

ADDENDUM

- p. 3. Add para 3 and read:
“Undertaking a cross-sectional survey design using convenience sampling, ...”
- p. 4. Add para 3 and read:
“i) non-standardised curricula (although a standardised curriculum is not universally viewed as problematic); ...”
- p. 6. Add para 1 following citation:
“(Institute of Medicine, 2008)”
- p. 8 Delete para 3.
- p.13. Add para 2 following citation:
“(Health, 2002; Shaban, 2009). Further analysis ...”
- p. 14. Add para 1 and read:
Replace “cafe latte lifestyle” with “swap their ‘modern lifestyle’ for the demands ...”
- p.27. Add para 2 and read:
“Currently, in Australia, national ambulance competencies only exist at an undergraduate diploma level (although the CAA has in the past had draft competences that were not enforced), despite the majority ...”
- p. 28. Add para 3 and read:
“In defining ‘ambulance’ it is important to note the absence of a standardised definition like other cognate disciplines such as nursing (e.g. ICN), although state based legalisation is more homogeneous defining ‘ambulance’ as offering similar levels of care in the provision of prehospital treatment and transport (Eburn & Bendall, 2010). Historical material ...”
- p. 33. Add para 3 following citation:
“(Howie-Willis, 1983). As Field ...”
- p. 47. Add para 3 following citation:
“(Howie-Willis, 1985). In fact, having ...”
- p. 55. Add para 2 following citation:
“(Broom & Woodward, 1996), including outright ...”
- p. 57. Add para 1 and read:
“... a more ‘, multiprofessional’ model (Willis, 2009b).
- p. 69. Add para 2 and read:
“(Dawson, 2008; Lord, 2002; Webb, 1996). It is not ...”
- p. 76. Add para 1 and read:
“(A. McDonell, personal communication, October 20, 2007; Dawson, 2008).
- p. 119. Add para 2 and read:
“... undergraduate Bachelors (first offered in 1959), masters ...”
- p. 113. Add para 3 and read:
“... and medical dominance through political and professional bodies such as the Royal College of Nursing and Australian Nurses Federation”.
- p. 146. Add para 1 and read:
“The PGAS was developed to elicit opinions from the paramedic sector ...”

- p. 185. Add para 1 and read:
"Firstly, the paramedic discipline is not currently viewed as a full profession by those sampled".
- p. 189. Add para 2 and read:
"Other professions such as nursing, medicine, dentistry, and physiotherapy, as well as a number of international paramedic groups (United States, Canada, and United Kingdom) have achieved national standards ..."
- p. 192. Add para 1 and read:
"Recommendations for future research include establishing further construct and content validity using a larger sample size from a broader cross-section and randomised sampling methods of the paramedic ..."
- p. 195. Add para 3 and read:
"Potential selection bias and sampling bias were at least partially reduced by the large representative sample size, although attempts ..."
- p. 225. Add para 2 and read:
"Based on this broad guiding principle, as well as the large sample size, the sample size ..."
- p. 274. Add para 1 and read:
"In fact, planning data suggest the majority of students graduating from university programs are now female (Australasian Survey of Student Engagement, 2010).
- p. 276. Add para 1 and read:
"... professional rates of pay (ACAP, 2010a; Gallagher, 2010; Industrial Relations Commission, 2007; Lennox, 2010; South Australian Industrial Relations Tribunal, 2008). In ACT's case ..."
- p. 301. Add para 3 and read:
Delete "then" and replace with "... those participants older than 40".
- p. 348. Add para 2 and read:
"... Oliver et al., 2007; Parry & Reynolds, 2010; Scoufis, 2000).
- p. 399. Add para 3 and read:
"Replicated research might consider including non-paramedic college members to better represent the paramedic population, or consider alternative sampling techniques such as randomised, cluster or stratified sampling"

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Graduate Attributes and the Professionalisation of Australian Paramedics: An Empirical Study

Volume I

Submitted by

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Glossary of key terms and abbreviations

The following provides a list of the key terms and abbreviations used throughout the thesis.

ACAP	Australian College of Ambulance Professionals
AIHW	Australian Institute of Health and Welfare
AMA	Australasian Massage Association
AOTC	Ambulance Officers' Training Centre
APA	Australian Physiotherapy Association
AUQA	Australian Universities Quality Agency
Attributes	'The knowledge, abilities, skills and attitudes that together underlie competent professional performance' (Gonczi, Hager, Oliver, 1990, p. 62)
CAA	Council of Ambulance Authorities
CBT	Competency-based training
CI	Clinical Instructor
COAG	Council of Ambulance Governments
CSP	Commonwealth Supported Places
Competency	'A combination of attributes underlying some aspect of successful professional performance' (Gonczi et al., 1990, p. 62)
EMS	Emergency Medical Services
IPE	Interprofessional Education
Paramedic	A person trained and educated to provide emergency medical treatment in the pre-hospital sector
PGAS	Paramedic Graduate Attribute Scale
Pedagogy	The science of teaching

Pre-employment	Undergraduate paramedic university student. (Referred to pre-registration in countries that have paramedic registration).
MICA	Mobile Intensive Care Ambulance
MCCU	Mobile Coronary Care Unit
NCAU	National Council of Ambulance Unions
NPR	National Professional Recognition
RPL	Recognition of Prior Learning
RTO	Registered Training Organisation
TAFE	Technical and Further Education
UNS	Unified National System
UK	United Kingdom
US	United States
VET	Vocational Education and Training

Abstract

The paramedic discipline within Australia has seen a remarkable change in a number of areas including education, training, identity, and scope of clinical practice, particularly over the past three decades. Therefore preparing future paramedic graduates for these expected roles and changes requires a careful and strategic alignment of graduate attributes to course curricula, especially since what constitutes these graduate attributes is still a contentious area of debate amongst practitioners. The primary aim of this study was to investigate the graduate attributes that best reflected professional practice for Australian paramedics, thus providing an opportunity to standardise curricula nationally and strengthen its claims to be recognised as a fully-fledged health care profession.

By undertaking the first attempt at developing an empirically-based paramedic graduate attribute scale; this study makes an important and informed contribution to the paramedic body of knowledge, theory and practice. This thesis reports the development and validation of the Paramedic Graduate Attribute Scale (PGAS). The PGAS was completed by 872 paramedic participants from around Australia. A combination of classical-test theory (factor analysis) and item-response theory (Rasch analysis) were utilised to validate and refine the PGAS. Results from these analyses confirmed a 30-item reliable and valid scale made up of seven viable factors (Personal Behaviour and Attitudes, Patient Interaction and Welfare, Scientific Approach to Patient Care, Paramedic and Society, Commitment to Professional and Health Care Outcomes, Professional Behaviour, Interaction Skills).

The PGAS provides a graduate attribute and curriculum blueprint for paramedic course accreditation, standardisation, curriculum mapping and benchmarking processes. Accompanying this standardisation will be a nationally consistent paramedic curriculum, providing assurance that graduates are meeting industry standards and community expectations. The implementation and uptake of graduate attributes has been historically patchy in the Higher Education sector, therefore, the integration of the PGAS should be based on a theoretical and curriculum framework. One such model that appears well suited to paramedic education is constructive alignment.

The outcome of the graduate attribute mapping and curriculum renewal process is that it signals to other health care professions, industry partners (employers), and state and federal governments that the paramedic discipline is now confident that it will be recognised as a legitimate health care profession. The PGAS can now be utilised by the Australian paramedic discipline in its attempt to standardise and formally accredit the growing numbers of paramedic programs around Australia. It will also assist in making a meaningful contribution to the growing body of paramedic empirical knowledge.

Declaration

This is to certify that

- (i) the thesis comprises only my original work towards the PhD,*
- (ii) due acknowledgement has been made in the text to all other material used,*
- (iii) relevant Human Research Ethics Committees have approved (12th June 2008, CF08/1124 – 2008000553) all research undertaken in this thesis.*

Signed

Date.....

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Publications, Presentations and Awards Arising Out of the Thesis

Peer Reviewed Publications

Chapter 1

Williams, B., Onsman, A., & Brown, T. (2010). The changing Australian healthcare landscape: what does this mean for the provision of paramedic practice? *Journal of Paramedic Practice*, 2(12), 580-584.

Chapter 2

Willis, E., **Williams, B.,** Brightwell, R., O'Meara, P., & Pointon, T. (2010). Road-ready paramedics and the supporting sciences curriculum. *Focus on Health Professional Education: A Multidisciplinary Journal*, 11(2), 1-13.

Chapter 3

Williams, B., Onsman, A., & Brown, T. (2010). Is the Australian Paramedic Discipline a Full Profession? *Journal of Primary Emergency Health Care*, 8(1).

Williams, B., Onsman, A., & Brown, T. (2009). From stretcher-bearer to paramedic: the Australian paramedics move towards professionalisation. *Journal of Emergency Primary Health Care*, 7(4).

Chapter 4

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory Factor Analysis: A Five-step Guide for Novices. *Journal of Emergency Primary Health Care*, 8(3).

Williams, B., Onsman, A., & Brown, T. (2010). Australian Paramedic Graduate Attributes: A Pilot Study Using Exploratory Factor Analysis. *Emergency Medicine Journal*, 27(10), 794-799

Chapter 5

Williams, B., Onsman, A., & Brown, T. (2011 accepted 16th April). Establishing paramedic graduate attributes: Design and validation of a paramedic graduate attribute scale. *Evaluation for the Health Professions*, doi:10.1177/0163278711407314 (online first).

Williams, B., Onsman, A., & Brown, T. (2011 accepted 2nd May). Is the Australian Paramedic Discipline a Profession? A National Perspective *Focus on Health Professional Education: A Multi-Disciplinary Journal*.

Chapter 7

Williams, B., Onsman, A., & Brown, T. (2010). Paramedic education: the significance of graduate attributes. *Journal of Paramedic Practice*, 2(10), 474-479.

Williams, B., Onsman, A., & Brown, T. (submitted under review). Constructive Alignment in Paramedic Education. *Journal of Paramedic Practice*.

Williams, B., Onsman, A., & Brown, T. (submitted under review). Embedding Graduate Attributes Through Constructive Alignment. *Journal of Paramedic Practice*.

Peer Reviewed Conference Presentations

Williams, B., Onsman, A., & Brown, T. (2010). *Validation of the Paramedic Graduate Attribute Scale (PGAS): A Rasch Rating Analysis*. Paper presented at the Australian College of Ambulance Professionals Conference. Perth, 14-16 October.

Murcott, P., **Williams, B.,** Morgans, A., & Boyle, M. (2010). *Community perceptions of the professional status of the paramedic discipline*. Paper presented at the Australian College of Ambulance Professionals Conference. Perth, 14-16 October.

Williams, B. (2010) *Psychometric evaluation of a paramedic graduate attribute scale: A Rasch rating scale analysis*. Monash Education Research Community Collaborative Colloquium by HDR students and Faculty scholars. Melbourne, 5 October.

Williams, B., Onsman, A., & Brown, T. (2010). *Is the Australian Paramedic Discipline a Full Profession?* Paper presented at the ANZAME Conference. Townsville, 13-16 July.

Williams, B., Onsman, A., & Brown, T. (2010). *Paramedic Graduate Attributes: Using Exploratory Factor Analysis to Professionalise Paramedic Curriculum*. Paper presented at the OTTAWA Conference. Miami, 15-20 May.

Williams, B., Onsman, A., & Brown, T. (2009). *Development and validation of a paramedic graduate attribute scale*. Paper presented at the Australian Association for Research in Education (AARE) International Education Research Conference. Canberra, 29-3 December.

Williams, B. (2009). *Paramedic Graduate Attributes: Results from a Pilot Study*. Paper presented at the Monash University Education Research Community Annual Conference. Melbourne, 3 July.

Peer Reviewed Poster Presentations

Williams, B., Onsman, A., & Brown, T. (2010). *A Rasch and Factor Analysis of the Paramedic Graduate Attribute Scale (PGAS)*. Paper presented at the Australian Association for Research in Education (AARE): 2010 International Education Research Conference, Melbourne. 28-2 December.

Williams, B., Onsman, A., & Brown, T. (2010). *Is the Australian Paramedic Discipline a Profession? A National Study*. Paper presented at the Australian College of Ambulance Professionals Conference. Perth, 14-16 October.

Williams, B. Onsman, A. Brown, T. (2009). *Paramedic Graduate Attributes: Using Exploratory Factor Analysis to Inform National Curriculum*. Paper presented at the Australian College of Ambulance Professionals Conference. Auckland, 15-17 October.

Williams, B. Onsman, A. Brown, T. (2009). *The Development of the Paramedic Graduate Attribute Scale [PGAS]*. Paper presented at the Monash University Research Week Symposium. Melbourne, 19 August.

Williams, B., Onsman, A., & Brown, T. (2009). *Paramedic Graduate Attributes: Findings from a Pilot Study*. Paper presented at the ANZAME Conference. Launceston, 1-4 July.

Invited Conference Presentations

Williams, B. (2010). *Paramedic National and Independent Registration: An Interactive Session*. Paper presented at the Australian College of Ambulance Professionals Conference. Perth, 14-16 October.

Williams, B. (2009). *Embedding professionalism in paramedic education and practice in the setting of emergency primary health care – where to, and how do we get there?* Paper presented at the Inaugural Annual JEPHC Symposium. Melbourne, 16 July.

Williams, B. (2008). *The Current Challenges Confronting Paramedic Education: Paramedic Graduates – Are we getting what we want?* Paper presented at the Australian College of Ambulance Professionals Conference. Melbourne, 4-6 September.

Book Chapters

van Dreven, A., & **Williams, B.** (in press). Professional Development. In K. Curtis, C. Ramsden & J. Friendship (Eds.), *Emergency and Trauma Care*. Sydney: Mosby Elsevier.

McDonnell, A., Burgess, S., & **Williams, B.** (2008). From Academia to Clinical Practice In P. O'Meara & C. Grbich (Eds.), *Paramedics in Australia: contemporary challenges of practice* (pp. 181-191). Sydney, Australia: Pearson Education.

Best Paper Award

2010: *Best Higher Research Degree Oral Presentation:*

Validation of the Paramedic Graduate Attribute Scale (PGAS): A Rasch Rating Analysis.
Paper presented at the Australian College of Ambulance Professionals Conference. Perth,
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Research Award

**2009: Monash University *Inaugural Centre for Medical Health Science Education
(CMHSE) Emergent Educational Researcher Prize.***

Title: The Development of a Paramedic Graduate Attribute Instrument Using Exploratory
Factor Analysis: A National Study.

SECTION 1: Historical Background and Context Setting

Chapter 1

Introduction

Introduction

The Australian paramedic ¹ discipline forms an integral part of Australia's health care system, providing care and transport within the prehospital setting (Joyce, Wainer, Piterman, Wyatt, & Archer, 2009) and accounting for approximately 2% of Australia's 450,000 professional health care workforce (Willis, Pointon, & O'Meara, 2009a). The majority of Australian ambulance services (with the exception of Western Australia and the Northern Territory) are managed by state or territory governments under the auspices of either emergency or health services legislation. Western Australian and the Northern Territory ambulance services are privately operated by St John Ambulance.

Currently, the paramedic discipline faces many changes such as increased workloads. For example, in 2008-2009 Australian ambulance services attended 2.9 million incidents (a growth of over 500,000 in three years), 1.3 million of which were considered urgent or an emergency (Council of Ambulance Authorities [CAA], 2006a; 2009c).

Currently, there are over 18,000 paid or volunteer paramedics, practicing at varying levels and involved in pre-hospital care for the sick and injured in all six states and two territories (CAA, 2008c). The overall majority of these paramedics are employed primarily in operational or clinical positions with annual staff attrition rates from individual ambulance services at 4% (CAA, 2009a). There has been a steady growth in paramedic employees since 1996 of over 10%, and an increase of 6% between 2008-2009 (CAA, 2009a).

¹ Paramedic will be used as a generic term for all historical and current levels of ambulance and prehospital practice. It will be used interchangeably with ambulance officer and ambulance driver.

Paramedic education and training² has undergone many significant transformations (Grantham, 2004; O'Donnell, 2006; Walker, 2009; Yates, 2009) over the past 130 year period. This brief retrospective review outlines the movement and transition of Australian paramedic education from its traditional technical-vocational roots to the present-day tertiary level institutions. For over 30 years, the majority of Australian paramedic education and training was provided by Technical and Further Education (TAFE) organisations and/or in-house Ambulance Officer Training Centres (AOTC) that acted as registered training organisations (Kaye-Eddie, 1996; Reynolds & O'Donnell 2009).

The education programs offered during the 1950-1970 period included short advanced first aid training programs including the well recognised Bronze Medallion (Howie-Willis, 2009). These and other short education programs eventually progressed to basic certificates in Applied Science and later (1970-1990s) to Associate Diplomas that were underpinned by vocational education and training principles (Wilde, 1999). Currently, base paramedic qualifications are offered at the Bachelor degree level, with some Australian universities offering postgraduate study at both the masters and doctoral level (Boyle, Williams, & Burgess, 2007; Sheather, 2009). Interestingly there has been a fivefold increase in Bachelor-level qualified graduates in the past 5 years in Victoria, with further projections of up to 30% more graduates entering the workforce between 2008 and 2012 (Joyce et al., 2009). University-level paramedic education is now offered using contemporary models of educational theory and is in the early stages of developing scholarly approaches to teaching and learning (T&L), as well as integrating research-led teaching into the undergraduate curriculum.

This thesis is concerned with the area of graduate attribute and curriculum renewal in Australian paramedic education and training programs. Undertaking a cross-sectional survey design using convenience sampling, data were analysed using a combination of Classical-Test Theory and Item-Response Theory to develop a psychometrically sound

² Training is considered in this thesis as teaching of skills or practical procedures leading to competency. Education will be used in the context of imparting knowledge and powers of reasoning and judgement.

graduate attribute instrument. The development of this instrument aims to offer the Australian paramedic discipline an opportunity to standardise its curriculum nationally, and to develop a unique body of knowledge, thus strengthening its claim to be recognised as a fully fledged profession.

Importance of the Research

Paramedic Education and Training

The Australian paramedic discipline has seen a remarkable change in a number of its facets in education, training, health care identity, and clinical practice, particularly over the past three decades. The recent move to the Higher Education³ sector has meant that questions such as benchmarking Australian undergraduate paramedic programs, graduate attributes, skills, competencies, and qualifications are yet to be undertaken at the non-vocational undergraduate Bachelor level. Yates (2009) points out that “the relationship between the competency standards developed by the professions and the education offered by the universities in preparation for the professions is less clear cut” (p. 88). In addition, to date there has not been any formal implementation of accreditation of paramedic programs in Australia⁴ (Australian College of Ambulance Professionals [ACAP], 2009a). The transition to the Higher Education sector has seen dramatic changes in some state ambulance services, including the loss of educational, training, and employability control – control that they had previously held (ACAP, 2009a; O’Donnell, 2006). There has been a re-allocation and shift of the traditional areas of professional jurisdiction and control within the paramedic discipline at the state and national level. In other words, traditional zones of ‘professional turf’ have been re-shaped (Willis, 2009b).

The transition to the Higher Education/University sector has resulted in four problematic areas: non-standardised curricula (although a standardised curriculum is not universally viewed as problematic); ii) a duplication of education and training that new university

³ Higher Education is defined as any educational institution at the tertiary level, i.e. university, institutes of technology, and vocational colleges.

⁴ At the time of writing, no formal or nationally standardised accreditation exists. Commissioned by the CAA, site evaluation teams are preparing to visit each of the respective universities throughout 2011 and 2012.

graduates receive once they are employed by an ambulance service; iii) a lack of consistency about educational ideology between university providers and industry stakeholders; and iv) in turn a mismatch between professional education and on-the-job paramedic role requirements. The net results of these features are educational duplication and financial inefficiencies, and uncertainty about whether paramedic education programs reflect the attributes, skills, and knowledge needed for a rapidly changing population (O'Donnell, 2006). Confusion surrounding these fundamental features of identity ultimately limits the capacity of the Australian paramedic discipline to develop itself as a fully developed and recognised health care profession.

The next section will outline further background to the issue, including the factors involved in shaping and changing the way the paramedic discipline is currently positioned within the Australian health care workforce. The section also leads into why an investigation of paramedic graduate attributes for the Australian paramedic discipline is imperative for future service delivery models, curriculum standardisation, and strengthening claims to be considered a full profession.

The Changing Health Care Context for Paramedics

The Australian health system and delivery of health services in general is under increasing pressures and is searching for innovative models of service delivery (Department of Human Services, 2008; Kilpatrick, Le, Johns, Millar, & Routley, 2007; Lowthian et al., 2011; National Health and Hospitals Reform Commission, 2008). This changing nature of health is noted by Reid (1994):

State and Commonwealth Ministers have agreed that Australia needs a health system that is more responsive, efficient, equitable and consumer-driven. This implies health professions for which entry is open and qualifications and experience are portable, and thus a labour force that can be flexibly deployed (p. xv).

This situation is mirrored on a global scale as are attempts at developing and trialling potential solutions (Association of Schools of Allied Health Professions and National Network of Health Career Programs in Two-year Colleges, 2002; Bezold, 1989;

Chapman et al., 2004; Department of Health, 2005a; Kilpatrick et al., 2007; McGinnis, 2004; US Department of Health and Human Services, 2007). It could be argued that a similar situation with the paramedic discipline would follow in Australia; therefore its context may be expected to be similar, and solutions for one may be viable for the other. Several key documents have been produced by the international paramedic community in support of developing new solutions including: *EMS Agenda for the Future* (National Highway Traffic Safety Administration, 1996), *Rural and Frontier Emergency Medical Services Agenda for the Future* (McGinnis, 2004), *The Future of EMS in Canada: Defining the New Road Ahead* (Emergency Medical Services Chiefs of Canada, 2006), *Emergency Medical Services at the Crossroads* (Institute of Medicine, 2008) and *The Future Role and Education of Paramedic Ambulance Service Personnel* (Joint Royal Colleges of Ambulance Liaison Committee, 2000).

Underpinning these changes to paramedic service delivery is a population whose health needs are changing and further exacerbated by a health workforce struggling to meet current health care service demands (Lowthian et al., 2011). The following is a brief overview of these pressures and transformations that provides a context for the changing roles of the Australian paramedic discipline and why identification and integration of graduate attributes into the paramedic undergraduate curriculum is both timely and essential.

Current workforce supply and demand is placing significant strains and burdens on a system that is searching for alternative service delivery models to meet public and primary health care needs (Heath, 2002; National Health and Hospitals Reform Commission, 2009). One of the manifestations caused by this strain is ambulance service inefficiencies and subsequent organisational restructuring that has occurred throughout Australia over many decades (Brand, 1989; Capp, 1992; Department of Human Services, 2008; Ferguson, Gardiner, & Higginbottom, 2008; Fitzgerald & Shugg, 1994; Harrison, 2008; New South Wales Government, 2008; Osborne & Sims, 1973; Public Bodies Review Committee, 1984; Public Bodies Review Committee, 2004; Rawlingson, Warren, Mayo, & Marsh, 1994; State Services Authority, 2006). Other features of the health care

strain have been reported including dissatisfied and poor morale amongst paramedic staff, outdated clinical qualifications, increased up-skilling leading to a dilution of specialised care, and organisational disharmony within ambulance services (Ambulance Employees Association, Victoria, 2006; Anonymous, 2008; CAA, 2006a; Joint Standing Committee on Community Development, 2003; New South Wales, Auditor General, 2007; Public Bodies Review Committee, 1984; South Australian Ambulance Service Report, 2006; State Services Authority, 2006). The Council of Ambulance Authorities (2006b) summarises the dynamic change taking place in prehospital employment and in the clinical practice context by stating that the “traditional role of ambulance services is under review in most jurisdictions with particular emphasis on future service delivery in rural and remote areas” (p. 1).

Not only is the demand for ambulance services expected to increase dramatically but so too is the search for improved health care efficiencies, a university curriculum for students that reflects not just an acute model of care, and alternative service delivery approaches (Australian Preventative Health Taskforce, 2009; Lowthian et al., 2011). Greater expectations are now required of paramedic graduates and ambulance organisations as increased demands for resources and diversification of roles, such as extended-scope of practice, are now expected in many parts of Australia (O’Meara et al., 2006; Phillips, 2007; Reeve, Pashen, Mumme, De La Rue, & Cheffins, 2008; Stirling & O’Meara, 2009; Willis, 2009b). Demands, efficiency, and delivery of service are influenced by many factors underpinned by social, health, political, and economic forces, which include:

- An aging population
- Changes in population health
- Discipline-specific education and training
- Changing and evolving workforce scope of professional practice
- Workforce shortages
- Decentralisation of health care services

- Diversification of population locations (Australian Institute for Primary Care [AIPC], 2007).

- **Aging Population**

Australia's population is aging (Heath, 2002; National Health and Hospitals Reform Commission, 2008) and according to the Australian Bureau of Statistics [ABS] (2006a), the average age of Australian citizens will increase between 39.9 years and 41.7 years by 2021 to 44.6 years and 48.2 years in 2051. These increases will also bring associated co-morbidities (for example, arthritis, high blood pressure, and heart disease) and are likely to present all health care disciplines with significant clinical, economic, and logistical challenges (Armstrong, Gillespie, Leeder, Rubin, & Russell, 2007). The notion that Australia is quickly growing 'older' is reinforced by the projection that the proportion of people aged over 65 years will increase to between 26% - 28% of the total population by 2051 (ABS, 2006b). It is suggested that as the population grows and ages, a greater demand for aged care facilities will subsequently occur. Moreover there will be an urgent need to consider paramedic workforce change and shortage issues and to develop sophisticated prehospital approaches to meet these demands (Australian Department of Health and Ageing, 2009; Capolingua, 2007; Heath, 2002; Stirling & O'Meara, 2009; Van Der Weyden, 2007).

- **Changes in Population Health**

Changes in population health are highlighted by continued obesity (over half [54%] of Australia's population is obese) and generational obesity (7.4 million people aged over 18 years are considered obese) (ABS, 2007a), and an increase in chronic illnesses such as high blood pressure, heart disease, and diabetes. Chronic illnesses (ABS, 2006a) are imposing change to public health and primary health issues, which are rapidly increasing ambulance demand, particularly as the population is 'living longer and sicker'. Others have suggested that the increased incidence of chronic illness and disease, coupled with an increase in the prevalence of cardiovascular risk factors, will place an enormous strain on the health care sector including the paramedic discipline (AIPC, 2007).

