March 2008

**Chapman N**, Dempsey S, Warren-Forward H, Reflective Inventories - Assisting health professional with reflective practice, ANZAME The Association for Health Professional Education conference, September 2007

**Chapman N**, Dempsey S, Warren-Forward H, Assessing student journals for evidence of reflection, 10<sup>th</sup> Australasian Association of Educators in Medical Radiation Science conference, Newcastle, Australia, July 2007  
in Medical Radiation Science conference, Newcastle, Australia, July 2007

### 7.3.3 WORKSHOPS

**Chapman N**, Dempsey S, Enhancing Clinical Practice, Research and Personal Development in the Cancer Care Setting, Western Sydney Area Health January 2009

**Chapman N**, Dempsey S, Enhancing Clinical Practice, Research and Personal Development in the Cancer Care Setting, QLD Statewide allied health cancer care training and development program, Brisbane, Australia, February 2008.

## Chapter Eight

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