- **Discipline-Specific Education and Training**

Kilpatrick et al. (2007) emphasises that there is a clear need for “innovative service delivery and training models to help reduce health skill shortages” (p. 21). Yet the majority of health care students are educated in isolation of one another and receive little to no formal exposure to other disciplines and their respective roles in the care of patients (Bourke et al., 2004; Thistlethwaite & Nisbet, 2007). The trend has been that health science students are educated in towers of professional isolation. One potential solution is the concept of ‘multiskilling’. Multiskilling is a healthcare concept that provides health care providers with the capacity to perform more than one function in and across a variety of health disciplines (Australian Department of Health and Ageing, 2009; Makely, 1998; National Health and Hospitals Reform Commission, 2009). The notion of cross-learning is supported by Fleming (2008) who writes that “multiskilling, or cross-training of practitioners across functions or disciplines, has been identified as a means of coping with increased health care demand in the public sector” (p. 116). This would be particularly relevant in rural and remote regions where the recruitment of health care staff is often challenging.

The concept of interprofessional education (IPE) has also been receiving ongoing attention in the health care literature (National Health and Hospitals Reform Commission, 2009). There is increasing international and national evidence to support the benefits of IPE that encourages a more fluid, diverse, and multiskilled workforce (Anderson, Manek, & Davidson, 2006; Fleming, 2008; Heath, 2002; Humphris & Hean, 2004; Lavin et al., 2001; McNair, Stone, Sims, & Curtis, 2005; Roberts, 1998; Stone, 2006; World Health Organization, 2010a). In IPE, different health care disciplines come together to learn from and about each other in order to provide better quality health care (Lewis & Stone, 2007). In turn, this leads to greater flexibility and produces a workforce that is more productive and efficient (Makely, 1998), thus offering potential solutions to the struggling Australian health sector (Walker, 2009). The goal of IPE is not that students learn to become proficient in the skills and expertise of other disciplines, but instead become acquainted with the scope of practice of other health care professionals.

Positive outcomes of IPE include dispelling professional stereotypes, professional individuality, collegial learning, improvement in respect, teamwork and communication, and holistic patient care systems and attitudes (Fleming, 2008; Leaviss, 2000; Nestel, Williams, & Villanueva, 2010; Yarborough, Jones, Cyr, Phillips, & Stelzner, 2000). Others have purported that this approach produces better patient outcomes and improved patient satisfaction (Fleming, 2008; Mickan, 2005). In addition, IPE ensures individual health care disciplines not only learn about other disciplines, but gain a greater sense of their own identity and how this broader understanding can improve and shape their clinical discourse and management, particularly in holistic extended-scope roles, as the clinical boundaries become indistinct and professional ‘silos’ are removed (Fleming, 2008).

However, the implementation of IPE is not without its challenges. Inflexible and incompatible course structures within educational institutions across multiple disciplines often restrict the scheduling of IPE activities (Nestel et al., 2010). Other barriers include traditional areas of professional practice jurisdiction or ‘protecting one’s professional turf and professional specialties’ (Bourke et al., 2004). Furthermore, research has shown that students underestimate the contribution, skills, and knowledge of other professionals in patient care (Parsell, Spalding, & Bligh, 1998; Insalaco, Ozkurt, & Santiago, 2006).

- **Changing Workforce**

The way in which Australian health care professionals work is changing (Australian Department of Health and Ageing, 2009; Heath, 2002). The continued development of interdisciplinary and flexible degrees is potentially suited to the next generation of employees – Generation Y (Gen Ys) (born 1980-2000). This generation (colloquially referred to as the Net Gen, iGeneration, or Neomillennials) are considered the most influential generational group since the Baby Boomers (1946-1964) (Patterson, 2007). It is claimed that Gen Ys are considered materialistic, easily bored, demanding, impatient, to have high expectations, socially responsible, and likely to have several jobs in their lifetime (Patterson, 2007; Preston, 2007; Walker, 2007). Larkins (2009) notes that “no

longer is it usual for graduates to work in a single job or even in the same type of job for all their professional lives” (para, 2). Recent work from the nursing profession has examined the capacity to recruit and retain registered nurses aimed squarely at Generation Y (Walker, 2007). Given the specific characteristics of Generation Y, it would seem timely that other health care professions should investigate these phenomena more closely and consider the potential impact to diversification and the high attrition rates of health care professionals (Healy, 2007). From an undergraduate paramedic perspective, the overwhelming majority of students (86%, since 2005) studying a paramedic degree in Victoria were aged less than 30 years (Monash University, 2011; Williams, 2006a). Other Victorian data suggest paramedic graduates are younger compared with the previous technical-vocational programs (average age of 24 and 27 years respectively) (Joyce et al., 2009).

- **Workforce Shortages and Patterns**

The Australian health care workforce is not as it once was; as with the general population, it too is getting older, particularly as the baby boomer generation draws closer to retirement age (Australian Government, 2010; Heath, 2002; Productivity Commission, 2005). From 2000 to 2005, the proportion of workers aged above 45 years increased from 37% to 43% (AIHW, 2003; Fleming, 2008, Kilpatrick et al., 2007). The majority of the Australian health care workforce is female, with the exception of medicine, optometry, and dentistry (Fleming, 2008; Kilpatrick et al., 2007). There is a greater shift towards working less and working part-time (Kilpatrick et al., 2007), both of which place an immense pressure and burden on workforce demands, particularly when most disciplines are experiencing workforce shortages (Fleming, 2008; World Health Organization, 2010b). This is highlighted by Heath (2002) who observed that there “is a growing societal expectation that there should be balance between working life, family and social life” (p. 42).

Recent findings reported by the AIHW (2003) stated that up to a quarter of paramedic staff worked more than 49 hours a week, and in another study, 87% of paramedics experienced fatigue and tiredness as a consequence of working long hours (Hannan,

2008). During 1996-2001, there was an increase in paramedic occupation of 747 (12.5%) nationally and only a small proportion (7%) of paramedic staff worked part-time or casually (AIHW, 2003). It should be noted that casual or part-time employment is a relatively new concept for ambulance organisations. Figures also suggest that paramedics currently work long hours and may not find a balance between work and family life, manifesting in potentially unsafe work practices (ACAP, 2009b) and negative media coverage. Several recent studies have examined paramedic fatigue and work-life balance (Courtney, Francis, & Paxton, 2010; Sofianopoulos, Williams, Archer and Thompson, submitted). Service delivery must be modernised to achieve workforce satisfaction, lifestyle balance, and sustainability.

- **Decentralisation of Health Care Services**

To assist with health service delivery, greater emphases is now placed on reducing inpatient hospital stays, performing more medical procedures on an outpatient basis, providing home-based care for patients (such as Hospital-in-the-Home), and decentralisation of medical procedures (in part due to the increased sophistication of medical technologies, interventions, diagnostics, and informatics) (AIPC, 2007; Armstrong et al., 2007; Heath, 2002). This decentralisation or shifting of medical care has partly manifested itself when “hospital-bypass” (or access block) occurs (AIHW, 2010; Whitelaw, 2010), thereby directly affecting availability of ambulances and causing significant delays in ambulance response times (Rood, 2010). Hospital-bypass occurs when a hospital emergency department is full to capacity and does not allow any ambulances to bring patients to that hospital for treatment until space is available, even when it may be the closest health care facility.

This has a direct impact on ambulance services with an increasing but shifting service demand being placed on road and aeromedical ambulance transfers (Fatovich, Nagree, & Sprivulis, 2005). In turn, this alters the structure, competencies, and attributes associated with ‘non-acute’ care ambulance management (AIPC, 2007; Fahey, 2003). Further demands are also being placed on health disciplines (such as paramedicine) with the increase in the number of chronic illnesses and acuity level of health problems caused by

the decentralisation of institutional care to home and community health agencies (Heath, 2002; Shaban, 2009). Further analysis and investigation of contemporary models and alternative approaches that offer potential solutions to demand and service delivery shifting to decentralised, community-based contexts is warranted (Kilpatrick et al., 2007). An example of this is the development and increasing use by hospitals of the 'Hospital-In-the-Home' program as a means of moving people out of acute care hospital beds more quickly and receiving treatment in their home environment.

- **Diversification of Population Locations**

The majority of Australia's population is concentrated in urban areas located on the east and west coasts of the continent (Heath, 2002); however, an increasing population is locating in inland regional centres (ABS, 2007b). Mortality and morbidity rates are higher in rural and remote locations correlating with reduced access to medical infrastructure and specific health services (Allan, Ball, & Alston, 2007; Australian Government, 2010; Kilpatrick et al., 2007). Special training needs, skill utilisation, generalisation of medical services, and professional development are dominant issues in rural and remote health care environments (World Health Organization, 2010b).

As the population becomes more widely dispersed, it translates to specific challenges for rural and remote health service delivery including the merging of occupational territories and loss of professional identities, particularly with the high attrition rates of some health services in remote areas (Capolingua, 2007; CAA, 2006a; Heath, 2002; Van Der Weyden, 2007). In the media, for example, it has been mentioned that medical students when they graduate do not want to swap their 'modern lifestyle' for the demands of living in rural and remote regions. Understandably the community expects timely ambulance response times and paramedic skills maintenance and reaccreditation (Fleming, 2008). So in some ways, these health care issues have served as a catalyst for generating and developing innovative rural and remote health service delivery solutions, such as multiskilled allied health care assistants, nurse practitioners, paramedic practitioners, extended-care paramedics, and physician assistants (CAA, 2008b; Fleming, 2008; Kilpatrick et al., 2007; Raven, Tippet, Ferguson, & Smith, 2006; Reynolds & O'Donnell,

2009; Stirling & O'Meara, 2009; Stirling, O'Meara, Pedler, Tourle, & Walker, 2007).

This point is supported by the Council of Ambulance Authorities, (2006b) who state:

The ambulance service is a unique nationwide mobile health provider staffed by a skilled workforce assisted by advanced communication systems. There exists significant potential to better utilise these resources within the wider health service. The development of a qualification based on relevant nursing and paramedic skills similar to the UK 'practitioner' model is worthy of consideration. While the UK model is intended for areas of high population density, the Australian demography with the tyranny of distance factor suggests such a model could benefit rural and remote communities equally as well (p. 3).

The Australian health system requires solutions to the internal and external issues/problems discussed above. Predictable solutions include: mobilising a flexible and portable workforce, and developing and embracing educational ideologies such as IPE, which may in turn offer a more multiskilled health care workforce able to work across a range of health disciplines (National Health and Hospitals Reform Commission, 2009). They may also offer solutions in dealing with remote rural locations (Kilpatrick et al., 2007) where an interdisciplinary and/or extended-scope practice could be implemented. Fleming (2008) believes that "a more fluid workforce with generic skills and blurring of professional boundaries with the emphasis on generic health workers and expanded roles" (p. 116) is needed.

Professionalisation of the Australian Paramedic Discipline

As previously outlined the Australian health care system and delivery of health services is under increasing pressure secondary to increased population, longevity, subsequent chronic illness patterns and modernisation of service delivery. Therefore preparing health care graduates for these expected changes requires careful alignment of graduate attributes to core components of academic curricula. Walker (2009) is adamant that "Paramedic scopes of practice need to expand and an accredited and appropriate education and training framework is required so that the paramedic workforce can respond effectively to community needs of the future" (p. 155). The Australian paramedic discipline has seen a remarkable change in a number of areas over the past

three decades, particularly education and training. It is, however, currently in a tenuous position since it is not yet considered a 'full profession' (Reynolds & O'Donnell, 2009). This is largely due to it not being registered or regulated nationally and disjointed attempts at developing a national and unified body of knowledge through non-accredited and non-standardised university programs (O'Donnell, 2006). The outcome of not being recognised as a profession means that currently the paramedic discipline continues to be ignored in national policy considerations and other health care reforms (ACAP, 2010d; Sheather, 2009; Willis, 2009b). For example, the paramedic discipline was not included in the list of ten health care professions (chiropractors; dentists [including dental hygienists, dental prosthetists and dental therapists]; medical practitioners; nurses and midwives; optometrists; osteopaths; pharmacists; physiotherapists; podiatrists; and psychologists) that will fall under the mandate of the Council of Australian Governments (COAG) national registration and accreditation scheme started in 2010.

Therefore it will be argued that the Australian paramedic sector has reached a critical point in its development as a recognised profession. In order to remain and grow as an autonomous and respected part of contemporary and modernised health service delivery, and consequently become recognised as a profession, a number of key questions demand answers: does the sector have the capacity to assist with burgeoning health care workforce shortages or offer alternatives in service delivery? If so, does the role equate to some form of extended practitioner duties or shared care roles such as physician assistant or paramedic practitioner? Either way, it appears reasonable that the role, responsibilities, and function of a paramedic both in urban and rural locales in the near future will undergo some form of change: the question is whether any such change will be professionally developmental or detrimental for the paramedic discipline? Stirling and O'Meara (2009) make the following remarks on these questions and set the scene for the justification of this study:

The lack of State or National registration is the most obvious barrier to the more widespread introduction of extended paramedic roles. Matching this foundation is the need for paramedic education and training systems that are nationally accredited and broad enough to

accommodate a more autonomous role for experienced rural and paramedics in areas of need (p. 56).

Justification of the Study

A review of the literature revealed only two peer-reviewed articles (Kilner, 2004a; Kilner, 2004b) that specifically address graduate attributes, and two doctoral dissertations (O'Donnell, 2006; O'Meara, 2001) that specifically investigate paramedic practice competencies. Several other studies and two doctoral dissertations (although not addressing graduate attributes or practice competencies) provided important guidance and positioning of this study. They examined paramedic demographics and characteristics of paramedic educators and the educational transition from vocational settings to universities (Brown, Dickison, Misselbeck, & Levine, 2002; Dawson, Brown, & Harwell, 2003; Margolis, 2005; Raynovich, 2006; Ruple, Frazer, Hsieh, Bake, & Freel, 2005; Ruple, Frazer, & Bake, 2006). The literature search yielded few published articles overall and an even further limited group of articles whose findings might be generalised outside the United Kingdom (UK) or the United States (US) where those particular studies took place.

The only published research that has directly investigated desirable paramedic graduate attributes has been from Kilner (2004a, 2004b), O'Donnell (2006), and O'Meara (2001). The first paper of a two-part series by Kilner (2004a) used a Delphi study approach in reaching agreement and consensus among a group of identified experts on the desirable attributes for UK paramedic technicians, paramedic officers, and paramedic clinical supervisors. Twenty-five broad attribute themes were generated from the first study phase that included: professionalism, communication skills, intellectual skills, and clinical decision-making. The second phase of data collection generated 203 narrow attributes which were then ranked according to mean scores and occupational group. These included: ability to learn including the use of reflection and learning from experience, patient centredness, caring, empathy, and valuing life. Kilner (2004a) concluded that paramedic education and training continued to develop curriculum

without being informed, clearly articulating, or acknowledging what desirable attributes staff would exit their training programs.

Taking the earlier findings of the Delphi study into consideration, Kilner (2004b) in his second paper used factor analysis to explore the inter-relations between the three paramedic occupational groups outlined above. Three factors were generated from each paramedic group, namely core professional skills, role-modelling, and lifelong learning. It was hypothesised that paramedic education and training has not responded to changes from within the paramedic discipline or from the broader health care sector. This educational imbalance between pedagogic purpose and desirable professional attributes was summed up by Kilner (2004b):

It is difficult to see how trusts [ambulance services] can adequately respond to the demands of a modern health service while continuing to pursue training programs that are philosophically the same as those developed over 20 years ago and for the technician more than 40 years ago (p. 382).

O'Donnell's (2006) doctorate research examined whether the Australian National Training Authority (ANTA) endorsed Training Package and its 15 vocational Australian ambulance competencies were evident in an undergraduate paramedic program, at Flinders University. O'Donnell also investigated the perceptions of graduates and clinical supervisors of to what degree these competencies were formally achieved during the program. A mixed methodological approach was undertaken in this study, using a combination of content analysis and a survey-based design. Results from the content analysis revealed that only one ambulance competency was not evident in the undergraduate program (that being 'Manage routine non-emergency scene'). Furthermore, findings from the two surveys suggested that several of the ambulance competencies were unable to be achieved, largely due to a lack of practical experience and limited opportunities for clinical practicum.

While isolated to one university program located within one state in Australia, its findings have provided a platform for others to undertake further research on a larger

national basis. Whilst the study provided important information about the preparation of graduates required for paramedic practice using the national paramedic competencies, important parallels can be made justifying the importance of this thesis. For example, there is a clear gap in establishing higher-order graduate attributes beyond the vocational national ambulance competencies that reflect a more accurate representation of the non-vocational Bachelor-level degree programs. This point is noted by ACAP (2008a) who added that “While this framework provides a suitable structure for the VET [vocational education and training] level qualifications, it has not addressed the university level programs and broader roles of the paramedic” (p. 14).

In his doctoral research, O’Meara (2001) investigated the community and health care professional’s expectations of paramedics working in regional parts of Victoria, Australia. In his study, O’Meara (2001) used a survey-based approach involving members of the public, registered nurses, physicians and paramedics ($n=285$). Results suggested that the expectations of service availability and speed of response were seen as most important by paramedics and members of the public, while the competencies of clinical skill, communication and teamwork, professionalism and ethical practice were all seen as the key competencies by each group. The results from O’Meara’s (2001) study were largely focused on developing a unique service delivery model for rurally based paramedics, and not competency development. Nonetheless, O’Meara’s work importantly provides the justification that the creation of paramedic graduate attributes which cater for all paramedics, regardless of geographic location, is warranted.

Papers by Brown et al. (2002) and Dawson et al. (2003) examined the various attributes and demographic characteristics of paramedic staff. Using a standard and cross-sectional survey methodology, descriptive results focused on areas such as employment type prior to becoming a paramedic, education and training standards, work satisfaction, and health and wellbeing as a paramedic. Whilst not specifically addressing graduate attributes, the work of Brown et al. and Dawson et al. identified many factors and variables that, in a relatively new health care discipline, shaped the paramedic workforce and suggested that this should be monitored and evaluated regularly.

Ruple et al. (2005) and Ruple et al. (2006) identified and quantified the characteristics of American paramedic educators in a document entitled the *EMS Agenda for the Future* (National Highway Traffic Safety Administration, 1996). Again, whilst not specifically addressing graduate attributes, these studies provide important data from an international educational viewpoint and add to the body of knowledge to the paramedic discipline. One of the main findings was that characteristics of paramedic educators should undergo regular examination and that paramedic curriculum design and innovation should undergo regular audits. Ruple et al. (2006) proposed that “while the curriculum has proven useful during the formative years of EMS [Emergency Medical Services], it is recognized that the work may be restrictive and inflexible relative to the evolving scope of practice and future educational needs of emergency medical services providers” (p. 235).

The recent international transition of undergraduate education being provided by Higher Education institutions is in its early stages and has unavoidably led to paramedic and allied health academics developing curriculum that is largely uninformed in terms of graduate attributes. This notion is considered by Kilner (2004a) who explained that “it is entirely possible that the curriculum is defining the attributes of the occupational group [paramedics] rather than the desirable attributes being used to define the curriculum” (p. 374). The educational difference between subject matter and optimal clinical employment has been addressed in several discussion papers by the Joint Royal Colleges Ambulance Liaison Committee (UK) and the National Highway Traffic Safety Administration (US). Critical analysis of the current climate would suggest that clear educational or workforce synergies do not yet exist in the paramedic sector, and there is no clear understanding of whether universities are producing graduates that are not only employable, but also possess the required attributes and competencies to work in a context undergoing significant change with regard to public health policies, job descriptions, and job expectations.

Two clear gaps in the literature currently exist. Firstly, no literature was located that addressed graduate attributes from an Australian paramedic perspective. Secondly, no literature was located that addressed these graduate attributes issues from an undergraduate paramedic viewpoint. The international literature that is available has focused on non-Australian *qualified* and *employed* paramedic staff, is locality specific, and does not necessarily address these concerns from a combined Higher Education/University and industry stakeholder perspective. In other words, it is not directly translatable to the Australian context.

Problem statement

Currently none of the 12 universities around Australia offering paramedic undergraduate, double-degree (i.e. nursing/paramedic), or postgraduate conversion degrees have standardised curriculum, or consistent graduate attributes. This inconsistency has created a range of issues such as educational discordance between industry and universities, and uncertainties whether graduates are meeting industry and rapidly changing health service and workforce needs, and in turn has identified a major gap in the knowledge required for graduate attribute and curriculum reform in paramedic programs, and for professional positioning in the rapidly changing health care landscape.

Research Aim

The aim of this study is to investigate the graduate attributes that best reflect professional practice for Australian paramedics, providing an opportunity to standardise curricula nationally. The specific research question posed was:

What are the graduate attributes that best reflect the desired characteristics of professional paramedic practice in Australia?

Structure of the Thesis

To achieve the above aim the thesis will be presented in three sections over eight chapters. This is illustrated in Figure 1.1.

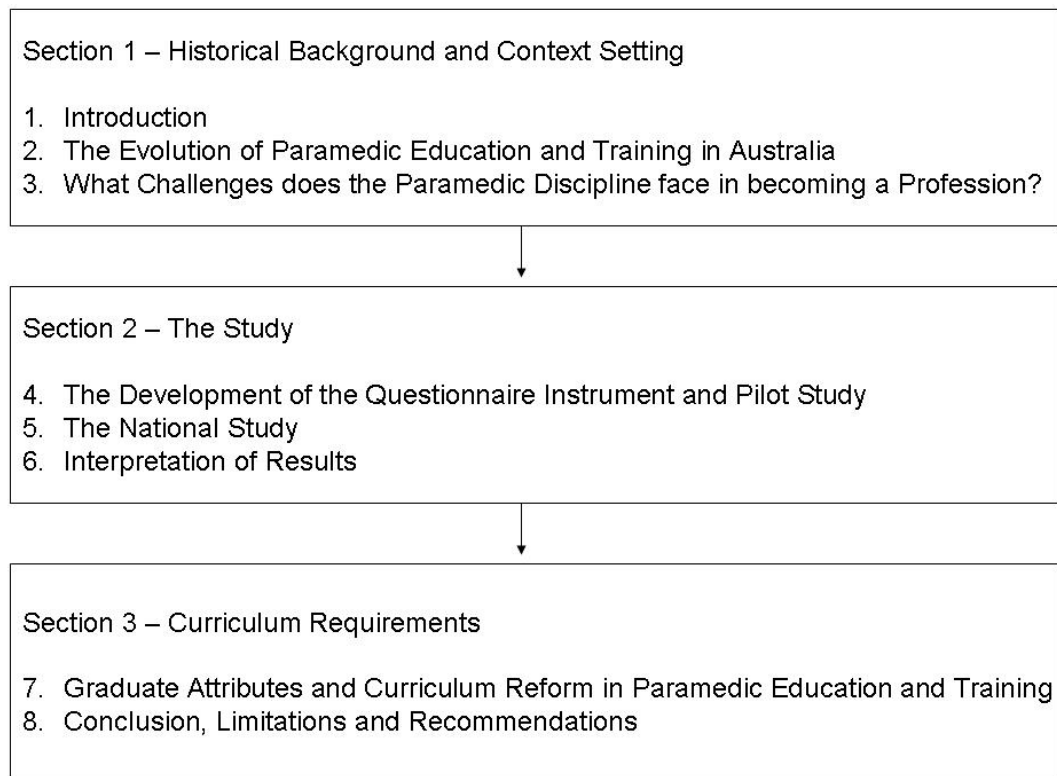


Figure 1.1: Structure of Thesis

Section 1 begins by exploring the historical background to Australian paramedic education and training, and current challenges to its professional identity within a rapidly changing health care system. Chapter 1 focused specifically on the issues surrounding Australian paramedic education and training, and why the paramedic discipline will continue to undergo significant changes in its service delivery and professional positioning until this is investigated further. This introductory chapter outlines the importance and justification of undertaking this research, followed by the problem statement and research aim which proposes that to address the current shortcomings urgent graduate attribute and curriculum reform is required.

Chapter 2 presents a historical review of the origins of ambulance transportation and the evolutionary changes that have occurred in paramedic education and training over the past 130 years. The aim of Chapter 2 is to provide an overview of the different T&L) approaches that were driven by a range of internal and external forces and also offers a future discipline diversification role.

Chapter 3 outlines a range of professional theories used to support the argument that the paramedic discipline is currently still a semi-profession. This semi-professional classification indicates the discipline is vulnerable to ‘occupational encroachment’ as other health care professions also compete for alternative service delivery scope of practice. Chapters 1-3 provide the foundation for the development of the argument upon which this study is based, i.e. the provision of agreed upon paramedic graduate attributes will provide the necessary blueprint in standardising national curriculum, thereby providing the platform to establish a unique body of knowledge, and protection of professional boundaries whilst making a stronger claim for profession recognition.

Section 2 describes the study’s methodology, results, and interpretations. Chapter 4 outlines the development of the *Paramedic Graduate Attribute Scale* (PGAS), the rationale and method of data gathering and analysis used in the pilot study. Chapter 5 outlines the design and conduct of the national study and reports the way in which inferential and multivariate statistical approaches were applied in the study investigation of professionalism and psychometric evaluation of the PGAS. Chapter 6 discusses the interpretations from the national study findings.

Section 3 explores the curriculum requirements needed to provide the necessary instructional framework to support the integration of the PGAS into national paramedic education programs. Chapter 7 examines the complexities and issues surrounding the continued patchy and varied implementation of graduate attributes in Australian universities. It then outlines an alternative conceptual and evidence-based platform with a proposed 4-phase template graduate attribute implementation approach, underpinned by

the curriculum theory of *Constructive Alignment*. Chapter 8 presents the conclusions drawn from the study's findings and offers a range of recommendations and directions for future research.

Summary

This chapter has described that the Australian paramedic discipline has undergone a significant number of changes in a relatively short period of time. Many of these changes are being influenced by an Australian health system that is in urgent need of reform in its service delivery and workforce planning. Other changes are attributed to the ongoing health care needs of patients, varying health roles, shifting professional role boundaries, and changes to educational approaches. All of these variations are placing extra demands on a discipline still acclimatising to its recent move into the university-level education sector and current attempts to move from a 'semi-profession status' to an 'autonomous professional body'. The aim of this study is to investigate the graduate attributes that best reflect professional practice for Australian paramedics, providing an opportunity to standardise curricula nationally and strengthen claims to be recognised as a profession.

The study will contribute significantly to the Australian paramedic body of knowledge, providing universities, industry employers, regulatory organisations, professional associations, and governmental bodies with a valid and reliable set of paramedic graduate attributes. It is anticipated that a consensus on paramedic graduate attributes will not only inform the universities that provide education and training, but also the ambulance sector that employs graduate paramedics. The new graduates will meet the increasing demands, be efficient through responsive education and training, and assist in modernising the health care system.

The next chapter provides a historical review of paramedic education and training in Australia, drawing on specific T&L approaches and likely graduate attributes during four discrete learning periods from 1880 to the present day.

Chapter 2

The Evolution of Paramedic Education and Training in Australia

Introduction

As outlined in the previous chapter, the Australian health care system is searching for efficiencies and modernisation of service delivery in its attempt to accommodate changing workforce patterns and population health demands. The search for alternative service delivery models is having a direct impact on the Australian paramedic discipline and its education, training, identity, and clinical practice. In order to examine the graduate attributes of current and future paramedics, it is important to understand the historical context of paramedic and ambulance care, so a clearer appreciation of what is required can be made. The historical origins of ‘ambulance use’ dates back over 500 years, with the emergence of the Order of St John and its initiation of first aid treatment to the public (Phillips, 2007). The growth of members and the governing role of the St John Association provided key points in paramedic history. Each of these will be discussed individually. Added to that, descriptions of the evolutionary changes to paramedic education, training, and graduate attributes are made emphasising the advancement that has occurred over the past fifty years. This will provide both the historical and contemporary context for the proposed study.

This chapter will also provide an overview of the genesis of the ‘ambulance’ and how the movement or transportation of a patient from an accident/incident site to definitive care has, in fact, not altered for many centuries. Whilst the notion of transporting patients to hospital has not changed, it is the transition and evolution of paramedic personnel in terms of education, training, pedagogy, clinical praxis, and scope of practice that has undergone significant transformations over the past five decades that can be framed into four distinct learning periods. Many factors and variables have played their part in this passage, particularly political, economic, and social pressure altering the way vocational and tertiary education was offered to prospective students. These factors and variables

will be discussed. The first section of the chapter also provides a retrospective review of the features and limitations of past paramedic education and training practices. The swift transition, whilst improving clinical and professional standards and patient care, has been undertaken despite the continued struggle of not having a national registration body or a nationally standardised accreditation system for education programs within Australia. This continued uncertainty currently undermines attempts at standardising national curriculum objectives and standards thus preventing national portability of qualifications between states and territories. The chapter will also identify that no uniform set of paramedic attributes currently exist in the Australian paramedic education and training system.

It is proposed that four distinct learning periods have occurred; cumulatively shaping the discipline of Australian paramedic emergency care. Australian paramedic education, training and pedagogy has been impacted and transformed by a number of factors, both educational and socio-politically. These learning periods include:

1. The *Stretcher-bearer* Paramedic (1880-1950)
2. The *Passive* Paramedic (1950-1970)
3. The *Reactive* Paramedic (1970-1990)
4. The *Proactive* Paramedic (1990 – current).

A fifth learning period, the '*Transdisciplinary* Paramedic', is also proposed. In some parts of Australia this phase is currently underway and will require contemporary and innovative curriculum and teaching approaches that integrate interprofessional competencies and graduate attributes that will best meet the complex and evolving needs of the Australian health care system (Joyce et al., 2009). This fifth period will draw from the international literature, in particular, Emergency Care Practitioners and Physician Assistants where extended scope and practitioner practice for paramedic staff has been prominent in the United Kingdom and United States for many years.

In a short period of time, paramedic education and training has moved from no formally recognised education or training (*Stretcher-bearer Paramedic*), to traditional didactic teaching centredness (*Passive Paramedic*), to teaching centredness and competency-based training (CBT) (*Reactive Paramedic*) to student-centred learning (*Proactive Paramedic*). Each of these phases will now be discussed drawing upon the expected and desired graduate attributes that past, present, and future graduates have exhibited and will need to exhibit. Paramedic graduates will require new interdisciplinary knowledge, skills, and attitudes that current educational syllabi and curricula do not currently meet on a national basis. Determining the best and most effective graduate attributes that the paramedic discipline requires, will set the stage for the *Transdisciplinary period* of paramedic education and practice to not only survive but thrive. An outline of the *Transdisciplinary period* will also be discussed drawing from national and international literature on alternative models of clinical practice.

The bulk of the period (1950-early 21st century) has centred upon paramedic technical competence using behaviourist teaching approaches (Grantham, 2004; Walker, 2009). With the shift from vocational training colleges to Higher Education, paramedic educators and academics, in most cases, unknowingly have modified their teaching approaches in accordance with more rigorous and sophisticated tertiary level undergraduate program requirements. Currently, in Australia, national ambulance competencies only exist at an undergraduate diploma level (although the CAA has in the past had draft competences that were not enforced) despite the majority of basic-entry qualifications commencing at the higher Bachelor level degree. While the national ambulance competencies are the baseline requirements of paramedic employment, universities are not mandated to include these into their respective curriculum (Yates, 2009). Likewise, no local or national graduate attributes exist for specific degrees, thereby making national comparisons, contrasts, transferability, and benchmarking challenging at best.

Paramedic attributes (whilst not explicit in Higher Education policy documentation) have nonetheless evolved and been modified and revised as the discipline has moved from a

basic technical to an advanced tertiary level of education, where greater emphasis is given to research, problem-solving, theory, and clinical reasoning skills. Identifying what attributes are needed is critical as the current health care sector needs a flexible, mobile, and interdisciplinary health care workforce to best meet its evolving needs (Productivity Commission, 2005). The contemporary graduate attributes required for paramedics potentially may not suffice or be current enough for future changes in paramedic roles and responsibilities. On this point, Walker (2009) noted that “Expectations are changing as ambulance is being challenged to move from a primarily transport model to the need for a more definitive pre-hospital medical treatment/primary health and social care model. This has enormous implications for paramedic education” (p. 155). In the same way the clinical attributes and professional attributes for a paramedic in the 1990s are not the same for one working in the 21st century. Over the past fifty years, paramedics have moved from being stretcher-bearers to ambulance drivers to diploma qualified technicians to degree qualified paramedic practitioners with a much broader scope of practice, who are responsible in some instances for the primary health and well-being of small rural communities (Reynolds & O’Donnell, 2009).

To better understand the needs of today, it is important to trace the genesis and development of the Australian paramedic discipline and therefore the graduate attributes of its membership. As Phillips (2007) argues, “it is essential to revisit history” (p. 1). Examination of the historical evolution of paramedic education and the complexity of a rapidly changing health care climate coupled with an exploration of the future graduate attributes will provide educators, academics, employers, regulation bodies, and administrators with important information. This has the potential to offer a workforce capable of modernising and delivering contemporary paramedic care to a health care system urgently requiring responsive modes of health delivery.

An International Historical Perspective of Paramedic Practice

The term ‘ambulance’ has both Latin and French translations. The French word ‘*ambulant*’ means to stroll or walk (Chambers English Dictionary, 1988) with the Latin word ‘*ambulare*’, meaning to walk or move about slowly (Eisenberg, 1997). In defining

‘ambulance’ it is important to note the absence of a standardised definition like other cognate disciplines such as nursing (e.g. ICN), although state based legalisation is more homogeneous defining ‘ambulance’ as offering similar levels of care in the provision of prehospital treatment and transport (Eburn & Bendall, 2010). Historical material (Barkley, 1990; Wilde, 1999) have suggested that a supported hammock wagon was used by the Anglo Saxons in 900AD to transport the sick. Other variations such as horse litters and pole stretchers were used during the Norman period (Barkley, 1990; Wilde, 1999). These stretchers consisted of a suspended bed attached to two poles which extended to specially-designed harnesses on horses at either end.

A number of distinguished people have played their part in the evolution from stretcher-bearer which is simply defined as carrying an injured patient from the field (Chambers English Dictionary, 1988). These will be discussed individually and include: Queen Isabella of Spain (1451-1504), Baron Dominique Jean Larrey (1766-1842)⁵, Baron Pierre Francois Percy (1754-1825), Military Surgeon Jonathan Letterman (1824-1872), Surgeon General Johannes Friedrich August von Esmarch (1823-1908), and Surgeon-Major Peter Shepherd (1841-1879).

The first report of ambulances being used in military conflict was in the 15th century by Queen Isabella of Spain (Barkley, 1990; Wilde, 1999) and also at the siege of Metz in 1553 by Charles V, her grandson. Mimicking the notion of ambulance use, mobile military hospitals or ‘*ambulancia*’ were created to reduce the number of military victims. In reality, however, many injured victims were left to die on the battlefield without transportation to a suitable facility. It was not until the rules of battle engagement (close proximity of mass formations of soldiers) and alterations to concentrated and more accurate firepower (Baker, Cazalaa, & Carli, 2005) occurred during the revolutionary wars (in the late 18th and early 19th centuries between France and the major powers of Europe) that the true meaning of ‘ambulance transportation’ or ‘mobile hospital’ was

⁵ Baron Larrey was noted for several other medical credits. He was responsible for the first two successful amputations of the leg at the hip joint in 1803 and first recognised that conjunctivitis was contagious.

really examined with a consideration of moving wounded victims away from the battlefield.

Prior to the 1790s, large cumbersome horse-drawn wagons called *Fourgons* were used to ferry patients to surgery. Unfortunately, the *Fourgons* could take up to three days to reach military victims, many of whom had already died from wounds received on the battlefield (Eisenberg, 1997; Nestor, 2003; Ponzer, Zane, Nelson, & Levine, 2004). It was one of Napoleon's military surgeons, Dominique Jean Larrey, who became distressed at the lack of medical treatment, as up until this time he had to position himself and medical staff 2.42 miles (Pantridge, Adgey, Geddes, & Webb, 1975) behind the front lines (on Napoleon's orders). In response he developed his '*Flying Ambulances*' or '*Ambulance Volante*' (Reynolds & O'Donnell, 2009). These ambulances were drawn by two horses that housed a wooden elongated compartment that was carefully sprung on a chassis to ensure a somewhat comfortable ride and was able to transport two patients at a time, along with a surgeon who straddled a centre pole during transport (Barkley, 1990; Nestor, 2003; Wilde, 1999). Another military surgeon named Francois Percy developed a vehicle called a '*Wurst*' that was drawn by six horses. This ambulance however, proved not to be a success due to military administration's resistance. In principle it was similar to Larrey's design in terms of carrying capacity and horse-drawn capabilities.

Not only were Larrey and Percy instrumental in the evolution of ambulance transportation and construction, but also importantly they proved that by using '*Flying Ambulances*' they could transport the sick and injured quickly to the most appropriate care, thereby potentially saving lives. Over 200 years later these principles are still used today in prehospital trauma and medical triage care, where patients are transported as quickly as possible to the most appropriate medical facility based upon the degree of threat to life (Kaye-Eddie, 1996; McDonald, 1976; Stewart, 1981).

The American Civil War (1861-1865) provided the next historical context in which ambulances were used during military battles. In 1862, Letterman used similar concepts and features to those of Larrey and Percy to design horse drawn ambulances that would

bring men from the battlefield to the rear to receive treatment (Barkley, 1990; Ponzer et al., 2004). Unlike Larrey, Letterman was unambiguous with the use of his ambulances in that they were only to be used for ferrying victims or medical supplies to and fro – not for treatment. These two-wheeled ambulances (called *Finley's*) were widespread throughout the civil war, with only slight modification being made to assist in withstanding the stresses of battlefield war and aid in the evacuation of wounded soldiers. Production of these ambulances was increased and Rucker '*ambulance trains*' (single file of 4-wheeled ambulances) were a common sight during the later stages of the civil war (Barkley, 1990).

The important lessons learnt in the design of ambulances from previous wartime events have also informed and shaped how military ambulance services incorporate trauma care of their soldiers during the wars of the twentieth and twenty-first centuries. How a victim was treated and transported in the two World Wars, Vietnam, Korean or Iraqi wars has its origins in battles and individual innovators dating back 500 years (Barkley, 1990; Kaye-Eddie, 1996; Phillips, 2007; Ponzer et al., 2004; Stewart, 1981). Similarly, the education, training and technological advances and recruitment of staff for ambulance services have also been driven by post war periods and were important drivers of professional identity (Phillips, 2007). This is described further by Willis and McCarthy (1986a),

Wars (unfortunately) are a good thing for Ambulance Services ... in that they increase field-medical technology and provide vast experience in terms of medical and paramedical skill application ... Both after November 1918 and October 1945 there were a significant number of serving Royal Australian Medical Corp, Royal Australian Air Force and Royal Australian Navy sick bay attendants who joined Ambulance. Their knowledge and skills not only raised the overall standard but was also passed information to those who hadn't served (p. 60).

From the revolutionary wars came not only the evolution of patient transport in ambulances, but so too the provision of first aid to the sick and injured in general. Two notable military surgeons, Friedrich Esmarch and Peter Shepherd, have been attributed with the concept of first aid for the injured in an out-of-hospital context (Baker et al.,

2005; Pearn, 1994). Friedrich Esmarch was responsible for providing first aid training to his medical attendants, with the anticipation that these attendants could provide first aid assistance during battle (McDonald, 1976). It was from these experiences and Esmarch's writings that another military surgeon, by the name of Shepherd, extended the scope of first aid management, to both military and non-military situations (Berry, 1977). Not only did Peter Shepherd develop lecture material on first aid but he is also considered the first person to provide first aid lectures to the general public (Baker et al., 2005; Pearn, 1994). Barely seven months after these classes their effectiveness was tested in the most traumatic of circumstances, when in 1878 the Princess Alice steamer was rammed by the Bywell Castle ship causing over 600 deaths (Pearn, 1994). It is suggested that because of Shepherd's first aid classes, many victims were provided with first aid care that ultimately may have saved their life. The event was recorded by Vincent (1890, as cited in Pearn, 1994) who said the first aiders:

... provided warm clothing and nourishment for the survivors ...
Some of the living were, however, in such a prostrate condition that
but for the help they received they too must have added to the long
list of dead (p. 1719).

Shepherd continued to play an important role with his first aid lecturing during the nineteenth century. During this time he had worked on a first aid manuscript which unfortunately he did not finish due to his untimely death during the Zulu War in Africa (Fletcher, 1979; Wilde, 1999). It was finally completed in 1878 by a young surgeon by the name of James Cantlie and was entitled, *A Handbook Describing Aids for Cases of Injuries or Sudden Illness* later re-titled *First Aid to the Injured*. This manual became the core reference text for all first aid teachings in Britain and later (after several editions) the core text for many international first aid and ambulance education and training providers internationally (Wilde, 1999).

This notion of evidence-based practice and transforming first aid care to the public further translated itself with several American and English hospitals employing ambulance drivers in the mid to late nineteenth century. Many of these hospitals had

previously cared for wounded soldiers during times of war and it was during this period that it was seen as a way of providing medical care to civilians. The very first ambulance driver was James R. Jackson who was employed at the Commercial Hospital, Cincinnati in 1865 (Barkley, 1990; Ponzer et al., 2004). In these cases, the ambulance driver was just that – a driver. They did not treat the patients in the ambulance, this was left to a doctor, or conversely if a doctor was not available, driving them to hospital was considered treatment. During the early part of the twentieth century, however, this changed in some areas, where ambulance drivers were provided with rudimentary first aid training equipment (Barkley, 1990).

Today, many organisations such as St John Ambulance and the Australian Red Cross offer first aid to members of the public and large organisations. Ambulance drivers nowadays are required to be health care practitioners and drivers with professional titles such as paramedic, intensive care paramedic, industrial paramedic, and emergency medical technician being used to highlight the increased professional standards, scope of clinical practice, and level of education and training now being offered throughout Australia (Sheather, 2009). This history of paramedic practice has created the foundation for the present-day paramedic. As identified, there was little or no formal education for paramedic personnel during these periods, and clearly no set of predetermined professional traits to which they should aspire.

Finally it is important to emphasise the scarcity of available historical reference documentation in relation to Australian paramedic education and training (Howie-Willis, 1983). As Field (1994, cited in Webb, 1996) noted, “Primary documents are no longer in existence about this early history and much of the history of pre-hospital care and ambulance education in Australia is anecdotal in nature” (p. 11).

The next section of the chapter will outline the four proposed learning periods: the *Stretcher-bearer* Paramedic, the *Passive* Paramedic, the *Reactive* Paramedic, and the *Proactive* Paramedic. A contextual overview will be provided with discussion of the specific teaching and learning (T&L) characteristics of paramedic education and training

during each period. It will emphasise extrinsic or intrinsic factors of change such as the genesis of the semi-professions, federal government initiatives, and the origins of paramedic academia. An analysis of graduate attributes gained by pioneer stretcher-bearers and paramedic students and graduates during each period will also be outlined, providing the reader with a landscape of unintentional and intentional desired qualities in paramedic graduates over the past 120 years.

Australian Paramedic Education and Training – 1880-1950 “The Stretcher-bearer Paramedic”

The St John Ambulance Association and St John Ambulance Brigade have direct links to the Order of St John which was originally founded in the twelfth century (Howie-Willis, 1983). The inclusion of first aid education, training, and clinical practice in Australia has historical origins dating to the late nineteenth century (Fletcher, 1979; Howie-Willis, 1983, 2009; Wilde, 1999). This next section will outline the formation of St John Ambulance and the part that St John played in the formation of professional and independent ambulance services throughout the 1880-1950 period.

The St John Ambulance Association

The Order of St John was originally formed in Jerusalem during the Crusades, where the Christian Knights later developed roles in the military and a mandate to defend Christianity whilst also vowing to care for the sick and the wounded (Phillips, 2007; Wells, 1991). It is this last point that best emphasises the origins of St John Ambulance and the provision of caring for the sick and injured. With the fall and demise of Jerusalem, the Order eventually migrated to Malta in 1530 later to be crushed and dispersed by Napoleon in 1798. Almost a century later in London in 1887, the St John Ambulance Association was officially re-formed; followed by the St John Ambulance Brigade some five years later which aimed to provide first aid assistance for the sick and incapacitated (Howie-Willis, 1983).

It was during the industrial revolution in Britain that the St John Ambulance Association first integrated public first aid more formally. First aid classes were offered across the country in areas such as coal mines, railways and in the iron industries playing an important role in providing basic first aid instruction to members of the public (Howie-Willis, 1983). Employment in increasingly dangerous workplaces caused greater numbers of injuries and deaths, impacting on productivity. Employing a trained first aid person was an easy way to counter the loss of life and the loss of profit. This culminated in the St John Ambulance Association and St John Ambulance Brigade developing and providing first aid training and instruction, publishing first aid training manuals, issuing first aid certificates and starting to transport victims to hospital by ambulance. Soon after the St John Association and St John Brigade merged into one organisation known as '*St John Ambulance*'. It is this St John Ambulance organisation that has provided innumerable public services such as offering first aid at sporting and non-sporting events, providing first aid lectures to members of the public as well as being directly involved in the genesis of professional ambulance services in Australia (Howie-Willis, 1983; Khangure & Howie-Willis, 1997). Based on these services, it is therefore not surprising that St Johns Ambulance was once considered a byword for emergency medical treatment in Australia (Howie-Willis, 1983).

From the 1880s, the St John Ambulance Association played three pivotal roles in the health and well-being of Australian citizens. Firstly, it provided the general public and workers such as railwaymen (Howie-Willis, 2009; Nelson, 1985), firemen, and policemen with basic life saving skills such as bandaging, applying slings, and splinting. Secondly, during times of war, in particular the Boer War (1899-1902), First World War (1914-1918), and Second World War (1939-1945), they provided the Defence Department with auxiliary military corps and ancillary support services trained and skilled in the provision of basic first aid services. It was during these periods that St John provided immeasurable training support and first aid trained personnel. For example, the advent of the First World War saw an increase of 236%, 261%, and 834% in first aid training outputs in the states of Western Australia, Victoria, and New South Wales respectively. Similarly, astounding increases in training occurred prior to the Second

World War, where training outputs increased from 3,505 in 1938 to 14,759 in 1939 (Howie-Willis, 1983). And finally, St John provided the foundations for independent ambulance services to undertake transportation services; initially based on financial good-will and volunteerism (Howie-Willis, 1983). For instance, by the mid-twentieth century funding was often provided by female auxiliary committees who raised funds through dances and other activities. The St John Ambulance Association has had direct involvement in the formation of all state and territory ambulance services in Australia (Howie-Willis, 1983; Wilde, 1999) during the mid-twentieth century. This involvement in forming present-day ambulance services will be discussed in the next section.

The Genesis of Ambulance Services in Australia

Interestingly, what is clear from the historical literature is that the majority of ambulance design, functionality, and innovations have occurred during wartime periods.

Conceptually, the notion of ferrying victims to hospital from injury site in civilian life has essentially remained unchanged for over a century. As outlined above, the St John Ambulance movement nationally has had over 100 years of momentum in the provision of ambulance care for the sick and injured. In many cases, this has developed from small local community charities and volunteer-based enterprises (Fitzgerald & Bange, 2007a; Howie-Willis, 1983; Khangure & Howie-Willis, 1997; Wells, 1991). It is therefore not surprising that every ambulance service in Australia in the pre and post colonial days were originally formed under the auspices of the St John Ambulance Association and because of poor state government funding, without this close alliance, ambulance care and transportation would likely not have been seen as an essential health care service in Australia (Kaye-Eddie, 1996).

The St John Association first established itself in Melbourne, Victoria in 1883 and was the first centre to provide home nursing first aid teaching to volunteer groups and to members of the public (Bird, 1999; Howie-Willis, 1983, 2009; Wells, 1991). These first aid lectures were popular and well-attended. Emerging not long after these activities was the Victorian Militia Ambulance Corps (Howie-Willis, 1983) and hence the first steps towards ambulance transport stretcher-bearers. Similar experiences occurred in other

Australian states and cities shortly thereafter in the following chronological order: Adelaide, Launceston, Brisbane, Sydney, and Perth (Howie-Willis, 1983). These St John centres were responsible for the training and provision of basic ambulance care and transportation. For example, the Victorian centre provided first aid training to 14,000 people from 1883-1890, with a large proportion of these earning St John first aid certificates (Howie-Willis, 1983). One such group that benefited from first aid teaching were railwaymen. Railway staff (who later formed the Railways Ambulance Corps) were trained in first aid techniques which could be provided to the travelling public (Howie-Willis, 2009). First aid training included topics such as basic anatomy, bandaging, positioning, and stretcher-handling (Howie-Willis, 1983; Nelson, 1985).

The increasing number of people being trained in first aid led to the creation of the Ambulance Corps (Howie-Willis, 2009). These groups were the first unsophisticated dependant volunteer ambulance brigades providing transportation of the sick and injured throughout Australia. The notion of stretcher-bearer and ambulance transportation came to fruition by the late nineteenth century, where the St John Association sponsored Ambulance Brigades to undertake public first aid and transportation duties (Howie-Willis, 1983; Wilde, 1999). It was during 1896 in Melbourne, Victoria that the first mobile ambulances - known as *Ashford Litters* - were used in Australia (Howie-Willis, 2009). Through public funding, the Victorian centre purchased six litters from London (Bird, 1999; Blosfelds, 1983; Collyer & Young, 1991; Howie-Willis, 1983; Wilde, 1999; Willis & McCarthy, 1986a, 1986b; Wells, 1991) which were later linked by telephone in an attempt to reduce time delays. In the first twelve months of use, the litter was called out over 100 times (Wells, 1991) thereby constituting Victoria's first organised ambulance transport system.

The *Ashford Litter* was a two-wheeled stretcher that consisted of an undercarriage with large circular supporting springs and retractable supporting legs (Howie-Willis, 1983, 2009; Wilde, 1999). In a stationary position the Litter was supported by four wooden legs. These legs were re-tractable and formed handles for the stretcher-bearer to pull and push the patient in a fixed position. Later versions of the Litter consisted of waterproof

canopies to protect patients from cold and wet weather (Wilde, 1999), although earlier versions apparently did not even carry blankets for patients (Willis & McCarthy, 1986a, 1986b). By 1899, horse drawn wagons were being used in conjunction with *Ashford Litters* and by 1910 the first motorised ambulance was used on a regular basis in Melbourne, Victoria (Collyer & Young, 1991; Wilde, 1999; Willis & McCarthy, 1986a, 1986b). These transport mediums evolved over many years at different times for each Australian state and territory. Similar evolution occurred with changes in St John's governance structure and the provision of volunteer ambulance transportation, where the operation of ambulance services was tendered to public bids. This marked the first time where ambulance transportation was not just about transporting the sick and injured, but also about being financially profitable and sustainable, since this was previously undertaken entirely on a voluntary basis (Wilde, 1999; Willis & McCarthy, 1986a, 1986b).

Currently, St John Ambulance provides the statutory ambulance service (though not regulated by legislation) on behalf of state governments in the Northern Territory, Western Australia and, until recently, South Australia (Eburn & Bendall, 2010; Kaye-Eddie, 1996). Other states and territories are now under the auspices of various state government authorities, with clinical practice being governed by state Health Practitioner Registration Acts (Fitzgerald & Bange, 2007a). The following table (Table 2.1) outlines each state ambulance service, when they are formed as an organisational entity and when they were disenfranchised away from St John Ambulance (Wilde, 1999).

Table 2.1: Origins of ambulance services in Australia (Collyer & Young, 1991; Elks, 2001; Hann, 1992; Howie-Willis, 2009; Trevithick, Flabouris, Tall, & Webber, 2003; Wells, 1991; Wilde, 1999; Willis & McCarthy, 1986a)

State / Territory Ambulance Service	Formed	Original Title	Independence from St John
Queensland	1892	City Ambulance Transport Brigade (St John Ambulance)	1960 – Queensland Ambulance Transport Brigade
New South Wales	1885	The Civil Ambulance and Transport Brigade of New South Wales	1972 - Ambulance Service New South Wales
Tasmania	1959	Ambulance Commission of Tasmania (St John Ambulance)	1977 – Tasmanian Ambulance Service
South Australia	1952	St John Ambulance South Australia	1995 – South Australian Ambulance Service
Northern Territory	1967	St John Ambulance Northern Territory	-
Western Australia	1899	St John Ambulance Western Australia	-
Australian Capital Territory	1915	Canberra Community Ambulance (St John Ambulance)	1955 – Canberra Ambulance Service
Victoria	1883	The Victorian Centre of St John Ambulance Association	1957 – Victorian Ambulance Services formed

The symbol of St John Ambulance is the Maltese Cross (Wells, 1991) (Figure 2.1), which symbolises the chivalric qualities of the Knights of Malta and is still evident in St John Ambulance volunteer uniforms worn today. This same symbol is also incorporated and modified into almost all state and territory ambulance uniform badges worn around

Australia to this day. The Tasmanian Ambulance Service is the only Australian service that does not use the caudecus emblem – shedding it from its uniform when it disassociated itself from St John in 1977. Other ambulance services and prehospital providers throughout the world identify themselves using a range of different symbols other than the Maltese Cross including a red cross, crescent, and caudecus.

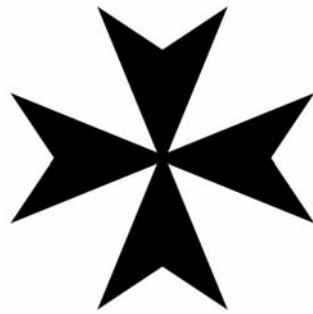


Figure 2.1: Maltese Cross

The four arms of the cross symbolise the Christian virtues of prudence, justice, temperance, and fortitude. The eight points of the cross represent merits for a St John member or volunteer: Merciful, Pure, Peacemakers, Persecuted, Humble, Comforters, Meek, and Righteous (Howie-Wills, 1983). The ambulance service in New South Wales publically describes what the eight points of the cross mean for their members, or in other words, the expected paramedic characteristics. These include: Observant, Tactful, Resourceful, Dexterous, Explicit, Discriminating, Persevering, and Sympathetic (Ambulance Service New South Wales, 2007). It is unclear if these characteristics are reflected in their university education and training programs.

From the perspective of 21st century medical care, the need for first aid training seems self-evident. But first aid, as it exists today, has only a recent history, approximately 120 years (Pearn, 1994). Placing this into context, the paramedic or prehospital care of patients in a ‘professional’ sense is only approximately 35 years old. Whilst most ambulance services in Australia have separate governance from St John Ambulance, many of the original virtues and objectives have persisted to the present day. As with the

historical wartime stretcher-bearers, the use of various types of ambulance transportation mediums and the function of St John Ambulance, have all influenced the attributes ascribed to present day paramedics.

The next section will draw upon the context previously discussed above and outline the specific teaching approaches and learning environments offered to ambulance staff in the 1880-1950 period.

Teaching Approaches in Paramedic Education and Training: 1880-1950

The spread of St John Ambulance first aid teaching to public and ancillary support services, played a crucial role in not only providing Australian members of the public with first aid skills but also the formation of ambulance transportation services across Australian states and territories. Wilde (1999) points out that, “Before the 1960s, there was no formally organised system of training. The main formal instruction that ambulance officers received was in first aid, following the syllabus of the St John Ambulance Association” (p.21). This training provided ambulance officers with one-dimensional management of patients (scoop and run), particularly those suffering serious injury or illness (Blosfelds, 1983; Bouvier, 1993a).

The importance and integration of first aid education and training for ambulance corps staff was first evident in Melbourne, Victoria in 1903 (Wilde, 1999). One of the conditions of employment in the Victorian ambulance brigade was that staff were trained to the level of the First Aid Certificate (Wilde, 1999; Willis & McCarthy, 1986a, 1986b). Whilst this training was basic, it signalled for the first time that education was an important facet of ambulance care and transportation. The First Aid Certificate, later named the Bronze Medallion, was the base qualification for all ambulance officers until the 1960s, and was often undertaken on the officers’ own time (Brown, 1992; Howie-Willis, 2009; Willis & McCarthy, 1986a, 1986b). Instruction was provided initially by medical staff and later by nurses, and followed the training format and outline from Peter Shepherd’s textbook, *First Aid to the Injured*.

Emphasising the basic and historically-bound structure of ambulance syllabus and training, an Australian version was not produced until the 1960s, some sixty years after the later edition of 1901. In other words, ambulance education was based on dated military first aid principles first proposed more than eighty years earlier. The training syllabus was based on Shepherd's textbook organisation of dividing lectures into five modules. The fifth module offered male student's stretcher-handling training and females an alternative lecture of preparing a room for an injured patient (Wilde, 1999).

The greater part of early ambulance education was devoted to practical skills and procedures (R. Bouvier, personal communication, July 4, 2008b; Jacobs, personal communication, July 6, 2008; Mills, personal communication, July 6, 2008). The underpinning knowledge was provided in a didactic and authoritarian manner, and understanding hinged largely on rote memory learning (Wilde, 1999). Teaching staff were dispensers of knowledge, with one-way communication and discourse from teachers to students. Wilde (1999) adds, "The syllabus was very simple and practical and it was emphasised that not too much of each lecture should consist of talking" (p. 22). Moreover, the bulk of time was spent on bandaging and splinting. For example, three out of the five modules contained practical application of the triangular bandage (Wilde, 1999).

The expected educational outcomes were basic and students were expected to follow and obey a 'black and white' approach. This, of course, raised issues of applying classroom 'black and white' principles to real-life cases where patients may have presented in darker shades of grey and much sicker than students' basic first aid training had not prepared them for (Wilde, 1999). Added to this complexity in outer metropolitan areas, ambulance officers for many decades worked alone without medical guidance or support (Wilde, 1999). It should be noted that this theory, practice and syllabus dichotomy has always been apparent throughout all levels and stages of paramedic training, wherein syllabus and curriculum management is largely reactive to sociological and epidemiological health needs (Willis, 2009). There is no evidence that training aimed to

provide learners with specific competencies or core graduate attributes during this era. The next section provides a retrospective review of the likely attributes and skills of volunteers, students and full-time staff employed by St John Ambulance and ambulance services in Australia during the 1880-1950 period.

“Stretcher-bearer Paramedic” Graduate Attributes

Very little has been written about graduate attributes from this time period. However, what is known during this period was that all staff were male who were not expected to treat patients beyond a basic first aid level. They focused on basic psychomotor skills such as bandaging, splinting, and safe lifting. Transportation of patients to hospital was mandatory without thought or consideration of alternative arrangements or locations. Discipline was a key attribute of all staff with detailed attention given to prompt transportation of patients and represented in professional pride in a pressed uniform, clean and shiny ambulance vehicle and neat stretcher presentation. Good communication skills, initiative, and a calm demeanour were important characteristics in reassuring patients, in an era of poor educational content and organisation (B. Lord, personal communication, October 11, 2007; B. Steer, personal communication, September 9, 2007; R. Bouvier, personal communication, July 4, 2008b; M. Boyle, personal communication, September 14, 2007b; S. Burgess, personal communication, October 18, 2007; I. Jacobs, personal communication, July 6, 2008; A. McDonell, personal communication, October 20, 2007; N. Mills, personal communication, July 6, 2008; W. Ross⁶, personal communication, July 12th). The next section will describe the Passive Paramedic period (1950-1970).

Australian Paramedic Education and Training - 1950-1970: “The Passive Paramedic”

“In the early days, anyone who could drive and had a first aid certificate could qualify as an ambulance officer (Kaye-Eddie, 1996, p. 7)”. Education, training, and patient

⁶ Wally Ross (along with Wally Byrne) were the two paramedics to crew the first MICA ambulance in Australia (9th September, 1971).

outcome were not necessarily the priorities of an ambulance service during the 1950-1970 period. This is reinforced by Wilde (1999) who points out that “There was very little training for those who operated the ambulances” (p. 10). This is underscored with the most senior officer (determined by years of experience) *always* driving the ambulance and the junior officer or student *always* caring for the patient regardless of the level of criticality (I. Jacobs, personal communication, July 6, 2008; N. Mills, personal communication, July 6, 2008). In actual fact, many patients were transported with no first aid care in the back of the ambulance. This is illustrated by Bouvier (2008a) in a recent speech:

In the 1960s I learned many lessons when I was driving my daughter back to her boarding school in Melbourne and we came across an accident on the highway ... where a drunk pedestrian was run over. He had severe head and other injuries. I asked the ambulance officer, from a one-man branch if he would be caring for the patient in the back and if anyone else could drive the ambulance. He replied that he would keep an eye on the patient as he drove!

In fact, owning a Drivers’ License that was unblemished with no prior offences, being male, and over 21 years of age were the only employment criteria required of employees up until the 1960s (Bouvier, 1993b; N. Mills, personal communication, July 6, 2008; Wilde, 1999; Willis & McCarthy, 1986a, 1986b) with no mandatory educational qualifications being required of prospective applicants (Berry, 1977). Little education in the formal sense occurred (Bouvier, 1993b) and few skills or competencies were required during these three decades. An apprentice-style of education and training was used and much of the learning of skills occurred on-the-job. Any skills required during that period centred at the first aid level (Anonymous, 2007) or advanced first aid at best, and were invariably provided by a colleague who also had received little or no formal training. This is supported by Wilde (1999) who noted that, “Ambulance officers learned as they went along. Before the 1960s, there was no organised system of training. The main formal instruction that ambulance officers received was in first aid, following the syllabus of the St John Ambulance Association” (p. 21).

Given the lack of education there was little capacity to cope clinically with distressing scenes or complex cases and in some cases officers were unable to deal with the many demanding psychological aspects of the paramedic discipline. No formal or structured debrief or counselling opportunities were provided to employees. I. Jacobs (personal communication, July 6, 2008) remembers this being a problem for some staff noting, “You had no training and you found that there were people who after a day or two in the job just gave it away, because they just couldn’t cope”. In fact, it was not until the Russell Street bombing in Victoria in 1986 that the first ambulance crisis counselling unit was established (Robinson, 1993; Robinson & Young, 1986; Temple, 1992). It was during this 1950-1970 period, that ambulance services evolved from simply treating and responding to emergency first aid calls, to dealing with the transportation of the sick and injured to and from hospitals or between hospitals (*inter-hospital transfers*) (Opit & Christie, 1980).

Educational theory was neither considered nor supported in teaching, with sessions being solely didactic with little consideration given to integrating classroom theory into clinical paramedic practice. Graduates were expected to practice at a basic level, with little focus or consideration given to higher order skills such as problem-solving, critiquing, contrasting, or synthesising. For example, graduates did not practice according to clinical practice guidelines or protocols and therefore were not required to clinically match a patient with specific management requirements, or in other words, every patient was treated using the same approach. If the treatment matched the injury occurred, it did so because of experiential, opportunistic, or situated learning diffusion. Teaching was often undertaken by medical, nursing, or other allied health care staff and supported by senior ambulance personnel (R. Bouvier, personal communication, July 4, 2008b; I. Jacobs personal communication, July 6, 2008). Curriculum design was unsophisticated and lacked the necessary contextualisation of linking clinical theory with clinical practice.

Staff, in some instances, received as little as two weeks training before being released into the on-road care and practice environment with no continuing education opportunities for reaccreditation, appraisal, or remedial training. In March 1961, the first

ambulance officer training centre and short course commenced in Geelong, Victoria (Bouvier, 1993b; R. Bouvier, personal communication, July 4, 2008b; Wilde, 1999, Wells, 1991). The course was structured over a 4-week period and included one participant from each region (at that time, the Victorian ambulance was divided into 16 regions) from across Victoria with a theoretical and a practical summative examination at the conclusion of the program. The course was designed at the level of wartime medical orderlies and delivered in a didactic fashion with autocratic levels of military expectations and discipline (Wilde, 1999). This military influence was strong throughout the ambulance services, with many wearing military-style uniforms with ranks and insignia (N. Mills, personal communication, July 6, 2008; Willis & McCarthy, 1986a, 1986b). Throughout the 1960 period, general concerns were being raised by training officers (Dr Ric Bouvier, Mr Jock Berry and Mr Alan Cumming) over the lack of consistent and formalised educational standards of ambulance officers and associated learning difficulties (Wilde, 1999). Despite these concerns, entry requirements into courses were neither increased nor based upon educational excellence or previous qualifications. Learning difficulties identified during this period included English and Mathematics, with little remedial or improvements in standards being made available for another decade (Wilde, 1999). The learning difficulties during this period are illustrated by R. Bouvier (personal communication July 4th, 2008b) who recently stated:

We found the average educational level of AOs (Ambulance Officers) was Year 8 and that of Superintendents was Year 10. This limited of training was all that we could offer at that time. Most AOs had been in the motor trade as drivers or mechanics but were very interested in first aid.

In 1963, initial attempts were made by Bouvier to increase training programs from 4 weeks to a 2 year nursing course for ambulance officers. However, this was not put in place until the late 1970s as the Victorian Ambulance Service Association was not prepared to support the associated costs of education and training (R. Bouvier, personal communication July 4th, 2008b). This was considered a bold attempt at improving the educational standards of ambulance officers, whilst also highlighting the lowly professional status held by paramedics at that time. This is best summed up by a letter

from Bouvier (cited in Wilde, 1999) which stated, “Ambulance officers of the future should be of a standard about that of trained nurses so they may provide better patient care than they do now” (p. 58).

The literature from this period generally refers to ambulance education and training as ‘ambulance nursing’ (Wilde, 1999) and providing nursing care (Willis & McCarthy, 1986a, 1986b). Attempts were made by Bouvier in the late 1960s to develop pre-entry courses, similar to those used in nursing. He proposed that ambulance officers do the first two years of nursing and an ambulance-specific third year before qualification. This proposal was rejected by the ambulance service in Victoria, and a vocational apprenticeship cadet system was introduced as the educational model (R. Bouvier, personal communication, July 4th, 2008b). Cadet recruits were aged between 17-18 years old and had appropriate high school certificates. The first intake commenced in 1966, but this program only lasted some 6 years (Wilde, 1999).

The ambulance discipline developed under the auspices of the Australian Convention of State Ambulance Authorities in 1962 (now the Council of Ambulance Authorities) as ambulance services expanded. As this grew so too did the number of suitable applicants. These ‘suitable’ applicants at this time were homogenous, being almost entirely male, physically strong (Field, Battersby, & Hodge, 1999; Howie-Willis, 1985), of mature age, and they invariably had prior military, trade, or mechanical backgrounds. In fact, having a mechanical background was considered a significant advantage, as they could maintain and service their own ambulances. Generally, no formal application or interview process was required and police or security checks were not considered necessary, all highlighting the lack of standardised requirements (M. Boyle, personal communication, September 14, 2007b; S. Burgess, personal communication, October 18, 2007; W. Ross, personal communication, July 12th). I. Jacobs (personal communication July 6, 2008) recalls when he applied for a job in the Victorian ambulance service in 1968, “I went in to apply for the job and I did a driving test – just drove the ambulance around the block. That was it!”

The next section will draw upon the context discussed above and outline the specific teaching approaches and learning environments offered to students in the 1950-1970 periods.

Teaching Approaches in Paramedic Education and Training: 1950-1970

Over these two decades, very little educational rigour existed despite the need for appropriate levels of education and training (Willis & McCarthy, 1986a, 1986b). During the 1950-1960 period, in many cases education programs lasted between two or four weeks with no continuing education opportunities or linkage between classroom theory and practical fieldwork experience. Lectures and practical sessions were delivered in a didactic fashion usually by doctors or nursing staff who had little background in ambulance care. Validation of learning was offered by summative assessment only and in some instances was not offered at all (Wilde, 1999). No literature has been located about integration of educational theories into paramedic teaching practice from this period, although anecdotal evidence suggests that teaching was provided in two forms: didactic instruction of knowledge supplemented by experiential learning when students commenced working in the field. An important point in this process was the dichotomy between the subject matter (advanced first aid) taught to students and what was actually experienced during on-the-job fieldwork placements. In other words, students were offered no more than advanced first aid skills in most cases, despite many of their patients requiring more advanced levels of care.

Teaching staff were dispensers of knowledge and learning was generally one-way with little capacity for self-initiated learning given the teacher-centred approaches used. I. Jacobs (personal communication, July 6, 2008) recalls, “Some of the sessions you had no hope of getting hands-on. It was just a talk and chalk session”. Teaching approaches focused on didactic delivery and integration of educational theories and were not based upon best-practice or quality assurance needs during this time period. R. Bouvier (personal communication, July 4th, 2008b) noted that the “teaching was delivered by doctors in the same fashion as they delivered to nursing – didactic”. These approaches

were integrated through the actions of instructors who had backgrounds from the military, medicine, and/or nursing supported by the strong St John Ambulance ethos of tenacity, compliance, and simplicity.

The educational theories and pedagogic design current at that time supports the use of face-to-face didactic instruction, behaviourist learning theory, and experiential learning theory via a master-apprentice model. Behaviourism as a learning theory (Skinner, 1949) focuses on the exhibited behaviours that can be observed or measured (assessment). Experiential learning theory (Kolb, 1984; Rogers, 1983) refers to learning that is reinforced and supplemented by action or doing (skills). These theories played an important part in an era that required students to *passively* ‘listen’ and ‘act’ accordingly. For example, students would have been taught the manual technique of providing traction to a fractured limb. No discussion or debate on an alternative technique would have been offered given the one-dimensional T&L environment that was provided. The students expected and were expected by teaching staff to just do as they were told and were not required to think or question more broadly than that. The next section provides a ‘retrospective’ review of the likely attributes of students and full-time staff employed by ambulance services in Australia during the 1950-1970 periods.

“Passive Paramedic” Graduate Attributes

Despite the rudimentary teaching and basic clinical practice expectations of this time period and apparent lack of targeted graduate attributes, skills, and competencies, a number of core attributes were typically expected of graduates. Given the lack of available literature, a member-checking process was undertaken asking current academic and clinical teaching staff and former paramedics and administrators to summarise what key graduate attributes existed during each of the three learning periods. Participants involved in the member-checking process were all experienced in paramedic education and training across all of the different learning periods. It is anticipated this process would minimise the subjectivity and improve the reliability of the claims.

The following were seen to be the key attributes during the 1950-1970 period. Staff were male, older than 21, generally fit, and often had backgrounds in the armed forces or the motor trade. They were not expected to treat beyond a first aid level, focusing on basic psychomotor skills, such as bandaging, splints, slings, blood pressure and transporting patients to hospital without using high order problem-solving or decision making skills. Height was also considered important, particularly during the 1950-1970 period, as N. Mills (personal communication, July 6, 2008) recalls, “At one stage we advertised for people between 5’8” and 6’.” They were generally well-respected in the community. Discipline was a key attribute of all staff with detailed attention given to good driving skills, personal pride in their uniform and maintenance and presentation of ambulance vehicles. Good ‘lateral thinking’ and communication skills were required such as being able to reassure patients with a calm demeanour. Given the passive nature of education and training, accepting and not questioning authority from other health care professionals (i.e. medicine, nursing) were also considered important attributes during this period (B. Lord, personal communication, October 11, 2007; B. Steer, personal communication, September 9, 2007; R. Bouvier, personal communication, July 4, 2008b; M. Boyle, personal communication, September 14, 2007b; S. Burgess, personal communication, October 18, 2007; I. Jacobs, personal communication, July 6, 2008; A. McDonell, personal communication, October 20, 2007; N. Mills, personal communication, July 6, 2008; W. Ross, personal communication, July 12th). The next section will describe the Reactive Paramedic period (1970-1990).

Australian Paramedic Education and Training – 1970-1990: The Emergence of the “Reactive Paramedic”

Intense industrial campaigning surfaced over professional recognition, pay rates and working conditions of paramedics during the mid to late 1970s. These actions played an important role in shifting the occupation from a ‘job’ to a ‘professional career’ (Howie-Willis, 2009). Industrial disputes led to a purposeful improvement in the standard of equipment, (such as resuscitation circuits, defibrillators, analgesics, medical anti shock trousers, collapsible stretchers and traction splints) which had direct implications for

paramedic education and training standards (Kaye-Eddie, 1996; Reynolds & O'Donnell, 2009). This period was largely driven by contemporary advances in cardiopulmonary resuscitation and advances in road trauma management influenced by the seminal publication from the United States entitled: *Accidental death and disability: The neglected disease of modern society* (National Academy of Sciences and National Research Council, 1966). The report outlined the extent to which road-related death and disability had on the American population and illustrated problems with the Emergency Medical Services (EMS). One of its key recommendations was the call to improve EMS standards through standardised policies and procedures (Margolis, 2005; National Academy of Sciences and National Research Council, 1966).

The first sign that international events (such as Korean and Vietnam Wars) and the *Accidental death and disability: The neglected disease of modern society* white paper had gathered momentum in Australia was in 1969 at a Royal Australasian College of Surgeons (RACS) seminar. During this seminar, the benefits of prehospital retrieval from battlefields and trauma sites received considerable attention (Blosfelds, 1983; Collyer & Young, 1991; Ross, 1991). This saw the introduction of Mobile Intensive Care Ambulances (MICA) and Intensive Care Units (Howie-Willis, 2009; Sloman, Blosfelds, & Luxton, 1981) and thus more formalised education and advanced training in invasive procedures were required by paramedic staff. The catalyst for these courses and programs were formalised after the pioneering work of Professor J. Frank Pantridge at Belfast's Royal Victoria Hospital (Blosfelds, 1983; Howell, 1992; Fleming, 1980; O'Rourke & Michaelides, 1975; Ross, 1991; Stewart, 1981).

Pantridge, supported by earlier work by McNeilly and Pemberton (1968) and Gordon and Kannel (1971), noted that approximately 60% of young and middle aged males died within one hour of chest pain manifestations and that over 90% of these deaths were directly linked to lethal cardiac rhythms (Eisenberg, 1997; Pantridge & Geddes, 1967). Pragmatically, Pantridge felt the solution to this potentially reversible heart rhythm could be achieved by establishing mobile coronary care units (MCCU) that would reach patients in a timely manner prior to admission to hospital (Eisenberg, 2006). In 1966

these MCCU were driven by an ambulance driver with one or two doctors and nursing staff to provide medical care for the patient. Defibrillation was performed with the very first portable defibrillator developed by Pantridge and his colleague Geddes (Eisenberg, 1997; Eisenberg, 2006; Pantridge & Geddes, 1967; Wilde, 1999). In the first 15 months of this trial, ten patients were successfully resuscitated (previously unprecedented) with a 50% long-term survival rate (Eisenberg, 1997).

Similar specialist MCCU or MICA units were formed in America (1969, in Los Angeles and Seattle) and Australia soon after (Eisenberg, 2006; Lord, 1998; Luxton, Harper, Hunt, & Sloman, 1975; Ponzer et al., 2004; Stewart, 1981; Wilde, 1999). Three things emerged from this period. Firstly, lives were being saved; secondly it was not feasible for a physician-staff model to be sustainable; and thirdly an increased number of ambulance dispatches to non-cardiology or heart attack victims, such as motor vehicle accidents, respiratory emergencies, and industrial accidents was occurring (Eisenberg, 2006; Hillbrick & Sammon, 1978; Luxton, Peter, & Sloman, n.d.). These factors extended the need for education, training, autonomy, clinical decision-making skills, and scope of practice that could be applied by paramedic staff in a variety of non-cardiac clinical situations (Fleming, 1980). In short, it meant that the paramedics needed to have an increasingly complex skill set with expertise in both medical and trauma conditions and a shift away from the traditional vocational role of ambulance driver and first aid provider (Lord, 1998).

Western Australia, Victoria, Tasmania and New South Wales were the first four states to embark on such an approach to prehospital emergency care. These were undertaken in 1969, 1971, 1972, and 1976 respectively and focused mainly on the initial research findings of Pantridge's work in acute cardiology and resuscitation (Blosfelds, 1983; Howell, 1992; Fleming, 1980; O'Rourke & Michaelides, 1975; Ross, 1991; Sammel, Taylor, Selig, & O'Rourke, 1981; Stewart, 1981; Webb, 1996). Training and education related to these programs was still provided by both on-the-job and off-the-job training. But for the first time, education and training was also integrated into formalised nursing/medical coronary care courses and lectures at local hospitals such as the Royal

Melbourne Hospital (Luxton et al., 1975; Opit & Christie, 1980; Sloman, Blosfelds, & Luxton, 1981), St Vincent's Hospital (Ambulance Service New South Wales, 2006; McDermott, 1983), and the Royal Hobart Hospital (Anon, 1983).

The coronary care course offered at the Royal Melbourne Hospital was the most famous in Australian paramedic education and training for implementing the first formal coronary care education specifically designed for MICA paramedics and registered nurses (Blosfelds, 1983; Sloman, Blosfelds, & Luxton, 1981). In fact, the MICA ambulance service was seen as a mobile wing of the hospital's coronary care unit in its first few years of operation and was initially entitled '*Emergency on Site Medical Care Unit*' staffed by ambulance paramedics and medical registrars (Andrews, 1975; Howell, 1992; Opit & Christie, 1980). The remaining components of this MICA coronary care training program consisted of supervised hospital and ambulance placements and written and oral examinations (Luxton et al., 1975; Sloman, Blosfelds, & Luxton, 1981). Other states and territories formed similar advanced paramedic training programs from the 1980s through to the 21st century.

The mid-1970s period proved to be a significant milestone in paramedic education for two reasons. Firstly, there were targeted, direct improvements in education and training. This point was made by Willis and McCarthy (1986a, as cited in Skea, 1970) who reported that "it was agreed by the Committee [Ambulance Training Advisory Committee] that the concept of training should be broad enough to help Ambulance Officers develop initiative and individual thinking as well as become efficient technicians well versed in routine work" (p. 60). Secondly, it provided intradisciplinary professional recognition that paramedics now had some 'ownership' of their own professional courses and development of a unique body of knowledge. N. Mills (personal communication, July 6, 2008) remembers the impact the MICA course had on the discipline, and mutual respect gained by other health professionals, noting that "Perhaps these blokes aren't entirely stupid at all, and it became, I think, a mutual acceptance of each other and it gradually spread around a bit and well, it changed the environment." Despite the increased independence of paramedic staff, the division of labour and the notion of

medical (and nursing) dominance continued in paramedic curricula design with much of the teaching being undertaken by medical or nursing staff (Wilde, 1999).

Predictably, this led to parochial occupational ownership by paramedics as Wilde (1999) cited, “as ambulance officers received more training and experience, some came to challenge this medical dominance of their own area of expertise” (p. 103). Some of this independence came about by changes to medical specialities that first occurred in the 1960s. It was only when these specialities were formed that doctors suddenly realised the impact the prehospital setting might have on patient care and patient mortality and morbidity rates (Wilde, 1999). In effect it was a meeting of physicians at the RACS Seminar on the Management of Road Traffic Casualties in 1969 that was recognised as a pivotal turning point in paramedic education and training and the first suggestion of professionalism (F. Archer, personal communication, November 14, 2007).

Medical dominance is defined as the health system being dominated by the medical profession (Germov, 2002). In essence it is an unchallengeable dominance over occupational territories; a scope of clinical practice protected by government legislation, knowledge base, and public status (Freidson, 1970) (Table 2.2).

Table 2.2: Key features of medical dominance (Freidson, 1970)

-
- Unequal status of medicine compared with other health care professions
 - Over-arching role of medicine in diagnosis and management
 - Medical supervision of allied health care occupations
 - Medical control over others' specialised body of knowledge
-

Division of labour is the production of health services through arrangement of health organisations (Willis, 1989) and is represented primarily by a range of professions they represent, of which paramedics is one.

A profession is broadly distinguished from non-professions by its higher levels of autonomy, status, recognition, and remuneration (Fleming, 2008). Willis (1989) identified two features of the division of labour within the health care sector. Firstly, it is hierarchical in nature and secondly, it is unquestionably dominated by the medical profession: despite it only comprising less than 20% of the health workforce in Australia (Germov, 2002; Fleming, 2008). However, despite the negative connotations and assumptions associated with medical dominance (Broom & Woodward, 1996), including outright denial of legitimacy for other health care provider groups such as homeopaths, osteopaths, naturopaths, acupuncturists, and chiropractors (Adamson, Kenny, & Wilson-Barnett, 1995; Germov, 2002; Willis, 1989), without it, then or today, the paramedic discipline and its attempts for professional autonomy, greater skill sophistication, and problem-solving skills would not have been possible.

Despite the increased knowledge and skills required to study at the Intensive Care level, ambulance officers who entered these programs, did so from courses (perhaps 4 weeks in length) that offered very little in terms of advanced knowledge and professional skills. This apparent disconnection between the course and curricula continued until the late 1970s. In 1978, the first Certificate of Applied Science course was offered as the standard base qualification for new employees, colloquially referred to as the 'bionics' by older and less formally trained employees (Wilde, 1999; Willis & McCarthy, 1986a, 1986b). It was viewed by some as a 'total' course although it was seen as threatening by

many less qualified ambulance staff. It did nonetheless provide staff with ongoing educational needs (Pammenter, 1978) and offered the first hope of standardising paramedic education and training (Pammenter, 1979). I. Jacobs (personal communication, July 6, 2008) recalls the tensions associated with the initial ‘bionics’ groups who entered the paramedic workforce:

One of the problems that was faced initially by the bionics was they were told they were the cream and some of them acted that way, which didn’t go down very well with a lot of the older guys who tried to point out to them that they were still on the same team!

This program, first offered in Victoria, consisted of 15 or 16 units combining on-the-job with off-the-job training over a 3-year period and was taught primarily by either doctors or nurses. Not only was this an essential step in providing a foundational qualification in paramedic studies, it perhaps more significantly reduced the learning variance between basic and intensive care training courses. In some states, ‘grandfather clauses’ were implemented for staff employed prior to the introduction of the Certificate of Applied Science courses to apply for Certificates of Equivalence (Willis & McCarthy, 1986a, 1986b) in an attempt to reduce the qualification variances. It also served as a catalyst to motivate staff to undertake further undergraduate and postgraduate studies in ‘non-paramedical’ areas such as education and management (Wilde, 1999). However the notion of independence and the development of a unique paramedic professional identity created the perception that not enough content was taught by ambulance trained staff themselves. The medical and nursing dominance was now being questioned. This is best summed up by Moore, Lechmus, and Parkes, (1982 as cited in Wilde, 1999):

As the majority of teaching staff are not ambulance personnel, students feel that teachers do not understand the problems and stresses of the student ambulance officer, nor do they illustrate their lecture material with suitable reference to ambulance work (p. 121).

Incidentally, a multidisciplinary staffing approach is apparent in many university paramedic teaching departments across Australia today and, anecdotally, similar concerns are still voiced by paramedic students. It would seem that many ‘territorial’ obstacles

still exist as the discipline moves towards a more ‘multiprofessional’ model (Willis, 2009b).

During the 1980s there was a hiatus in the development of new clinical educational programs as the states (particularly the south eastern states). The remaining states and territories whilst neither performing nor offering an Intensive Care program, continued to build upon their base level paramedic qualifications. All programs were offered with combined on-the-job and off-the-job training and attempts at maintaining structured continuing education and re-accreditation opportunities. Some programs now offered specialised clinical visits for students to areas such as pathology museums, mortuaries, forensic medicine, and ballistic departments. Qualifications were offered by a Registered Training Organisation (RTO) or Technical and Further Education (TAFE)⁷ college to Certificate level or Associate Diploma level (Pammenter, 1979). In 1978 the Royal Melbourne Institute of Technology (RMIT) was approached by the Hospital and Charities Commission to conduct a Certificate of Applied Science program for Victorian paramedic officers; although this arrangement lasted less than five years (R. Bouvier, personal communication, July 4th, 2008b; Hotchin, 1986; Sloman, Blossfelds, & Luxton, 1981; Wilde, 1999).

As no professional registration existed, clinical, educational, and operational governance was undertaken locally by each state’s ambulance service and overseen by the state government health or emergency services departments. To this point there had been no attempts to create a national paramedic approach. There were no national standards nor any set of uniform protocols. In the late 1980s the first attempts were made by the Institute of Ambulance Officers (now Australian College of Ambulance Professionals) to develop a national competency system. The National Competency Based Training Project coordinated by Dr Gerry Fitzgerald aimed to assist in clinical and educational consistency and portability between state and territory ambulance services. However, this attempt was largely unsuccessful mainly due to parochialism of the individual state

⁷ TAFE is a provider of vocational education and training in skills-based programs. International equivalents would include Polytechnics or Community Colleges.

ambulance services and the potential industrial implications of higher pay demands by increasing the level of education qualifications (Fitzgerald & Bange, 2007a; Kay-Eddie, 1996).

It is also important to note the gender imbalance that existed within the Australian ambulance services during this period. At this time each service was dominated by Caucasian male employees. In fact all senior management positions were male, invariably having worked their way up the ambulance ranks. Staff were not offered flexible working arrangements and the discipline was generally very family-unfriendly. It was a common view (both publicly and privately) amongst staff that females would not be strong or tall enough or have the communication skills to perform the duties of a paramedic. I. Jacobs (personal communication, July 6, 2008) remembers this period noting:

Of course there was a lot of carry on in the first couple of years until the women actually were able to show the guys. There were all sorts of pranks played on them, but they overcame it and some of them are still around today.

Disappointingly, some such misogynistic views are still evident today with some senior male staff believing that female undergraduate students are too young, too small, and not strong enough to undertake the daily tasks associated with being a paramedic (Boyle, Williams, Cooper, Adams, & Alford, 2008). Fortunately such views are generally on the decrease.

Although the employment characteristics found in the 1970-1990 period can still be seen today, because the ambulance discipline, particularly senior management, is still dominated by males, the number of female paramedics is nonetheless gradually increasing. Obtaining accurate information on the number of women employed in each ambulance service is difficult as figures are not often reported in the public domain. However, some services do publish the figures in their annual reports. For example, for the past three years in South Australia almost two-thirds of the staff are male. The numbers are slightly higher in the Australian Capital Territory, in New South Wales over

75% and even higher in Queensland, where almost 80% of staff are male (Ambulance Service New South Wales, 2002; Australian Capital Territory Emergency Services Authority, 2005; Queensland Ambulance Service, 2005; South Australian Ambulance Service, 2004; South Australian Ambulance Service, 2005; South Australian Ambulance Service, 2006).

The next section will use the context discussed above to outline the specific teaching approaches and learning environments offered to students in the 1970-1990 period. It will also draw upon the relevant socio-political and educational changes that occurred during this period, given their importance to the way education and training was provided to the Australian public. The changes to the Australian education and training landscape have been instrumental in shaping where and how we teach today's paramedic students.

Teaching Approaches in Paramedic Education and Training: 1970-1990

Tertiary education in the period between 1970 and 1990s was dominated by two national reports. Tertiary education was shaped in the 1960s by the recommendations of the Martin Committee Report. At the end of the 1980s, John Dawkins introduced a number of far-reaching reforms. Paramedic education and training would not be immune from the changes.

The Martin Committee was formed in the early 1960s to create a blueprint for the development of Higher Education in the wake of the post-war reconstruction period. Australia had been a homogenous, transplanted British colony. Increased immigration from other countries had not only increased the population it had also broadened its cultural base. The post-war economy was strong, and domestic industrial growth was high. The demand for a highly trained workforce was pressing on the hitherto homogenous and elitist education system that had been imported from the United Kingdom.

The burgeoning Australian industrial sector demanded a new group of technically-savvy graduates who were capable of analysis and decision-making. Occupations such as engineering and nursing were assuming professional status and required their training to adapt. In order to better equip society for the practical world of industry, the committee recommended that colleges of advanced education be created instead of further expansion of tertiary institutions, later described as the *binary system* (Meek, 1991).

Simultaneously, similar changes had occurred in British universities and polytechnics and were largely based upon economic rationalism (Meek, 1991).

As a consequence of the Martin Committee's recommendation, Colleges of Advanced Education, TAFEs and private providers proliferated. Overall however they failed to accommodate the increasingly sophisticated demands of the new professions. By the end of the 1980s significant political pressure was being applied to modify the structure of tertiary education in Australia and in December 1987, the Green Paper – *Higher Education: A Policy Discussion Paper* - was presented in Sydney by the then Federal Education Minister John Dawkins. This period (known as 'the Dawkins' era') saw the introduction of the Higher Education Contribution Scheme (HECS). The era also saw the abolishment of the previous binary system of colleges of advanced education and Higher Education institutions and its replacement by the Unified National System (UNS). For example, in ten years, the number of Higher Education institutions fell from 87 in 1982 to 39 in 1992 (Reid, 1994).

The UNS restructure resulted in some traditionally technically focused disciplines being assigned under a dual university and TAFE sector (such as University of Technology Sydney, Victoria University of Technology and Royal Melbourne Institute of Technology). This change afforded the possibility for some trades or semi-professions to assume professional standing, such as engineering, nursing and later paramedics. This era of unification was ultimately seen as critical in maintaining Australia's competitive position in global markets by allowing more young people to enter Higher Education (Goedegebuure & Meek 1991; Ramsey, 2008). The demand was caused by labour shortages in a range of professions including engineering, health sciences and accounting

(Gonczi, Hager, & Oliver, 1990). As a result of the massification of tertiary education, student places were substantially increased. Other tangible benefits included providing an improved and more efficient and flexible higher education system by distributing funding more equitably across each institution (Ramsey, 2008).

Crucially for paramedic education the 1970s brought a new era of education and training in some states (Pammenter, 1979), whereby students were offered more sophisticated programs that not only offered greater educational praxis, but also advanced clinical skills and theory, such as defibrillation and management of cardiac dysrhythmias. Programs now included clearer course aims providing students with structured learning topics in areas such as: ambulance patient care, patient transportation, equipment and vehicle preparation, communication and teamwork skills and public relations. Structured on-the-road and off-the-road periods were more commonplace, with targeted learning objectives during both learning settings. On-the-job training now existed in hospital emergency departments, operating theatres, midwifery suites, and medical surgical wards. This had obvious explicit clinical learning benefits, but implicitly started to address some of the professionalism issues for paramedics.

During this decade, many health professionals still considered paramedics as ambulance drivers or stretcher-bearers despite the positive changes to educational standards in the paramedic arena. Further, despite these advances, there is limited evidence showing the ability to provide learners with specific competencies and no evidence of effort to integrate core graduate attributes. Despite these limitations, in 1976, the National Education Committee, Institute of Ambulance Officers outlined 13 aims from the Certificate of Applied Science program (cited in Phillips, 1992a); these are included in Table 2.3. Of significance, these 13 aims are essentially prerequisites and first attempts at paramedic specific graduate attributes.

Table 2.3: Educational Aims of Certificate of Applied Science (Phillips, 1992a)

1. Diagnostic skill and knowledge
2. The skills and knowledge necessary to initiate, continue or assist in the care of patients. Including the understanding of underlying pathophysiology
3. The skills and knowledge necessary for ambulance nursing
4. The skills and knowledge necessary to assist in the continuing care of the patient
5. The skills and knowledge to play an active role in the routine care of patients within a hospital
6. Skills and knowledge in communicating with others
7. The capacity to apply relevant law, protocols and procedures
8. The skills and capability to supervise Junior Ambulance Officers and an understanding of subordination
9. Competence in basic instructional techniques
10. Insight into the sociology of patient care
11. Skill and knowledge required to drive an ambulance
12. Skills and knowledge to maintain an ambulance vehicle and equipment
13. Skills and knowledge or rescue techniques

The standards of some paramedic educational programs and the upgrading of skills, training and equipment being offered were improving (Opit & Christie, 1980).

Educational literature from this era, whilst not producing peer-reviewed publications, did offer submission reports and technical papers. Improvements were not only occurring in educational program status, but also in novel and evolving T&L approaches. One pedagogical approach was competency-based training (CBT) that was largely driven by the recommendations made by The Kangan Report (1974). The Kangan Report was a critical time in re-directing paramedic education and training to TAFE and provided the impetus to consider and later develop the first ambulance Certificate course in 1978 (Wilde, 1999). Internationally, the CBT movement had been integrated and applied in the USA from 1967 (and the UK from 1988) demonstrating that a large body of CBT application had previously been undertaken (Yates, 2009).

The Kangan Report, and later the Finn Report (1991), Carmichael Report (1992), and Mayer Report (1992) supported the movement of CBT ensuring that the vocational education and training (VET) sector better meets the nation's industry and skills sectors

in an attempt to create a responsive, inclusive and mobile workforce (Cornford, 1993; Cummings, Robin, & Bunic, 1997; O'Donnell, 2006; Soucek, 1993). The implementation of this reform (National Training Reform Agenda) was overseen by the National Training Board (NTB) (now known as Australian National Training Authority) that fostered and developed a competency standards framework for all occupations (Burns, 1995; O'Donnell, 2006; Yates, 2009). The NTB viewed competency standards as an integral component in the economic and education reform of Australian vocational education, providing well needed self-evaluation and accountability on occupationally-relevant standards of competence (Burns, 1995; Guthrie, 2009; Masters & McCurry, 1990; Yates, 2009).

These competency standards were also seen as an important facilitator for professional recognition portability and subsequent employability in allied disciplines, such as physiotherapy, occupational therapy, and nutrition and dietetics (Gonczi et al., 1990; Guthrie, 2009). The nature of these standards developed by the NTB provided “the benchmark for vocation education, curriculum development, industry training and the recognition, delivery and accreditation of training” (Phillips, 1992a, p. 4). Another important development supporting the CBT movement was the establishment of the Australian Qualifications Framework which was first introduced in Australia in 1995 and fully implemented 5 years later (Guthrie, 2009). This framework provided national recognition and a unified and consistent structure to all qualifications, Secondary School Certificate and Certificate 1 to Doctoral Degrees) from across schools, VET, and Higher Education (O'Donnell, 2006).

The CBT movement in paramedic education and training was most prominent from the late 1980s throughout most states and territories (Appleyard, 1992; Anson, 1980; Phillips, 1992a; Phillips, 1992b; Tomlian, 1980; Yates, 2009). Whilst the notion of CBT was viewed as an important step in the evolution of paramedic training, some apprehension arose among educators and managers with the educational and industrial implementation of this process (Phillips, 1992b; Reynolds & O'Donnell, 2009). Competency-based training has one pedagogical aim; focusing on achieving a competency outcome in a task

or skill from resultant education or training (Guthrie, 2009). Other broad aims included educational and industrial reform with national training packages, national industry standards providing nationally recognised, valid competency assessments, and portable qualifications and labour market efficiencies (Appleyard, 1992; Australian Vice-Chancellors Committee, 1993; Bartetzko, 2004; Gonczi, et al., 1990, Masters & McCurry, 1990; Tovey, 1997). Specifically, CBT impacted paramedic education by providing paramedic education providers with a paramedic register of professional competency standards that in most cases provided clear, valid, and explicit skill requirements necessary for competent practice. These standards while locally-generated and applied, were the foundation for potential course accreditations and maintenance of professional clinical standards. Eventually these standards led to an attempt at national competencies and national competency training packages, providing a potential basis for graduate attribute development in future years (Fitzgerald & Bange, 2007a).

Following the earlier work of the Australian Paramedic National Education Committee, further attempts during the mid-1980s were made by the Institute of Ambulance Officers, national ambulance services, and ambulance unions to nationally align paramedic skills and clinical scope of practice. This alignment was seen as being crucial in recognition of prior learning (RPL) and credit transfer that permitted national portability and transferability of paramedic skills, clinical knowledge, and qualifications between state-based Australian ambulance services. It was not until 1981 that ambulance services were able to recruit interstate trainees and paramedics (O'Meara, 1983). Unfortunately, a national agreement was not obtained on how to best align clinical practice through RPL and other processes (Fitzgerald & Bange, 2007a). This lack of progress culminated in educational inconsistencies throughout Australia, and is best summed up by a paramedic student (O'Meara, 1983) "there is no justice in the system when interstate officers of dubious qualifications can walk into Ambulance Qualified after passing token examinations, whereas we, with our comprehensive course, are not necessarily accepted in other states" (p. 16).

Despite these attempts, CBT was the first meaningful pedagogical approach that provided national qualifications, vocational foundation, and stability to paramedic curriculum, curriculum design, learning objectives and assessments (criterion referenced).

Experiential learning was still vital in paramedic students' learning where many ambulance services incorporated clinical logbook/portfolios, and where students' learning activities and reflection were used in formative assessment and for continuing education purposes. Moreover students, educators, and employers were now provided with some form of equity in confirmation and validation of competence. Students were now better placed in *reacting* to learning material, learning outcomes, and the exploration and discovery of learning instead of just being passive vessels of learning.

Despite the lack of evidence-based medicine in paramedic education and training, students were nonetheless encouraged to read broadly and make comparisons between the latest evidence and their current clinical practice. Comparing and contrasting the earlier 1950-1970 era, graduates had moved from basic first aid to sophisticated clinical practice, particularly during the latter part of the 1980s. Graduates were now becoming more responsible and motivated for their learning and in some areas greater autonomy and opportunities for professional development was being provided. Professional status and recognition were slowly improving and the questioning (in the professional sense) of authority was much more commonplace.

There is little, if any, literature located on specific graduate attributes during this era, although detailed learning objectives were routine in most paramedic programs. The next section provides a retrospective review of the likely attributes of students and full-time staff employed by ambulance services in Australia during the 1970-1990 period.

“Reactive Paramedic” Graduate Attributes

With the improvement in T&L approaches as a result of the CBT movement, explicit graduate attributes were still not directly linked to curriculum on a local or national scale. The following provides a summary of the core attributes and what was expected of students and graduates during this period.

The following, it appears, were seen to be the key attributes from the 1970-1990 time period. Staff (mostly male) still expected to provide patient treatment reliant on basic and advanced clinical practice focusing on psychomotor competencies. Less focus and attention was given to driving the ambulance and to the traditional notion of being a mere stretcher-bearer. Patients were still treated according to defined protocols as patient outcomes rose in importance, therefore basic problem-solving and acquisition of facts and synthesis were required to provide the patient with the correct treatment. Task and skill orientation were still key competencies for graduates. Graduates, whilst still being trained in most areas, developed the attributes of being self-directed and motivated in their own learning and learning needs. Despite the move away from the role of the dutiful first aider, from the 1950-1970 period, the St John ethos was still very influential in Australian ambulance services in both training and management. Graduates were expected to have high levels of communication and personal presentation standards. As the education and training standards improved, so did the level of recognition amongst health care disciplines and the degree of autonomy and professional inquiry despite the continued shadow of medical dominance (B. Lord, personal communication, October 11, 2007; B. Steer, personal communication, September 9, 2007; R. Bouvier, personal communication, July 4, 2008b; M. Boyle, personal communication, September 14, 2007b; S. Burgess, personal communication, October 18, 2007; I. Jacobs, personal communication, July 6, 2008; A. McDonnell, personal communication, October 20, 2007; N. Mills, personal communication, July 6, 2008; W. Ross, personal communication, July 12th). The next section will now describe the Proactive Paramedic period (1990-current).

Australian Paramedic Education and Training – 1990-current: The Metamorphosis of the “Proactive Paramedic”

... university-based paramedic education is growing and will soon be the only entry route to professional practice and employment in Australia (Fitzgerald & Bange, 2007a, p. 9).

During the 1990s, paramedic qualifications maintained an on-the-job and off-the-job training mode with elements of CBT being implemented. Eventually all basic qualifications were raised to an undergraduate Associate Diploma level (first accredited in 1987). In 1992 during the CBT movement, informal discussions within the New South Wales Ambulance Service lead to a proposed new *Bachelor of Applied Science (Ambulance Paramedics)* (Phillips, 1992b). Whilst the course did not eventuate, it was the first attempt at raising paramedic education qualifications beyond an Associate Diploma level. Several years later in 1994, the first Higher Education Contribution Scheme (HECS)-based Bachelor degree titled *Bachelor of Health Science (Pre-Hospital Care)* was offered to New South Wales paramedic officers by Charles Sturt University, providing the first step towards university-based education (Lord, 2003; Phillips, 2007; Yates, 2009). Four years later this degree program was offered on a full-time basis to pre-employment undergraduate students (Field & Lord, 1999). This pioneering course served as a catalyst for the development of a similar program with Victoria University of Technology (now Victoria University) that commenced for qualified paramedic members a year later in 1995 (deWit, 1997; Yates, 2009).

Paramedic health care is essentially considered a practical or hands-on discipline; however, the shift to Higher Education was undertaken to increase the depth and breadth of knowledge that was not achievable through the previous vocational system. Similar comparisons can be made with the nursing profession who were also undergoing transitional changes to their education and training (Yates, 2009). All Australian registered nurses from 1993 onwards completed a three-year Bachelor level degree at university. This period represented a landmark point in the history of nursing and provided the nursing discipline with the capacity to undertake broader and more

sophisticated roles than previously achievable. It also represented an important period where the higher educational qualifications now aligned nursing with other professions (Fleming, 2008). This has not yet been achieved in the paramedic discipline.

Presently 12 Australian universities offer undergraduate and postgraduate paramedic education. These are listed in Table 2.4.

Table 2.4: Tertiary institutions offering paramedic-orientated education programs

1. Charles Sturt University (NSW)
2. Queensland University of Technology (QLD)
3. Central Queensland University (QLD)
4. University of the Sunshine Coast (QLD)
5. Flinders University (SA)
6. University of Tasmania (TAS, NSW)
7. Australian Catholic University (VIC, QLD)
8. Edith Cowan University (WA)
9. Latrobe University (VIC)
10. Monash University (VIC)
11. University of Ballarat (VIC)
12. Victoria University (VIC)

The majority of these universities offer both undergraduate and postgraduate levels of education (Edith Cowan University, Queensland University of Technology, and Australian Catholic University do not). Each university offers a 3 year undergraduate paramedic degree that is offered on a full-time basis, on-campus and combines academic teaching periods with clinical fieldwork practicum. The majority of the institutions also offer some form of blended teaching approach (e.g. combining face-to-face with e-learning/online teaching environment).

The transition to Higher Education institutions has assimilated many benefits for the paramedic discipline, such as increased academic status, use of formalised educational principles (teaching, learning, and assessment), development of research agendas and profiles, postgraduate study opportunities, and collaborative opportunities with other academic departments. Academic staff employed by paramedic departments are now not only expected to teach but also develop a research agenda and research skills that best

meet the university sector combined requirements of teaching, service, and research. Research has increased the rigour of paramedic education, thereby providing students with better learning opportunities through evidence-led unit content. The latter point, given the approach used traditionally to paramedic teaching, has been significantly limited. The learning may not just lie with co-teaching and sessional staff, but also with paramedic students being able to socialise and circulate within the university student learning culture. Importantly, expertise with educational support in curriculum design, such as spiral curriculum (Field, 1994), assessment, and alternative teaching approaches have led to a thoughtful integration of pedagogical rationales in paramedic education contexts.

Battersby (as cited in Field & Lord, 1999) also saw this period as an important phase for the paramedic discipline and stated:

There is overwhelming evidence, particularly in the case of nursing, that the transition to university-based education has contributed to enhancing the professionalism of nursing, to the portability of academic nursing qualifications, to the clinical competence of new nursing graduates, to a lowering of attrition rates in the profession, to a greater public and community awareness of the role of nurses and to higher levels of acceptance amongst other health professionals of the various clinical and community roles of nurses. There is no reason why the same or similar gains cannot be made by ambulance officers (p. 22).

Despite these clear educational and professional benefits, resistance to university-based education continues to exist (Mann, 2010). One such example has been the difficulty of some staff (who themselves are products of the traditional vocational and CBT education system) accepting newly credentialed staff from the Higher Education sector (O'Donnell, 2006; Yates, 2009). Common perceptions of experienced paramedic professionals include: “too young”, “not enough life experience”, “won’t stay in the job very long”, “loss of curriculum”, “taking jobs of mature applicants”, “too much theory not enough practical sense”, and “cannot communicate with patients” (Dawson, 2008; Lord, 2002; Webb, 1996). It is not uncommon for students and/or academic staff to be met with latent (sometimes explicit) hostility from some paramedic staff concerning the direction

that university-based education is taking the discipline. Disconcertingly, there is only a small variation from the criticisms of the *passive/reactive* learning period's generation to women entering the industry twenty years earlier and this type of attitude and resistance will not serve the paramedic discipline well in the health care arena today as it undergoes significant transformation.

Pedagogical approaches and delivery of content varies greatly between each paramedic education program. For example, some departments integrate sophisticated Web 2.0 educational technology into online teaching platforms, whilst others do not incorporate any e-learning or blended learning into their pedagogy. Blended learning is defined as combining traditional face-to-face with some form of online T&L and is considered by some to be an effective approach in providing meaningful education (Garrison & Kanuka, 2004). Paramedic subjects now include more meaningful and higher order learning objectives that generally align them to a broader national standardised approach (Willis, 2009). Curriculum content now contains paramedic clinical practice and concepts, law and ethical dilemmas, epidemiology, public health, research methods, emergency and disaster management and preparedness, health administration and management, sociology, psychology, cultural studies, applied physics and professionalism.

The majority of university programs are offered on a full-time, on-campus basis with some integration of distance education principles. However some educational re-design has occurred since 2004. Monash University, Queensland University of Technology, and Flinders University now offer two year 'accelerated' pathway programs for graduates from nursing, allied health care or biomedical science backgrounds. This adoption of 'graduate entry' is not unique to paramedic education with many other health care disciplines, such as medicine, dentistry, nursing and midwifery, occupational therapy, physiotherapy, speech therapy, audiology, and optometry implementing the same model. Similarly, graduate entry pathways are common in comparable paramedic programs in the United Kingdom (UK) and Canada, where extended practitioner roles are provided (Lord, 2003).

This interdisciplinary linkage has promoted the notion of IPE and interdisciplinary learning partnerships and is well supported in the Productivity Commission Report (2005). The current mood of literature (Furber et al., 2004; Furness, Armitage & Pitt, 2011; Lewis & Stone, 2007; Nestel et al., 2010) is very supportive of IPE as it is seen as central in reducing the traditional ‘learning in silos’ mentality and allowing better appreciation and understanding between health disciplines; potentially producing a more diverse, flexible and responsive health care workforce (Bandali, Niblett, Yeung, & Gamble, 2011; Nestel et al., 2010; Russell & Hymans, 1999a).

Contemporary interdisciplinary health care programs have now been provided with State and Federal Government monetary support and therefore it is not surprising to note that three institutions, Monash University, Charles Sturt University, and Australian Catholic University, now offer double degrees in paramedic and nursing. Each of these double degrees are still in their early stages of development and issues such as potential loss of professional identity, registration of clinical placements, shifting workforce shortages, or the notion of ‘robbing Peter to pay Paul’ will need to be monitored closely. For example, the Australian nursing profession currently has a workforce shortfall of 19,000 practitioners per annum (O’Keefe & Armitage, 2007; Williams, Berthelsen, & Baker, 2004) and these shortfalls are underscored further by high attrition rates. About 10% of people with nursing qualifications do not work as nurses (Andre & Barnes, 2010; Fleming, 2008). Thus, the creation of double degrees such as these may come under close scrutiny from government health departments as nurses look to seek alternative employment in allied health care disciplines such as paramedics. So although the ideal of having a multi-skilled, flexible health care workforce may be attractive in some contexts such as rural and remote jurisdictions, it may have further concurrent negative impacts on employment attrition rates in professions such as nursing.

Moreover having dual qualifications in two professions fits well under the current notion of IPE and multidisciplinary treatment provision often provided in community health and rehabilitation settings. Also, graduates with a double degree are more likely to find full-

time employment than those with a single degree qualification (Graduate Careers Australia, 2007).

The next section will draw upon the perspectives examined above and outline the specific teaching approaches and learning environments offered to students in the 1990 to present phase. This section will again draw upon the relevant socio-political and educational changes that have occurred during this period emphasising the growing paramedic education research now being generated. This will not only inform current practice, but also provide an educational and research agenda for the 21st century.

Teaching Approaches in Paramedic Education and Training: 1990-current

With universities now providing greater emphasis on professional and vocational programs (Kilpatrick et al., 2007); this transition from the VET sector to Higher Education has seen many pedagogical changes to paramedic education and training (O'Donnell, 2006). This shift has offered paramedic academics the opportunity to integrate contemporary teaching models, and importantly the ability to undertake educational research into learning efficacy and satisfaction with students which had not been possible previously due to underdeveloped research opportunities. Literature on Australian paramedic education now includes peer-reviewed articles on a variety of topics including learning-centred approaches, clinical placement education, e-learning and online teaching, web-based examinations, clinical decision making, and clinical simulations (Boyle et al., 2007; Boyle et al., 2008; Field & Field, 1998; McCall, Wray, & Lord, 2009; McDonnell & Edwards, 2000a; McDonnell, Edwards, & Harries, 2000b; Waxman & Williams, 2006; Williams, 2006a; Williams, 2006b; Williams, 2007; Williams & Brown, 2007; Wyatt, Archer, & Fallows, 2007).

During this transition period, the Higher Education sector underwent further reform, directly impacting university paramedic education and training departments. In 2002, the then Federal Minister for Education, Science and Training, Brendan Nelson, released the Ministerial paper – *Higher Education at the Crossroads: An Overview Paper* (Nelson,

2002) - which saw the demise of the Dawkins' era of uniformity, replaced by an era of multiplicity, institutional diversity, and increased deregulation (Kilpatrick et al., 2007). Several key points from this report, such as Higher Education policy framework, regional engagement, and improving research effectiveness have caused a shift in the pedagogy and research direction of paramedic education and training. Kilpatrick et al. (2007) continues, "The current higher education reforms direct attention to priorities quite different from the goals of uniformity, growth and access sought by the Dawkins' reforms of the late 80s. The current focus is on institutional diversity and differentiated status between universities" (p. 2). In more recent times, the *Bradley Report* (Bradley, Noonan, Nugent, & Scales, 2008) has examined the global positioning of the Australian Higher Education Sector, playing particular attention to increasing the proportion of Australians attaining tertiary-level qualifications through the diversification and deregulation of student funding. This emphasis on diversification has yet to directly impact paramedic education and training curriculum, knowledge, or research. However, this diversification may need further examination in the future, particularly with the increasing numbers of universities offering paramedic undergraduate qualifications.

Despite the transition of paramedic education programs to the Higher Education sector, many of the VET sector roots still exist today, particularly the notion of CBT and measurement and evaluation of lower order cognitive knowledge, such as understanding and application. This, in part, is influenced by industry as noted by the Australian Vice Chancellors Committee (1993), "The pressure for competency-based standards derives from industrial requirements for educational institutions to articulate more directly with the needs of the industry" (p. 1). The 21st century has been tumultuous for CBT with many authors arguing against its appropriateness for today's educational needs Burns (1995). For example, described it as nothing more than "behaviourism in disguise" (p. 39). In contrast, however, its use has been supported by some in the medical profession (Albanese, Mejicano, Mullan, Kokotailo, & Gruppen, 2008; Cate, 2005; Govaerts, 2008) where it is seen as playing a significant role in both undergraduate medical training and medical postgraduate reaccreditation programs. Integration of educational theories and T&L strategies, such as problem-based and case-based learning, into paramedic programs

now exists (Lord, 2003; Williams, 2005). Boyle et al. (2007) include the explicit use of educational teaching models, such as DREEM (discovery, responsibility, empowerment, emancipation, motivation) and the inclusion of theories of constructivism, social constructivism, cognitivism, experiential learning, and situated learning (Boyle et al., 2008; Lord, 2003; Williams, 2005).

These theories appear to be well suited to current paramedic education and training requirements. Constructivism, social constructivism and cognitivism support the current use of student-centred teaching in the university context and provide students with a learning framework that encourages students to discover and scaffold new knowledge using existing experiences individually or socially in group learning networks. These theories are compatible with the clinical learning theories of experiential and situated learning. It also requires greater learning autonomy where the student must be *proactive*, self-motivated, work in teams and reflect on the learning activity previously undertaken (Kolb, 1984; Rogers, 1983; Lave & Wenger, 1990).

There is a paucity of literature located on specific paramedic graduate attributes during this time period. Despite most of the universities having prescribed generic graduate attributes, only one university (Edith Cowan University) explicitly links their paramedic program to the university graduate attributes, highlighting the inconsistent implementation of graduate attribute and curriculum standards. These generic graduate attributes include (Edith Cowan University, 2004):

- Use of Technology / Information Literacy
- Teamwork
- Problem Solving / Decision Making
- Internationalisation / Cross Cultural Awareness
- Communication
- Awareness of Political, Social and Ethical Issues
- Workplace Experience or Applied Competencies
- Service

- Professional Knowledge
- Enterprise, Initiative and Creativity.

On a positive note, detailed learning objectives are now synonymous in all paramedic programs. This final graduate attribute section will once again provide a retrospective review of the likely attributes of undergraduate students and full-time staff employed by ambulance services in Australia during the 1990 to present period.

“Proactive Paramedic” Graduate Attributes

Because the overwhelming majority of paramedic education is now being provided at the tertiary degree level, there is now an increased concern about achieving high student satisfaction scores, integration of research-led teaching and educational technology, and, importantly, increased employability for graduates. University strategic planning and policies also attempt to align paramedic core curriculum to the broad university graduate attributes. The challenge in achieving this alignment is exacerbated by the infancy of paramedic departments within the tertiary sector and core curriculum still being written and refined by a number of departments. The following provides a summary of the core attributes and what was, and is, currently expected of paramedic students and graduates.

After 1990, key competencies and graduate attributes shifted to reflect the changing nature of both the discipline and the professionalisation of the education and training programs. Lord (2002) continues, “Paramedic education requires not only the development of a substantial and relevant knowledge base to support practice, but that individuals learn to use information to construct knowledge and apply critical thinking skills to the process of diagnostic reasoning and clinical decision making” (p. 31). The following were seen to be the key competencies and attributes from 1990 to the present day. The gender balance is less dominated by males, with the majority of Commonwealth Supported Places (CSP) in paramedic Bachelor programs now mostly females (approximately two-thirds) (Boyle et al., 2008; Waxman & Williams, 2006; Williams & Boyle, 2007). Students are expected to engage in higher-order cognitive skills while attending their program using skills such as analysis, evaluation, and

synthesis which is hoped to provide critical thinking skills and the ability to solve and initiate problems as an individual and as part of a team. They are expected to be independent and self-directed learners who have technical literacy competence. Paramedic students are expected to critically analyse and appraise scientific literature that links to clinical practice. Graduates are also expected to have above average levels of verbal and written skills and be ethically, legally, culturally, and socially aware, competent, and responsible. With increased formalised teaching by paramedic-trained staff, students have increased levels of professional identity and view themselves as an important part of the broader health care community. Students are less “job-savvy” and are more focused on the “profession than the job”. (B. Lord, personal communication, October 11, 2007; B. Steer, personal communication, September 9, 2007; M. Boyle, personal communication, September 14, 2007b; S. Burgess, personal communication, October 18, 2007; A. McDonell, personal communication, October 20, 2007; Dawson, 2008).

The next section will now describe the anticipated *Transdisciplinary* Paramedic period (future). It is important to highlight that in each of the previous periods described, elaboration of the perceived graduate attributes was made; however, in this anticipated *transdisciplinary* period no elaborations will be made. Rather, these anticipated professional graduate attributes will serve as the basis to the research methodology described in Section 2: The Study.

Australian Paramedic Education and Training – The Anticipated “Transdisciplinary Paramedic”

... the existing technician and paramedic training does not deliver the range of skills necessary in a modern healthcare system, it is highly skills focused with emphasis on the management of those with life threatening conditions, but who are comparatively uncommon in the workload profile of ambulance staff (Kilner, 2004b, p. 384).

Analysis of current national and international contemporary reform issues suggests that change will continue to occur in the health care education and professional standards of care, due to globalisation, aging population, increased mobility of health care workers, economic constraints, reduced and decentralised medical resources, and changing community expectations (Capolingua, 2007; Everingham & Feletti, 1999; Higgs & Hunt, 1999; Ponzer et al., 2004). These changes are replicated in the paramedic discipline as described by Bissell et al. (1999): “As an entry point to primary medical care for many patients, EMS [Emergency Medical Services] not only has been targeted by managed care, but also has been asked to meet the medical needs occasioned by failures in other parts of the health care system and social safety net” (p. 140). Similarly, the Council of Australian Governments (COAG), the Productivity Commission, and the CAA commissioned report *The Regional and Rural Paramedic – Moving Beyond Emergency Response* (O’Meara et al., 2006) suggesting that future requirements and attributes of health care professions (including paramedics) in Australia are likely to be vastly different to past experiences and work practices. This is supported by O’Meara et al. (2006) who added, “New healthcare models with flexible workforce roles are clearly needed in rural Australia and expanded-scope paramedic roles are valuable innovations” (p. i). Despite the current rhetoric, opposition to medical workforce substitution does exist from some quarters in the medicine discipline who view this medical-dependent and team-based approach as not being the solution. They argue doctors cannot be replaced or substituted by lesser trained people (Capolingua, 2007).

International Developments

The same pressures being placed on Australia’s health system are also experienced in other countries, such as the United Kingdom, Canada, United States, and New Zealand. They too have examined contemporary and alternative models of service delivery to alleviate these pressures. As described earlier, international discourse has been shaped by several key documents including: *EMS Agenda for the Future* (National Highway Traffic Safety Administration, 1996), *Rural and Frontier Emergency Medical Services Agenda for the Future* (McGinnis, 2004), *EMS: At The Crossroads* (National Academy of Sciences, 2006), *The Future of EMS in Canada: Defining the New Road Ahead*

(Emergency Medical Services Chiefs of Canada, 2006), and *The Future Role and Education of Paramedic Ambulance Service Personnel (Emerging Concepts)* (Joint Royal Colleges Service Liaison Committee, 2000).

These strategic documents have attempted to outline a roadmap of change to educational and operational requirements for emergency services in their respective countries. The notion of accepting change is well supported by Roberts (1998) who added, “ the way in which health care will be delivered, combined with the prospect of a tight public finance climate make it increasingly likely that in order to remain successful ambulance services will have to learn to do different things – as well as doing things differently” (p. 7).

Importantly, several innovative *transdisciplinary* examples have provided the Australian Commonwealth government and paramedic sector with a potential ‘roadmap’ in developing new extended care roles for paramedics. In each of these following countries extended care roles have been implemented that include: *Emergency Care Practitioner* (UK) / *Paramedic Practitioner* (Australia), and *Extended Care Paramedics* (Canada, New Zealand), and *Physician Assistant* (US, Canada, Australia). The diverse roles and provision of skills of extended care paramedics enables them to provide medical care both within the specific prehospital arena, and also the broader context of primary and emergency care settings. In addition, these new roles offer a greater scope of practice, improved allocation of resources, and better alignment of the fiscal strategies being implemented by governments. An emerging body of evidence indicates these types of extended roles are having positive effects (Mason, Coleman, O’Keeffe, Ratcliffe, & Nicholl, 2006b; Mason, O’Keeffe, Coleman, Edlin, & Nicholl, 2007; Morgan, Strand De Oliveira, & Short, 2010; Reeve et al., 2008; Swain, Hoyle, & Long, 2010).

A brief overview of Physician Assistants and Emergency Care Practitioner/Paramedic Practitioners will now be discussed illustrating the unique characteristics and potential benefits to the Australian health care system.

Physician Assistant

During the 1950s, the American hospital systems were being confronted with increased demands on health services and a shortage of doctors trained in primary care. In response to these challenges, consideration of expanding the medical profession was first described in the literature by Dr Charles Hudson in 1961 (Holt, 1998). Soon after, Dr Eugene Stead proposed and developed the first physician assistant (PA) program at Duke Hospital in North Carolina (Buchan, O'May, & Ball, 2007; Carter & Strand, 2000; Holt, 1998; Hooker, 2006). Training first commenced in 1965 and by October 1968 the first three PAs graduated from Duke Hospital (Buchan et al., 2007; Carter & Strand, 2000). Despite these initial small graduate numbers, there are now over 65,000 PAs currently employed in the US, with predicted expansion to 90,000 by 2010 (Buchan et al., 2007).

Historically, PAs have worked mainly in primary health care. As the demands on health care increase, this has culminated in a shift in PAs work settings, with an estimated 30,000 PAs now working in a variety of areas such as emergency medicine, paediatrics, occupational health and neonatal care. Crawley, 2002 (as cited in Hooker, 2006) suggests moderate numbers of PAs now work in non-metropolitan areas, usually with populations of less than 10,000, providing optimism for rural locations in other countries such as Australia.

Physician assistants and extended paramedic practice are important and integral components of the American public health care system to reduce financial and workforce demands (Bissell et al., 1999; Carter & Strand, 2000; Evans, Wick, Brock, Schaad, & Ballweg, 2006; Hooker, 2006). It is therefore not surprising that countries such as Australia, Canada, Singapore, New Zealand, and the UK are currently implementing and examining the feasibility and sustainability of such positions within their health care workforce (Buchan et al., 2007; James Cook University, 2005; Parle, Ross, & Doe, 2006; The University of Queensland, 2010). It is anticipated that these new PA positions have the potential to provide greater workforce flexibility, a greater recruitment pool, and a more generalist/holistic approach (Buchan et al., 2007). In Australia, The University of

Queensland and James Cook University both offer a university-based PA training program. Admission into these programs is based on previous tertiary-level health care qualifications and clinical experience, specifically targeting those from the paramedic discipline. The programs offer students both face-to-face teaching and block release on clinical rotations (James Cook University, 2005; The University of Queensland, 2010) and is seen as providing the health care sector with an additional and flexible workforce opportunity, much needed in rural and remote communities.

Despite the perceived benefits and international evidence to support such extended-scope roles, what has yet to be answered, is what are the associated attributes and educational standards required of Australian paramedics? Moreover and perhaps more importantly, what educational and qualification requirements and pedagogical considerations will need to be undertaken to provide such pathway support in contemporary and autonomous roles such as paramedic practitioners and physician assistants? What is apparent in the development of these new roles is the clear divide between current and future graduate attributes requirements and therefore knowing what the most appropriate teaching, learning and curriculum is likely to be. This notion is also supported by Kilner (2004a) who adds, “It would appear there is an appetite to develop a curriculum or curriculum’s (sic) to educate these people without knowing what attributes with which they should exit from training programs” (p. 378).

Emergency Care Practitioner/Paramedic Practitioner

In the UK, the National Health Service (NHS) has developed and deployed the Changing Workforce Program (CWP) that aims to mainstream and modernise the health care workforce to better meet the demands of health care for the 21st century. The NHS (2004) “is fundamentally changing traditional and long-standing barriers to change, such as professional boundaries, team structures and hierarchies, existing care processes and established divides between organisations” (p. 2). Historically, UK paramedic education and training has not had the capacity to teach paramedics to the same standard as compared to Australia and for many years, until recently, have practised at a basic paramedic level only (ACAP, 2008a). Despite this disparity between the levels of

education and training between the two countries, the UK has been the first country to establish the professional position known as Emergency Care Practitioner (ECP) and is seen to offer a greater scope of practice and better allocation of resources (Department of Health, 2005b; Doy & Turner, 2004; Cooper et al., 2004; Mason, Wardrope, & Perrin, 2003; Mason, Coleman, Ratcliffe, Turner, & Nicholl, 2004; Mason, Coleman, O’Keeffe, Ratcliffe, & Nicholl, 2006a; Mason, O’Keeffe, Coleman, Edlin, & Nicholl, 2007; Woollard, 2006a). The diverse roles and provision of skills of ECPs enables them to provide medical care both within the specific prehospital arena, and also the broader context of primary and emergency care settings (Wood, 2000).

Ambulance resourcing is also a major problem for ambulance services in the UK (Brown, 2001; Neely, Eldurkar, & Drake, 2000; Squires & Mason, 2004; Volans, 1998; Woollard, 2003). Evidence suggested that an estimated 10% of patients calling an ambulance have “life-threatening” injuries (Department of Health, 2005b; Woollard, 2006b). The overwhelming majority of calls therefore are considered non-life-threatening and are often categorised within the social or mental health spectrum. Thus this new position, whilst increasing education (Masters Level) and clinical standards, has attempted to provide patients with the most appropriate care and in the most appropriate time frame (National Health Service, 2004; Woollard, 2006b). The Department of Health (2005b) adds, “Ambulance clinician training needs to be designed around the case mix they deal with. Therefore, staff training and education needs to focus on physical assessment, clinical decision-making, long-term conditions, minor illness and injury” (p. 43).

The multi-dimensional role has reinforced the notion of interdisciplinary health care teamwork that best utilises health care resources to reduce the burden placed on health services. It again reinforces that curriculum and graduate attributes should be mutually inclusive and as the content of material increases in sophistication, so too does the need to clearly integrate specific and generic attributes. In the case of ECPs in the UK, this view is supported by Wood (2000) who noted that “paramedics must identify the core competency standards to be achieved by PECs [practitioners in emergency care]. These

must be integrated into the curriculum with a robust strategy for the assessment of theoretical and practical skills to meet these standards” (p. 134).

The reforms undertaken in the other countries have shaped the future extended practice of Australian paramedics. These reforms (coupled with an escalating crisis in health care resources in Australia, over-crowding of emergency departments, hospital bypass, reduced access to health care facilities, greater autonomy by the paramedic discipline (Andrus & Clark, 2007; Howie-Esquivel & Fontaine, 2006; Griffin & Melby, 2006; Hooker, 2006; Hooker & McCaig, 2001; Percy & Sperhac, 2007), have led to discussions on the use of expanded-scope to paramedic practitioners (O’Meara, 2005; Reynolds & O’Donnell, 2009). Early analysis of this model was first undertaken by O’Meara (2003) who suggested that implementation of an extended scope of practice or a holistic approach, particularly in rural locations, would ultimately provide more cost-effective health care for both the primary and public health sectors. Although the literature does reflect that the nurse practitioner roles have not been without their own policy and educational difficulties (Brown & Olshansky, 1998; Fleming, 2008; Van Soeren, Hurlock-Chorostecki & Reeves, 2010), this should serve caution to ambulance and government administrators, particularly when it comes to implementing appropriate curriculum and occupational territory issues.

In more recent times discourse and close scrutiny have significantly increased regarding the notion of paramedic practitioners at Australian national paramedic conferences and submissions to the 2005 Productivity Commission Workforce Report (McDonnell & Balon-Rotheram, 2005; O’Meara, 2005), and commissioned reports (O’Meara et al., 2006; Raven et al., 2006). This new paramedic practitioner role is seen to not only provide greater patient care of acute and non-acute injuries and illnesses, but to better manage health disparities that currently occur in many urban and rural locations (Mitchell, 2007). O’Meara et al. (2006) pointed out that the “current workforce is capable of expanding its role to meet specific community needs that are not necessarily acute or emergency related” (p. 17). These paramedic practitioner roles are different to

other *standard* paramedic roles and currently provide broader urban and rural community considerations and include extended-scope skills with a wider primary health care focus.

Currently four ambulance services in Australia are providing ECP models. It is envisaged that this model can reduce the burden being placed on emergency departments, by allowing paramedics to administer drugs (such as antibiotics and antidiarrhoea's), order x-rays, suture and plaster, and arrange direct referrals to general practitioners (South Australian Health, 2009). The ECP models appear to be producing positive patient care outcomes in both New South Wales and South Australia (no outcome data is available from the other two services). For example, in New South Wales, the ECP model has reduced emergency department presentations by 11.6% ($p < 0.0001$), and significantly downgraded '000' emergency calls by 21.3% ($p < 0.0001$) (Smyth, 2009). The South Australian ECP model has prevented ($n=554$) 49.4% emergency presentations, and 5.3% hospital admissions avoided (South Australian Health, 2009). These new positions (while yet to be formally evaluated) have the potential to provide employment stabilisation, particularly in remote rural locations, where medical and allied health care staff have high attrition rates (Humphreys et al., 2001; Mitchell, 2007; Tolhurst, 2006).

It is proposed that these positions are likely to generate a new chapter or learning period in Australian paramedic education and training, which will need to be reflected in improved educational standards, relevant curriculum and measurable graduate attributes. Kilner (2004b) made the following remarks that "There seems to be a case emerging to support the need for an expanded curriculum to prepare clinical ambulance staff to reflect the demands of a modern consumer led health service" (p. 385). This new period may be captured by the term *Transdisciplinary* Paramedic.

Summary

The chapter has provided a historical background to the creation of 'ambulance care' that has origins dating back over 500 years, and an outline of the different learning periods in the evolution of the Australian ambulance sector. An analysis of graduate attributes gained by the forbearing stretcher-bearers and paramedic students and graduates during

each period was outlined, providing the reader with an overview of the unintentional and intentional desired qualities in paramedic graduates. The emergence of the Order of St John and the establishment of the St John Association were also examined, outlining the significance the Association had in the formation of the Australian ambulance system.

While the concept of prehospital transportation to definitive care has not changed for centuries, there have been a range of socio-political changes that have shaped the education, training, and levels of clinical practice for the Australian paramedic discipline. Over the past 30 years, the paramedic discipline has seen a significant change in how it delivers its education and training, and what attributes characterised paramedic staff and students moving from the vocational education and training sector to the tertiary system. At no point has there been an agreed set of professional graduate attributes for Australian paramedics.

It was proposed that these changes have shaped four distinct learning periods, including the *Stretcher-bearer* Paramedic (1880-1950), the *Passive* Paramedic (1950-1970), the *Reactive* Paramedic (1970-1990), and the *Proactive* Paramedic (1990-current). A fifth learning period was also proposed titled the *Transdisciplinary* Paramedic. This period was based on the current health care reforms taking place in Australia and international developments in alternative service delivery models, such as Emergency Care Practitioners, Paramedic Practitioners, Extended Care Paramedics and Physician Assistants.

The change in education and training over these discrete learning periods has seen a range of positive outcomes for the paramedic membership. However, a number of unresolved issues are still plaguing the discipline, such as a non-standardised and non-accredited curriculum, leading to duplication of education and training for newly employed paramedic graduates. Consequently, this has led to uncertainty over whether the university-based programs are providing the industry with the necessary graduate attributes. These long standing issues and uncertainties are leaving the discipline

potentially vulnerable to other health care professions, and the risk of ‘reverting’ back to former vocational education and training roots.

Nonetheless, a gradual professionalisation movement towards full professional status has emerged and therefore requires further investigation and examination on several aspects. Firstly, what are the specific implications this may have on the discipline? Secondly, what are the limiting factors in general profession models for the Australian paramedic discipline? Thirdly, this chapter has suggested that a new model of paramedic service delivery is possible. If this is the case, understanding where the paramedic discipline currently fits the professional model is crucial. It is essential to understand what the paramedic identity is and where this identity fits into the broader primary health care system. If alternative service delivery models are potentially viable, considerations of encroachment into other professions’ domains (often termed horizontal encroachment) must be carefully evaluated and assessed, particularly as the paramedic discipline is not recognised as a profession, nor is it nationally registered. This being the case, the discipline is at risk of being professionally over-run by others such as nursing or medicine. There is only one alternative to mitigate professional take-over risks – developing a professional model for the Australian paramedic discipline. This thesis will task itself in determining what professional graduate attributes are required for this to occur both locally and nationally, something that has not been undertaken before today.

There are significant risks to health care outcomes and Australian health standards (especially in the prehospital sector) if paramedic attributes are not addressed. These attributes not only need to be addressed, but they must meet the rapidly changing health care requirements. If they are not dealt with, this puts the Australian paramedic discipline at risk of professional ‘take-over’, and raises serious questions surrounding the sustainability of the discipline’s attempt at being recognised as a profession. Therefore, the discipline needs to accept that service delivery is changing and therefore new professional graduate attributes need to be clearly articulated to reflect these changes.

The next chapter will also provide an outline and comparison from a range of professionalisation models from two other health care professions: Nursing and Physiotherapy. This contrast and association is anticipated to better inform the paramedic discipline in what it requires in its pursuit of becoming a profession. Reviewing the historical professional models in other health disciplines will outline the gaps and then lead to a proposed set of attribute criteria to undertake further investigation. This will form the basis of this study.

Chapter 3

What challenges does the paramedic discipline face in becoming a profession?

Introduction

As outlined in the previous chapter, the development of paramedic education and training can be considered as defined by the four distinct stages. The stages include *Stretcher-bearer Paramedic* – no formal education or training, *Passive Paramedic* - traditional didactic teaching centredness, *Reactive Paramedic* - teaching centredness and competency-based training, and *Proactive Paramedic* – student-centred learning and research-led teaching. These stages have been generated, shaped, influenced, and informed by a range of social, health, economic, and political forces. The changes in education and training have not been paralleled by the professional progression of the Australian paramedic discipline which has only moved from an ‘occupation’ to a ‘semi-profession’ (Wilensky, 1964) during the past 120 years. The previous chapter also proposed a fifth stage referred to as *Transdisciplinary Paramedic*. Examples of transdisciplinary health care include paramedic practitioners, emergency care practitioners, or physician assistants. Whilst this stage has the potential to offer a more flexible workforce for the prehospital sector and Australian health care system, it also raises other issues such as parochialism and extended divisions of labour (Cameron, 2011). For example, the notion of occupational territorialism or ‘turf war’ and the flow-on effects this might have on obtaining full ‘profession’ status for the paramedic discipline or the worse case scenario of ‘occupational capture, encroachment, submission or take-over’ by another profession are additional related points of debate. These potential issues can only be addressed if the paramedic discipline can formally organise itself in relation to vocational registration, education program standardisation, and its occupational boundaries by becoming a profession.

This chapter will build upon the current education and training of paramedics in the Australian Higher Education sector, describe the proposed fifth learning era within the context of professionalism and professionalisation, and draw upon related theoretical models from a range of scholars. These models will be used to illustrate how the health care disciplines of nursing and physiotherapy have achieved full professional status in Australia. This review will examine the evolutionary processes the nursing and physiotherapy disciplines undertook, how they were impacted by factors such as division of labour and medical dominance, and how they went about aligning themselves with the profession of medicine. Other historical features of the nursing and physiotherapy fields will also be discussed, including the transition from the vocational sector to Higher Education and how this transition led to the establishment of unique bodies of knowledge, evidence-based practice, and ultimately the development of autonomous clinical practice recognised by government legislation.

The issue of whether the Australian paramedic discipline wants to achieve full professional status will be examined. In addition, comparing and contrasting different profession models will be used to highlight and inform what professional characteristics are and are not currently present or ‘owned’ by the paramedic discipline. A review of these common professional traits seemingly has resulted in three areas not yet achieved by the paramedic discipline: 1) strategic alliance with medicine, 2) registration and regulation, 3) Higher Education and the development of a unique body of knowledge. Discussion of these gaps will lead to the final part of the chapter and introduce why a transparent review and mapping of Higher Education graduate attributes and curriculum are critical for the Australian paramedic discipline. Identifying these deficiencies and gaps will lead to an opportunity to develop a paramedic educational blueprint that will better inform the relevant policymakers, funding bodies, regulators, employers, administrators, and academics as to how to best address the future health care needs of Australians. This notion is also supported by the Australian College of Ambulance Professionals [ACAP] (2005) who maintain that:

As the ambulance profession has quietly emerged within Australia and with the contemporary transition to a university-based pre-

employment ambulance education model, the ambulance profession is the last health profession to make this transition to recognised and independent professional status. As such, there is much to be learned from the experiences of the professional journey undertaken by other professions (such as nursing [and physiotherapy]) and the opportunities and difficulties encountered ... during that transition (p. 2).

The next section will now provide a rationale for reviewing the professional evolution of the nursing and physiotherapy fields as points of reference.

Rationale for choosing nursing and physiotherapy

This chapter will consider two health care professions that are cognate with paramedics: nursing and physiotherapy. It will briefly describe the evolution and historical origins of each discipline outlining *how* and *why* they progressed from a semi-professional status to that of a fully recognised profession. It is intended that two ‘case studies’ will provide greater insight into which professional model might be appropriate as a framework or blueprint for the paramedic discipline in Australia in its quest to achieve full professional status.

Examining these disciplines and how they evolved during their professionalisation process will provide a timely reference point and important context for this study. Professionalisation is defined as the *chronological* process of becoming a profession (Moloney, 1986; Williams, 2002). Given the long history of both disciplines and the battles that were fought over professional autonomy, it would be worthwhile for the paramedic membership to learn from and examine their history, with the aim of reducing the potential for repeating previously made mistakes. Learning from the nursing and physiotherapy professions will provide the paramedic discipline with a greater informed context for its own professional development, particularly in a rapidly changing health care workforce.

Whilst nursing and physiotherapy applied similar strategic and political approaches in aligning themselves with the medical profession, how they achieved other professional

traits varied slightly. The rationale for choosing nursing and physiotherapy as examples is based on the following:

1. Historically, nursing has been heavily involved in the paramedic education and training context, often being the primary teaching resource for paramedic students and staff.
2. Nursing and paramedics are similar in their scope of clinical practice and are often the 'first' and 'second' links in the chain of emergency health care provision.
3. Nursing and paramedic clinical practice, until recently, shared a similar subordinate and dependent position to the medicine profession in the well-established health care hierarchy.
4. Nursing and physiotherapy have similar roles, functions, and status in regards to medical dominance and the division of labour.
5. Physiotherapy has considered and also proposed similar clinical, patient-centred, and educational eras and models throughout the history and evolution of physiotherapy education and training (see Higgs & Hunt 1999, Interactional Professional Model).
6. Both nursing and physiotherapy have searched for new occupational territories and extended scope of clinical practice beyond traditional roles and functions, such as advanced nurse practitioner, practice nurses, physiotherapy practitioner, and physiotherapy clinical specialists.
7. Both nursing and physiotherapy have comprehensive literature sources documenting their professional evolution and professionalisation.
8. The nursing and physiotherapy fields have designated areas of practice specialisation (e.g., paediatrics, neurology, orthopaedics, rehabilitation).
9. The nursing and physiotherapy fields have scope of practice regulated by professional associations and defined by government legislation.

The Australian health system urgently requires an alternative health care workforce, one that is multiskilled and extends service delivery. The paramedic discipline has the capacity and potential to be a major part of this (Reynolds & O'Donnell, 2009). For

example, it has relatively well-established undergraduate and postgraduate programs offered within the Higher Education sector. It has suitable and independent clinical practice and emergency clinical skills to undertake such roles, and it does not have the attrition rates of other disciplines, such as nursing or physiotherapy (Andre & Barnes, 2010; Australian Institute of Health of Welfare [AIHW], 2003; McMeeken, 2008; O’Keefe & Armitage, 2007).

Despite these optimistic views, if an alternative approach to health delivery based on a multiskilling or a transdisciplinary model of health care is embraced; two clear problems can be identified for the paramedic discipline. Firstly, since the paramedic discipline is not yet recognised as a fully fledged autonomous profession, any attempts to develop new professional roles or domains of professional practice have the possibility of provoking a ‘turf war’ and ultimately the potential for take over or direct accountability to another profession. Gardner and McCoppin (1995, cited in Mahony, 2003) stress the importance of protecting professional domains to avoid encroachment (vertical and horizontal) from other disciplines and resultant loss of power. These struggles over occupational territories is explained by Williams (2002) who notes that:

The threat to the occupational boundaries of professionals, which can take forms: vertical and horizontal. Vertical encroachment can be from above (medicine, for instance) or from below, whereby less qualified workers do some of the tasks previously done by a professional. Horizontal encroachment refers to the occupational take-over of one profession by another, where both have similar status and power (p. 354).

The most likely health care group to encroach onto the paramedic domain is the nursing profession. This argument is based upon the emerging numbers of dual degrees offering concurrent qualifications in both nursing and paramedics. The evolution of dual degrees has raised recent issues of workplace learning during clinical placements and registration, particularly as nursing students are registered under the state or territory nursing boards and paramedic students are not. This raises the risk of registration for paramedics potentially being assumed by the Nurses Board for all students. Secondly, current integration of nursing principles continues to exist in paramedic education and training.

Thirdly, and perhaps more importantly, are the educational implications of an alternative approach to health care delivery. Currently, the paramedic discipline in Australia *does not* have specific, well articulated, defined graduate attributes and a linking curriculum that is reflective of these graduate attributes for its undergraduate programs. Neither does it have a strong basis from which to develop a specialised curriculum and graduate attributes for a model or approach such as extended practice or transdisciplinary health care.

As previously discussed, the Australian health system requires a workforce to supply a new service delivery (National Health and Hospitals Reform Commission [NHHRC], 2008). However this very notion places the Australian paramedic discipline in a tenuous situation as it is uncertain if it really meets the demands and expectations of the ambulance industry. In other words, does the current Australian paramedic curriculum and T&L approaches produce the desired graduates with the required graduate attributes that fit the requirements of a contemporary health care professional? Achieving full professional status is something that has been debated within paramedic circles for some time.

Before proceeding to consider the case studies in any depth, a contextual framework will be provided that defines both what a profession is and the process of professionalisation.

What is a profession?

Obtaining a precise definition of the term *profession* and how a profession should be expressed has been debated amongst scholars dating back to Flexner's seminal paper published in 1915 (Freidson, 1970; Wynd, 2003; Yam, 2004). In historical and contemporary contexts, the term *profession* has been applied to 'the traditional learned professions' – law, ministry, medicine, business and university teaching (Moloney, 1986; Sparkes, 2002; Stuart, 1981). Despite the difficulties in agreeing on an exact definition, a range of authors have attempted to describe its meaning and specific criteria. Freidson suggested that the term profession was based on independent practice, self-auditing

processes, expert knowledge, special value in its work, monopoly and service to the public (Freidson, 1970; 1986).

A number of other definitions have been put forward. Schwirian (1998) distinguished a full profession from a semi-profession and occupation in the following terms:

... profession can be defined as a prestigious occupation with a high degree of identification among the members that requires a lengthy and rigorous education in an intellectually demanding and theoretically based course of study; that engages in rigorous self-regulation and control; that holds authority over clients; and puts service to society above simple self-interest (p. 6).

Professions Australia (2008a) defines a profession as:

a disciplined group of individuals who adhere to ethical standards and who hold themselves out as, and are accepted by the public as possessing special knowledge and skills in a widely recognised body of learning derived from research, education and training at a high level, and who are prepared to apply this knowledge and exercise these skills in the interest of others (p. 8).

Hall (1969) had suggested that professions begin with a professional model, accompanying attributes, and profession-specific content. This notion of a professional model referred to by Carr-Saunders and Wilson (1944) in their definition of a profession. Their professional model included intellectual 'capital' that is acquired by specialised education and organised bodies of knowledge. This exclusive education and training is offered to members to ultimately provide benefit and service to individuals and the broader society. For example, nursing receive specialised training to care for patients who are sick or who have specific health care needs.

As well as the term 'profession' having a range of definitions, it is important to also note that a range of scholars believe that defining a profession is redundant and meaningless since each profession can (and usually does) define itself by generating an idiosyncratic set of defining characteristics that is meaningful only to itself (Stuart, 1981). This

subjectiveness was further noted by Kell and Owen (2008) who proposed that “the definition of ‘profession’ itself is always deeply contested, and varies across geographical, cultural and historical contexts” (p. 159). Vollmer and Mills noted (1966) that:

... we avoid the use of the term “profession,” except as an “ideal type” of occupational organization which does not exist in reality, but which provides the model of the form of occupational organization that would result if any occupational group became completely professionalized. ... we feel that it is much more fruitful to ask “how professionalized,” or more specifically “how professionalized in certain identifiable respects” a given occupation may be at some point in time (p. vii-viii).

Based on the earlier work by Vollmer and Mills (1981, as cited in Lowther & McMillan, 2006) described a profession in the following terms: “every occupation that is called a profession is, in reality, a semi-profession manifesting a number of professionalizing aspects” (p. 4), adding to an arena of varying definitions. In reality then, it is the idea of a profession that is most important.

The ideal of a *profession* emerged as Western civilisations developed greater social structures through urbanisation, industrialisation and other economic forces (Elliott, 1972; Freidson, 1970; Freidson, 1986, Hall, 1969; MacDonald, 1995; Sheather, 2009; Vollmer & Mills, 1966). Within these social structures emerged the notion of caring and concern for others and how professions could assist in this process (Marshall, 1963 as cited in McCauley, 2006). The importance a profession had within a society ensued status, privilege, and hierarchy. It is also important to point out that during this period of occupational-professional formation the *functionalism model* first emerged. Higgs, Hunt, Higgs, and Neubauer (1999) described the functionalism model:

In the functionalist model, a *profession* is a body whose membership is accorded after a long effective training under the control of experts in a university context, which guarantees the quality and effectiveness of members’ work. Because of this guarantee, professionals are accorded work autonomy and a privileged place in society (p. 17).

Durkheim in the late nineteenth century (cited in McCauley, 2006) highlighted the negatives associated with the establishment of professions. He suggested the process of professionalisation produced complex divisions of labour, increased individualism, and threatened social order (McCauley, 2006). In the context of this thesis, it is important to outline the long standing historical origins of the division of labour, and how it still alienates many allied health care disciplines (including paramedics) from achieving professional status. Whilst divisions of labour have always occurred in the health care system, it is one of the reasons why professions such as nursing and physiotherapy strategically aligned themselves with medicine so they could avoid a degree of alienation and achieve formal recognition as has happened to chiropractors and complementary medicine providers. Vollmer and Mills (1966) stated that an “increasing complex division of labor and specialization of occupational function is not only *induced* by industrialisation, it also appears to be *required* by it” (p. 46). Despite the development of complex divisions of labour, distinct professional characteristics were formed. This will be now discussed.

Certain professions such as law, medicine, theology, and university teaching have existed since the Middle Ages (Maloney, 1986). From this period, there has been the application of certain traits or occupational characteristics that personify professional status. Formal criteria of what determines a profession is well documented (Freidson, 1970; Hall, 1969, Vollmer & Mills, 1966). Goode (1960, cited in Freidson, 1970) contended that a profession must include two core characteristics; a prolonged specialised period of education and training, and a collective approach to social welfare. From these core characteristics arose a range of profession attributes or traits, which are broadly based upon four elements – high income, esoteric or academically complex bodies of knowledge, recognised high status within a community (power), and autonomous practice (Covert, 1917; Freidson, 1970, Freidson, 1986; Moloney, 1986; Schwirian, 1998; Vollmer & Mills, 1966). Other characteristics and criteria for profession acceptance are reported in Table 3.1. A range of scholars and a summary of the characteristics they ascribe to a profession are listed in Table 3.2.

Table 3.1: Attributes of a profession (Moloney, 1986, Kelly, 1981)

•	Altruism
•	Authority
•	Autonomy
•	Code of ethics
•	Commitment
•	Knowledge
•	Prestige
•	Professional association
•	Service
•	Theoretical base
•	Trustworthiness

Table 3.2: Profession characteristic/author matrix (Adapted from Moloney, 1986)

Profession Characteristics	Flexner (1915)	Carr-Saunders & Wilson (1944)	Cogan (1953)	Greenwood (1957)	Bixler & Bixler (1959)	Goode (1960)	Kornhauser (1962)	Barber (1965)	Hall (1969)	Freidson (1970)	Pavalko (1971)	Schein (1973)	Larson (1977)	Hoyle & John (1995)	Cruess & Cruess (1997)	Swick (2000)
Altruism	x							x	x					x	x	x
Authority				x						x				x		x
Autonomy					x		x		x	x		x	x		x	
Code of ethics	x			x				x		x	x			x	x	x
Commitment							x		x		x				x	x
Knowledge	x	x	x		x	x	x	x			x	x	x	x		
Prestige												x		x		
Professional association	x			x				x	x		x	x			x	
Service						x		x	x	x	x			x		x
Theoretical base	x			x	x						x			x		
Trustworthiness				x						x					x	x

What is professionalisation?

Without some delineation around what is a profession, the notion of professionalisation is meaningless (Freidson, 1986). Therefore, it is important to make distinctions between the terms of *profession* and *professionalisation*. Professionalisation is the process of an occupation attempting to obtain the status and recognition of a profession (Collins, 1990; Freidson, 1970; Vollmer, & Mills, 1966). Freidson (cited in Forsyth, 1995) continues,

... professionalization is the outcome of an essentially socio-political and historical process, and has to do with the ability of an occupation to convince legislators and the public of the importance of its work, rather than the intrinsic knowledge and value of that work (p. 165).

Thus the professionalisation process can be viewed as being on a continuum (Guttman, 1950 cited in McCauley, 2006; Stuart, 1981), and depending on the occupation, its professionalisation processes may be affected accordingly. Vollmer and Mills (1966) stated that, "Professionalization does not occur in a vacuum" (p. 46).

Carr-Saunders is thought to be the first sociologist to investigate the notion of professionalisation in a range of occupations (Vollmer & Mills, 1966). He defined professionalisation as a process along a continua working towards full professional status, using the following traits: codes of ethics, professional associations, specialised skills, and governance (Vollmer & Mills, 1966). This professionalisation continuum has also been described as the structural attributes of professionalisation by Wilensky and Caplow (cited in Hall, 1969). Wilensky and Caplow (cited in Hall, 1969) suggested that occupations pass through four sequential stages/functions during the professionalisation process: 1) creation of full-time occupation, 2) the formation of training schools, 3) creation of professional associations and 4) development and creation of a code of ethics (Hall, 1969). The process of professionalisation can be further summed up in Table 3.3, outlined by Wilensky (1964).

Table 3.3: Process of professionalisation (Wilensky, 1964)

1. Development of full-time occupation and formation of occupational territory
2. Establishment of training schools or colleges; linkage to university education should occur within several decades
3. Occupational promotion to national and international parties
4. Professional licensing and accreditation
5. Code of ethics is implemented

Successful professional groups self-regulate their education, administer their own accreditation processes, and provide protection of their occupational boundaries. This notion is referred in the literature as a way for the semi-professions to simply survive in the division of labour (Williams, 2002) or about obtaining a similar status among their health care contemporaries (Jacobs, 2006). It is also important to note that despite many occupations seeking professional status, it is only ever achieved by few (Moloney, 1986). Etzioni (1969) classified professional groups into the following categories: professional, non-professional and semi-professional. This process is perhaps best illustrated by the occupation-profession continuum illustrated in Figure 3.1 that outlines how and which professions have moved along the continuum from occupation to profession (Moloney, 1986; Schwirian, 1998).

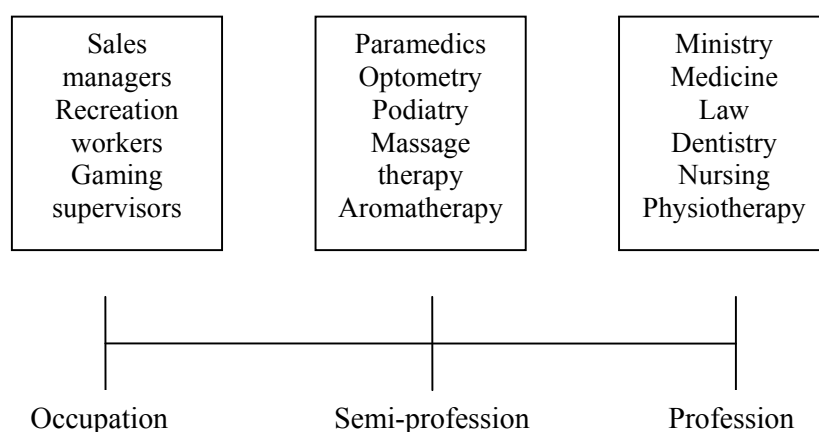


Figure 3.1: Occupation-profession continuum (adapted from Schwirian, 1998)

Does the Australian paramedic discipline want to be a profession?

The first question that needs to be posed is: ‘Is the Australian paramedic discipline considered a full profession?’ The current answer is ‘no’ (Harries, 1998; Mahony, 2003; Reynolds, 2004; Reynolds & O’Donnell, 2009; Sheather, 2009; Wyatt, 1998). Further evidence is demonstrated by the latest socioeconomic index for Australian occupations, where paramedics are positioned at a lowly 58%, compared with nursing (80%), physiotherapy (93%) and medicine (100%) (McMillan, Beavis, & Jones, 2009; Willis, 2009a). The second question that needs to be asked is: ‘Does the Australian paramedic discipline *want* to achieve full professional status?’ It appears through national and local discourse that it does. Other questions emerge around the professionalisation path of the Australian paramedic discipline. Why would obtaining full professional status be desirable for the paramedic discipline, and what does the discipline need to achieve this?

Historically, events such as improvements in educational standards, qualifications, and clinical practice as well as industrial disputes improving salaries, work conditions, and independence of clinical practice have all played pivotal roles in the movement of the paramedic discipline along its professionalisation continuum. Others such as Bouvier (1993b) have raised the notion of professionalising the paramedic discipline by stating, “All ambulance officers [paramedics] should strive to become and to be accepted as true health professionals. They have made remarkable progress in this direction in the past thirty years” (p. 1). Earlier discussions of how to make the paramedic discipline more ‘professional’ occurred during the previous decade on behalf of the Institute of Ambulance Officers. Wilde (1999) suggested the first purposeful steps were taken during the 1980s when paramedics moved away from the emergency services sector (which included police and fire fighters) and were integrated into the health care system.

Professional status will bring significant advantages to paramedics; including: monopoly over clinical domain and body of knowledge, autonomy, prestige, financial rewards, mastery of body of knowledge based on research, political independence, negotiating power, and self-regulation (Freidson, 1970; Freidson, 1986, Goode, 1960; Hall, 1969; MacDonald, 1995). Achieving it depends to a large degree on three salient factors: 1)

political alliance with medicine, 2) national registration and regulation and 3) Higher Education and the development of a unique body of knowledge.

These factors and processes are not developed in a 'lock-step' formation and are often shaped independently of each other (Moloney, 1986). Whilst the first two factors described above (e.g., strategic alliance with medicine, and national registration and regulation) are beyond the scope of this thesis, they are nevertheless critical features in becoming a fully fledged profession and are currently obstacles that the paramedic discipline must overcome if they want to move to being recognised as a profession.

Although the factors do not imply that a chronological sequence or lock-step process is not required in the professionalisation process (Wilensky, 1964), it is anticipated (given the relative early stage of the paramedic discipline) that addressing the third point by developing a profession-unique body of knowledge that is standardised nationally and taught in universities, that the other two factors will be achieved with less difficulty (Phillips, 2007; Reynolds & O'Donnell, 2009; Sheather, 2009). As will be exemplified by nursing and physiotherapy it was not until unique bodies of knowledge were gained through a university education that these two disciplines truly became professions (Higgs et al., 1999; Reid, 1994). This same point will be reviewed in terms of what the paramedic discipline must achieve in its professionalisation progression. Therefore, each of the factors will now be examined with particular attention given to the development of a unique discipline-specific body of knowledge.

1. Strategic alliance with medicine

Nursing and physiotherapy aligned themselves strategically with the medical profession, by embracing distinctly subordinate roles to physicians (Carter, 1994; Fleming, 2008; Martyr, 1997). This alignment provided the necessary empowerment by medicine initially and later the required recognition and acceptance by other professional groups (Moloney, 1986). Without acceptance of medicine's dominance, both disciplines may not have achieved eventual full professional status. Whilst the paramedic discipline openly accepts medicine's dominance in terms of its clinical governance and

development of clinical practice guidelines and protocols (Reynolds & O'Donnell, 2009), it has yet to align itself with that profession in a formal subordinate position in the health care hierarchy (Harries, 1998). Such alignment now seems both timely and pragmatic particularly with the concept of physician assistants and extended paramedic practitioner roles being discussed in Australia. In broad terms, the move to extend the roles to paramedic practitioner and/or physician assistant may actually force the issue to be dealt with sooner rather than later. Therefore, should the paramedic discipline seek professional status as an occupation that is under the jurisdiction or direction of the medical field similar to nursing and physiotherapy?

The recent changes in dentistry exemplify how effective such strategic manoeuvring can be. Before 2005, dental assistants, dental hygienists, dental therapists, and dental technicians were generally part of the allied health group. The Australian Dental Association (ADA) faced with a shortage of dentists realised that by creating dental management teams they could alleviate that pressure. For that they needed to up skill their auxiliary workforce. By reorganising their training they were able to include them within the ADA rather than allied health. Clearly they not only reduced workforce shortages they also protected and actually widened their occupational territory (ADA, 2005; Fleming, 2008). At the same time the auxiliary workers' status was substantially raised.

Given the likely changes to health workforces and potential occupational turf wars, it would seem that the Australian paramedic peak professional body or other representative agency has a small window of opportunity to achieve this professional alliance with medicine if it promotes itself as physician assistants and paramedic practitioners. Whether medicine is willing to accept the paramedic discipline as another practitioner in the health arena is another question. While that question is being resolved, attention needs to be paid to where paramedics are currently placed in relation to national registration and regulation.

2. Registration and regulation

The uncertainty surrounding registration and regulation also supports the need to develop an alliance with the medical profession, particularly in light of recent developments with the Council of Australian Governments (COAG) recommending one national registration system for the 10 registered bodies: medical practitioners, nurses and midwives, pharmacists, physiotherapists, psychologists, osteopaths, chiropractors, optometrists, and dentists⁸. The Australian paramedic discipline does not currently have national registration or regulation of a professional scope of practice (ACAP, 2008a; 2008c; 2010d, Reynolds & O'Donnell, 2009). Whilst proposals for national registration are in process, it is anticipated that progress will be slow, particularly given the outcomes of several recent reports (Burgess et al., 2003; New South Wales Government, 2008). National regulation, however, seems better placed than achieving registration. The Convention of Ambulance Authorities (CAA) has commissioned a project team to develop a road map and action plan in achieving national regulation (Fitzgerald & Bange, 2007b). Whilst national regulation does not currently exist, clinical practice and licensure is provided by each individual ambulance service at a local state level: illustrating how little the paramedic discipline has progressed towards achieving professional status.

An example of the immaturity as a discipline and reflection of what it is to be a profession is perhaps best exemplified by the lack of peer-reviewed articles or scientific papers published in the paramedic literature on professionalism, professionalisation, regulation, registration, practice ethics, and education program accreditation over the past 15 years (ACAP, 2003; Burgess et al., 2003; Fuery, 1992; Harries, 1998; Mahony, 2003; McDonell, 1994; McIntyre, 2003; Reynolds, 2004; Wyatt, 1998).

Cruess, Johnston, and Cruess (2002) described being part of a profession involves a *contract with society*. Part of this contract includes a societal guarantee of professional competence, safety, and accountability and that this is only achieved by registration and

⁸ The national registration scheme formally commenced on 1st July 2010.

regulation. Without registration or national regulation, the notion of achieving recognised professional status for the paramedic discipline is not possible. The next section will briefly outline the importance that Higher Education has in the professionalisation of the paramedic discipline.

3. Higher Education and the development of a unique body of knowledge

It is the third factor that forms the basis for this thesis: how education and training will impact the professionalisation process of the Australian paramedic discipline. Whilst the two previous factors (strategic alliance with medicine, and registration and regulation) are crucial in the professionalisation path, it could be argued that Higher Education (and having a unique, profession-specific body of knowledge) ultimately supports all of the professional characteristics and is key to obtaining full professional status (Phillips, 2007). Both nursing and physiotherapy were only recognised as professions after undergraduate Higher Education programs were established that later contributed to a further expansion of each field's body of empirical scholarship. It is also important in the development of evidence-based practice that a profession-specific theoretical base from which a designated scope of practice can be monopolised or 'occupational closure' can be maintained. In turn, this protects an occupational group from encroachment by other professional groups. For example, massage therapists, myotherapists, osteopaths, athletic-sports medicine therapists, and chiropractors perform several professional acts that also fall under the traditional scope of practice of physiotherapists. But it is the fact that being a physiotherapist requires an undergraduate degree – which creates a distinct body of scholarship, and it is this unique body of scholarship and research-based science which leads to self-development, self-regulation, authority, and professional autonomy (Moloney, 1986; Reynolds & O'Donnell, 2009).

Sheather (2009) and Reynolds and O'Donnell (2009) argue that paramedic research and the development of a unique body of knowledge, is largely generated from Higher Education. Moreover, Reynolds (2004) commented on the importance of Higher Education for the Australian paramedic discipline:

The Australian ambulance industry has undergone dramatic change over the last ten years. These changes have been singly reflected in the number of tertiary degree courses being offered throughout the [sic] Australia ... This single step could be viewed as a strategic move toward professionalism (Introduction Section, para, 1).

The development of a formal and standardised curriculum at a university is generally seen as a significant criteria in the development of a full profession (Freidson, 1970). Based on this notion the paramedic discipline is currently well placed with 14 undergraduate university paramedic programs now offered around Australia. Whilst that offers the discipline greater capacity to develop its own body of knowledge and research evidence, it also highlights several shortcomings in its growth within the Higher Education sector and overall professional progression. As outlined in Chapter 1, although a set of national competencies (diploma level) currently exist, unfortunately these do not meet the requirements or standards of the higher Bachelor-level qualifications now offered by the 12 universities. In other words, no national Bachelor-level degree competencies, national practice standards, or national standards for education programs and the curricula taught to paramedic students currently exist. This is further compounded by ambulance services (who are the major employers of paramedics) working and practicing independently of each other and in most parts of Australia, independent of the universities as well. Not surprisingly, there are no nationally recognised professional qualifications that are portable between the Australian states.

This educational and curriculum mismatch is further highlighted with uncertainty about which graduate attributes paramedic students exit programs with, and whether these attributes currently meet or do not meet the needs of the paramedic industry (ACAP, 2009d). In Australia, these questions have yet to be formally considered in detail. It will be proposed that whilst other factors are involved in the professionalisation process, it is the curriculum and processes contained within it, and the product of this curriculum (e.g., graduates and their accompanying attributes and skills) that are most important for the current and future needs of the paramedic discipline within Australia.

The next section will provide an overview and background of the nursing and physiotherapy disciplines highlighting their historical development in becoming a profession. These comparisons are intended to compare and contrast *how* and *what* these disciplines have undertaken to achieve full professional status, thus providing a context and greater appreciation and understanding of what the paramedic discipline still has to achieve to obtain this recognition. Where the Australian paramedic discipline currently falls on the professional continuum will be illustrated using literature, models of professionalism and comparison of the other health care professions. As well, this literature informs what challenges and obstacles face the paramedic discipline in achieving full *professional* status in Australia.

Cognate Case Study #1: The Professionalisation of Nursing

Overview

Although the nursing discipline in Australia has generally been accepted as being a profession (Reid, 1994), it is important to note that the assumption is still open to some contestation. The notion that nurses ought to be subservient to physicians remains and suggests that nursing can at best be considered a semi-profession (Ellis & Hartley, 2001; Keogh, 1997; Moloney, 1986; Stuart, 1981; Wynd, 2003; Yam, 2004).

The first steps on the path to professionalisation in Australia occurred in 1868 when a group of six nurses who had been trained under the Nightingale system arrived from England to establish a more formalised training structure for nurses within the local hospital system (Lusk, Russell, Rodgers, & Wilson-Barnett, 2001; McMillan & Dwyer, 1989; Moloney, 1986; Reid, 1994). Lucy Osburn was appointed Lady Superintendent in March, 1868 at the Sydney Infirmary, with the other five working in other areas around New South Wales establishing similar Nightingale training systems (Madsen, 2003). The fact that they had undergone some form of training can be argued to suggest a systematic approach to their nursing tasks, rather than simply being untrained aides to doctors.

Other defining moments in the professionalisation of nursing included World War I, World War II, and other military conflicts, the rise of feminism, and societal changes, all of which shaped and changed the image of nursing. Despite the complexity of these changes, and building on the early work of the Nightingale system, it was not until the mid 1950s that nursing and the notion of professionalisation was first discussed in the socio-historical literature (Ellis & Hartley, 2001). Both world wars and other military conflicts such as the Crimean, Vietnam, and Korean Wars all allowed nursing to flourish from 'hygiene teachers' to integral health care providers. This was brought about by constant improvements in disease pathology, aseptic techniques, and patient management, which aimed to reduce mortality from soldier's wounds and general sickness, allowing them to return to battle as soon as possible (Bloomfield, 1999). Nursing played an important part in this process, resulting in greater responsibility, authority and recognition by the general public and the medical field (Brayley, 2002).

While social prejudices of the day often constrained the active roles of women in society, the establishment of the Women's Liberation Movement and feminist ideology in the 1960s prompted re-examination of the gender divide in the labour workforce. At the same time the movement provided women with greater awareness of their social status and challenged the popular belief that women should be full-time mothers at home (Bloomfield, 1999). These societal changes provided women with employment opportunities in traditionally male dominated occupations, such as engineering, medicine, theology, business administration, dentistry, and law (Bloomfield, 1999; Eisenstein, 1982). Society was now more accepting of women undertaking employment beyond full-time child-rearing. Importantly, it offered the nursing discipline solutions to their workforce shortages and greater momentum in its pursuit of recognition and professionalism.

These watershed moments also provided nursing with greater recognition as skilled professionals in the general community, beyond stereotypical images of heroic and angelic carers for the sick and injured (Bridges, 1990). Recognition as professionals was

also improved within the health system, as were the role expectations of a Nurse. Greater knowledge and skill acquisition provided nursing with higher expectations in the search for improved education, training, and qualifications. In simple terms, nursing evolved because it demanded evolution.

Evolution of Nursing

Historically, the nursing profession was generally considered as being little more than teachers of hygiene, domestic carers for the sick and injured, or subordinate handmaidens to the medical profession (Carter, 1994; Fleming, 2008; Forsyth, 1995; Jacobs, 2006; McMillan & Dwyer, 1989; Yam, 2004). During this period 'The Doctor-Nurse Game' was first described in the literature based on the power and dominance physicians had over nurses (Stein, 1967; Stein, Watts, & Howell, 1990). In the Doctor-Nurse Game experiment 22 nurses were given a telephone order by a doctor for a drug dose that would have clearly caused an overdose. That only one nurse questioned the dose with the doctor, further highlights nursing's subservience to physicians (Larson, 1995). This medical hierarchical system has importantly led to sociological discourse in professions, power, and gender imbalance (Krogstad, Hofoss, & Hjortdahl, 2004). Freidson (1970) commented that:

As the case of nursing shows, those paramedical occupations which are ranged round the physician cannot fail to be subordinate in authority and responsibility and so long as their work remains medical in character, cannot gain occupational autonomy no matter how intelligent and aggressive its leadership (p. 69).

Nonetheless, despite the subservient role to physicians, carrying out this function played an important part in shaping and defining the nursing discipline as it is today (Ellis & Hartley, 2001). This role has ultimately led to greater empowerment and emancipation of the nursing discipline in its mission of building and establishing a nursing profession (Krogstad et al., 2004).

One of the first reported examples of subservience to medicine was led by Florence Nightingale during the Crimean War (Freidson, 1970). Leaving her nursing superintendent post in England, Nightingale was provided with a contingent of nurses to care for wounded soldiers. However, this process was not without its problems and eventually created dissatisfaction in the physician ranks. Military medical personnel refused to use nursing staff, and in turn Nightingale obliged by not allowing any nurse to undertake any care of patients without direct authority or direction by the doctor. For example, nurses were not authorised to provide food or drink to victims without a doctor's written order or consent. This handmaiden approach to medical dominance is summed up by Freidson (1970): "Nursing thus was defined as a subordinate part of the technical division of labour surrounding medicine" (p. 61). Given the patriarchal structure of society during this era, gender discrimination obviously played a key role in this subordination of the female-dominated nursing discipline to the male-dominated medical profession (Carter, 1994; Jacobs, 2006; Ruby, 1999; Witz, 1992; Wynd, 2003). In many cases male nurses were not viewed favourably either, being considered 'thoughtless beings' (Madsen, 2003).

Despite its subordinate handmaiden status to medicine, nursing was provided with its first true sense of its occupational territory and professional identity in the health system (Carter, 1994). However some authors argue (Holliday & Parker, 1997; Palmer, 1985) that the environment (created by Nightingale) in which nursing took their instructions from others was ultimately instrumental in thwarting the professionalisation of nursing and largely responsible for the paternalistic attitudes directed towards nursing (McMillan & Dwyer, 1989). Despite this, on Nightingale's return to England in 1860, she was considered a heroine (Freidson, 1970) and consequently nursing received national recognition. The increased public status led to increased funding and the first tentative steps toward nursing professionalisation and the establishment of the first nursing school in 1861 (Freidson, 1970; McMillan & Dwyer, 1989; Stuart, 1981).

Following the international recognition that Nightingale received and the formation of the nursing school, nursing was afforded an improved public status on a global scale. This

provided the foundation and opportunity for other nursing leaders such as Lillian Wald, Loretta Ford, Janet Geister, Mabel Staupers, Isabel Stewart, and Lucy Osburn to make their mark. Each of these pioneers provided important elements in the professionalisation of nursing such as, establishment of public health reforms, equality in education, expanding community health services, developing nurse leaders, and autonomous practice (Cook, 1995; Fondiller, 1995; Hektor, 1995; Mosley, 1995; Mrayyan, 2005).

The next section will build upon the evolutionary changes seen in nursing from its subservient, submissive beginnings. How this led nursing to aspire for higher status, creditability and recognition moving from semi-profession to profession will now be considered.

Transition of nursing from semi-profession to profession

Nursing in Australia has been undertaking a close examination of its professional characteristics for many decades. An investigation was first formally undertaken in 1943 by the Kelly Report that recommended better education and training, and higher salaries be offered to trained nurses (Reid, 1994). Nursing traditionally was undertaken in a hospital using an apprentice style of T&L linking classroom theory with ward-based internships under the direct supervision of ward sisters (Covert, 1917; Jacobs, 2006; Keogh, 1997; McMillan & Dwyer, 1989; Madsen, 2003). In reality however, it was medicine that had control of the delivery and core curricula content, not nursing (Forsyth, 1995). Ashley (1918, cited in Ruby, 1999) noted that “Hospitals were controlled administratively by physicians who became the overseers of nursing practice and education” (p. 23). Other curricula issues were raised by Russell (1986, cited in McMillan & Dwyer, 1989) who described that the nursing curriculum had in fact remained unchanged for the best part of 30 years. In 1978 the Sax Report recommended that hospital-based pre-registration nursing programs should be upgraded and amalgamated where possible with tertiary institutions (Sax, 1978).

The 1960-1980s was a time of deep professional turmoil that resulted in industrial and historic change for the nursing profession (Forsyth, 1995; Lusk et al., 2001).

Educationally, hospital based training programs often found it difficult to provide adequate support for study or integrate theory with practice, and education often played second fiddle to operational requirements of the hospital (McMillan & Dwyer, 1989). Nursing students were often viewed as a cheap labour pool for hospitals. Despite the professional identity afforded by the knowledge, skills, and attitudes gained in this process, the educational problems created professional turmoil by increasing the division of labour. It also emphasised poor wages and conditions for nurses which led to increased militancy and many years of industrial campaigns (Bloomfield, 1999) culminating in stronger, better organised, and more vocal lobbying to governments.

Prior to 1987, nursing education in Australia was provided by advanced technical colleges or other vocational organisations (Yam, 2004). With the abolition of the binary system during the Dawkins' era in the late 1980s, the nursing education sector transferred and upgraded its courses to the Higher Education arena (Reid, 1994). The Australian Federal Government approved the full transfer of nurse education from hospitals to the Higher Education sector, a move which was to be completed by 1993 (Fleming, 2008; Reid, 1994). Reid (1994) noted, "Nurses wanted their profession to enter higher education ... because higher education had become the hallmark of professional status" (p. 9).

The move to university-based education provided the nursing profession with an opportunity to develop a specialised body of knowledge, distinct from medicine that served as the most important move towards national registration, autonomy, self-governance, academic status, course accreditations, and competencies (ACAP, 2009d; Jacobs, 2006; Miers, 2002; Mrayyan, 2005; Reid, 1994). Other benefits of transferring nursing education to Higher Education environments noted by Wynd (2003) were that, "nurse researchers are asserting a stronger base for knowledge and practice, and the science of nursing knowledge is achieving high marks with the receipt of increased federal and private funding support" (p. 252). The then Federal Minister for Health, Neal Blewett outlined a range of benefits that this would bring to the nursing discipline (1984, cited in Reid, 1994):

First of all, it will provide a better educated and more flexibly trained profession. Secondly, it will create greater employment opportunities for fully trained nurses. Thirdly, it will bring occupational and vocational benefits, particularly to women. Fourthly, it will certainly help to underwrite the status of nursing as a major profession in the health care field (p. 9).

In Yam's (2004) descriptive paper on nursing professionalisation, she made the following comments on why formalisation of education at a tertiary level was important:

Through university education and exposure to esoteric knowledge and complex skill, members of the profession can tighten the boundaries between themselves and others. It also creates many forms of professional power in society and the workplace. At the entry level, it closes all other avenues of entry to that occupation if the licence to practices in this field becomes obtainable only by completing an accredited course of tertiary study. This social closure restricts resources and collegiate memberships to those holding a licence that is currently registered, and allows the occupation to retain its monopoly of service in society (p. 979).

The formalisation of pre-registration nursing programs through Higher Education can be seen as a critical point in nursing professionalisation and consequently to have an impact on day-to-day work practices (Heath, 2002; Reid, 1994; McMillan & Dwyer, 1989). The formalisation process has not been without controversy because during the transition period, the dual systems of qualification created some tension between registered nurses, enrolled nurses, and nurse aides (Reid, 1994). Courses' being taught at universities was seen as modernising nurse education, providing clearer relationships between curriculum and graduate attributes, and ultimately providing greater learning and independent clinical practice (Mrayyan, 2005; Reid, 1994). This notion was reinforced by Ruby (1999) who stated, "Some lesser-known, yet creative, forces in nursing education history were dedicated to the concept that for nursing to become a profession and meet the needs of a modernizing society, education had to be provided in a university" (p. 24). In Marles' (1988) study, she argued that greater nurse autonomy and professional identity would be a clear outcome of moving nursing education to the Higher Education sector.

Despite the increased knowledge gained in the newer programs, some groups within the nursing discipline are still opposed to nursing moving towards full professional status. Such attitudes and motives hark back to the Nightingale system and oppose nursing being conceived as a nationally organised, knowledge-based, registered occupation (MacDonald, 1995; Witz, 1992). This opposition was highlighted by Fitzgerald (cited in Carter, 1994) who noted:

For a long time, nurses have taken a subservient position within the health care profession, it will take a long time to alter this attitude, but as long as nurses believe it is the proper order of things they are unlikely to bring about change (p. 369).

Hence another barrier to professionalisation comes from nurses themselves: some are simply not willing to assume either responsibility for professional development or accountability for working towards autonomous practice. Their reluctance may be due to the levels of uncertainty surrounding the required educational standards; the perceived difficulties associated with these changes; and ultimately what medical control or medical dominance would be gained or lost in doing so (Clinton, Robinson, & Murrells, 2004; Forsyth, 1995; McMillan & Dwyer, 1989; Moloney, 1986; Robinson, Murrells, Hickey, Clinton & Tingle, 2003; Wynd, 2003).

Nonetheless, the transition of its training to Higher Education was an important stepping stone in nursing's progress towards professionalisation in Australia. Richard Hall's (1967) Professional Inventory (PI) has been widely used to identify a vocation's status (Wynd, 2003). According to the PI there are a number of characteristics that must be in evidence before nursing might be considered a profession:

- i) Use of the professional organisation
- ii) Belief in self-regulation
- iii) Belief in public service
- iv) Sense of calling
- v) Autonomy.

Most professional characteristics in the PI (i-iv) have been achieved by nursing through a variety of processes. For example, national and state registration and regulation bodies have provided powerful political support, establishment of a code of ethics, standardised curriculum, competencies, graduate attributes and employability skills and publicly a well-respected health care discipline (Ellis & Hartley, 2001; Heath, 2002; Keogh, 1997; Reid, 1994). Relating to this last point, it was not until the 1970s and early 1980s where the image of nursing and its public perceptions were first examined as was international decline of the sexual division of labour. It was from this point onwards that nursing used political leverage to undertake its pursuit of professional status which it has successfully done to a large degree (Ellis & Hartley, 2001). Nurses now possess diverse clinical and non-clinical roles within the complex health care system, such as nurse practitioners and practice nursing with general practice clinics (Goss, 2010). One example of this political influence has recently emerged with the nursing profession seen as one option in assisting in the chronic shortage of general practitioners in rural and remote regions of Australia (Maher, 2008). The final characteristic of *autonomy* seems to be the most problematic.

For professional autonomy to be effective, it must be underpinned by a unique body of knowledge. Nursing possesses a defining body of knowledge through the development of a discipline-specific curriculum based upon research and theories within the nursing discipline itself. It does not rely on the social or biomedical sciences as its core body of knowledge to reach professional autonomy (Ellis & Hartley, 2001).

Secondly, nursing has successfully negotiated within the confines of bureaucracy and the hospital system, division of labour and medical dominance through political and professional bodies such as the Royal College of Nursing and Australian Nurses Federation. In contrast to medicine (concerned with diagnosis and treatment), nursing is concerned with the *caring* and general well-being of health-related situations (Jacobs, 2006). It is therefore autonomous in practice (Forsyth, 1995; Jacobs, 2006; Mass & Jacox, 1977; Willis, 2009a). Medical monopoly or dominance over nursing practice is deep-rooted as noted by Bingham (1979, cited in Jacobs 2006), “Dealing with physicians,

the attainment of autonomy for nursing has been an implied goal within the nursing profession since the days of Florence Nightingale” (p. 131).

The next section will examine the evolutionary changes in the physiotherapy discipline in its quest of gaining professional status.

Cognate Case Study #2: The Professionalisation of Physiotherapy

Overview

We have seen that medicine and nursing enjoy unique status as professions. In describing the Australian health workforce, the majority of its workers are divided into three categories: nursing, medical practitioners, and allied health. Physiotherapy falls into the last category. As a group, allied health is represented by the Allied Health Professions Australia [AHPA] which is a national peak body that liaises between associations and lobbies government bodies (AHPA, 2008). Currently, the AHPA represents 15 professions:

- Audiology,
- Dietetics and Nutrition,
- Exercise Physiology,
- Medical Radiation Science,
- Occupational Therapy,
- Orthoptics,
- Orthotics and Prosthetics,
- Pharmacy,
- Physiotherapy,
- Podiatry,
- Psychology,
- Social Work,
- Sonography,

- Speech Pathology, and
- Optometry.

Several common features characterise each of these professions including university-based education, professional associations, professional accreditation of education programs, and self-regulation and/or registration. Professional membership is gained by having a direct role in health care, either private or public sectors, though medicine, nursing and unions are excluded (AHPA, 2008).

Physiotherapy provides us with an illuminating example of how professional status can be achieved. Currently it enjoys a mutually respectful relationship with medicine, nursing, and the other allied health group professions. Professionally it is one of the few health providers that enjoys “first contact practitioner” status, which means it does not require patients to first get a doctor’s referral before they can be seen. Educationally, practice depends upon successfully completing one of the most demanding university qualifications. How physiotherapy managed to develop into a high status profession may provide paramedics with a blueprint for its own professional development.

In Australia and internationally, the physiotherapy discipline has been considered a profession for some time (Bentley & Dunstan, 2006; Higgs, Hunt, Higgs, & Neubauer, 1999; Higgs, Refshauge, & Ellis, 2001; Johnson & Abrams, 2005; Sparkes, 2002; Struber, 2003), holding a position of prestige among other allied health care workers and public perceptions (Struber, 2003). Similar to nursing, physiotherapy has undergone a significant transformation in its progress from occupation to semi-profession to full profession, although taking a slightly different approach in shifting its subordinate position away from the medical profession and over-arching medical dominance (Martyr, 1997). Physiotherapy first emerged from its original occupation, massage therapy, in the late nineteenth century (Bentley & Dunstan, 2006; Chipchase et al., 2006) and it was these massage therapists who were instrumental in the formation of the physiotherapy discipline in Australia (Twomey & Cole, 1985, cited in Chipchase et al., 2006).

Massage and later electrotherapy, exercise therapy, remedial gymnastics, therapeutic exercise, and physical therapy were all seen as respectable complementary therapies by the medical profession (Bentley & Dunstan, 2006). It was acceptance by the medical profession that assisted the first official massage education program being approved in Victoria in 1906 (Bentley & Dunstan, 2006; Chipchase et al., 2006). In the 1930s the term physiotherapy became more widely used than massage (Bentley & Dunstan, 2006; Chipchase et al., 2006), reflecting the progression towards a respectable medical practice, culminating in the professional identity of the Australian Physiotherapy Association (APA) as it is known today. The Australian physiotherapy profession is considered to be the most prestigious and oldest allied health profession of all the health science disciplines (Struber, 2003).

Physiotherapy (or physical therapy as it is described in countries such as the United States) tends to be broadly defined. The World Confederation of Physical Therapy (2002, cited in Struber, 2003) defines physiotherapy as “services to people and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan” (p. 1).

The Australian Physiotherapy Association (2000, cited in Higgs, Refshauge & Ellis, 2001) on the other hand defines physiotherapists as a group of people who treat:

... people with musculoskeletal, neurological and cardiopulmonary problems. Treatment interventions are based upon sound principles of clinical reasoning, decision-making diagnosis and evidence based practice. They include thorough assessments before, during and after treatment, documentation of the assessment findings and the interventions applied, and evaluation of the outcomes of these interventions (pp. 80-81).

The physiotherapy discipline seems to use broad definitions and descriptions in order to be adaptable to changes in health systems (service delivery), health care (population health) and other global factors such as the globalisation of sport where physiotherapists are prominent in the management of elite athletes and professional sports teams. Looking

slightly ahead, paramedics as a discipline should consider physiotherapy's approach in defining itself, particularly when paramedics have a vast array of skills, clinical knowledge, and breadth of service delivery (e.g., volunteer first aiders to independent paramedic practitioners).

Physiotherapy's move to professionalism has its basis in the science-driven developments that erupted in the early twentieth century (Bentley & Dunstan, 2006; Struber, 2003). At the same time two key changes to the structure of the discipline provided the impetus for physiotherapy ultimately gaining full professional status (Higgs et al., 1999; Twomey & Cole, 1985). Firstly, the acceptance of physiotherapists as first contact practitioners within the health system gave it public status. Secondly, the transfer of physiotherapy education to Higher Education (Galley, 1977; Higgs et al., 1999; Twomey & Cole, 1985) gave it autonomy and self-control. The circumstances and importance of these two key changes will be further discussed within the context of the evolution of physiotherapy as a profession.

Evolution of physiotherapy as a profession

As outlined above, the physiotherapy field emerged from massage therapy. It should also be pointed out that physiotherapy/physical therapy has some role and practice overlap with the nursing profession which often undertook some of these roles during the first several decades of the twentieth century (Bentley & Dunstan, 2006; Kell & Owen, 2008). This practice overlap conveyed a message of professionalism that may have bettered the public perception of both disciplines given the continued presence of scientifically unproven health care practices often referred to as 'quackery'. 'Quackery' was widespread throughout western civilisation at the turn of the century and was an important historical factor in the medical discipline seeking its own professionalisation processes. Furthermore during the period between 1900-1940 many medical breakthroughs occurred including: viral and anti-bacterial discoveries, immunisations, and advances in surgical techniques and anaesthetics (Aiello, Larson, & Sedlak, 2008). A further factor in medicine's professionalism was the rise of evidence-based medicine and the integration of scientific practice. All these factors also had flow-on effects for

nursing and physiotherapy who by this time had positioned themselves under the medical hierarchy and were able to implement practice that was guided by science and evidence.

The gender division of labour that dominated the nursing profession seems less clear in the physiotherapy sector. Kell and Owen (2008) suggest a gender division existed, but according to Martyr (1997) this is not completely accurate. Martyr (1997) states, “There is popular belief among physiotherapists in Australia that their profession has always been exclusively female-dominated. This is not quite correct: organisational structures were actually male-and medically-dominated, but most of the rank-and-file membership was female” (p. 9). Nevertheless the gender divisions of labour assisted the establishment of physiotherapy’s own professional identity and hierarchy by accepting subordination (handmaidens) to the medical profession (Kell & Owen, 2008; Martyr, 1997). Kell and Owen (2008) added that, “By aligning themselves with medicine, the founders hastened the advance of physiotherapy in the professional ecology” (p. 161).

“It is quite clear that, by the turn of the [last] century, massage practice in major eastern population centres [Australia] was ready and willing to be subject to the control of the medical profession” (Martyr, 1997, p. 9). Seizing the opportunity, physiotherapy strategically associated itself with the medical profession. During the early part of the twentieth century, massage closely aligned itself with orthodox medicine and escaped the quackery stigma often bestowed to others not practising traditional medicine (Martyr, 1997). The advantages of associating with the medicine profession outweighed the benefits of working independently. The medical profession had by this time consolidated its control of the provision of health care (Martyr, 1997). Interestingly this period of political and strategic manoeuvring proved to be the catalyst for the formation of the Australasian Massage Association (AMA) and subsequently led to the development of the first accredited massage education program (Bentley & Dunstan, 2006; Chipchase et al., 2006; Martyr, 1997).

As with the nursing and paramedic disciplines, several world and national events also contributed to moving physiotherapy along the professionalisation continua. These

included World War I, World War II, an Australian outbreak of poliomyelitis throughout the 1930-1940s, tuberculosis (1950s), and more patients surviving traumatic accidents (e.g., traumatic brain injuries, spinal cord injuries, amputations) (Bentley & Dunstan, 2006; Galley, 1977). Many masseuses enlisted for military service in times of war (particularly after World War II) thus creating a shortage and consequently a greater demand for massage therapists (Chipchase et al., 2006). The poliomyelitis outbreak and knowledge required for its management was a major influencing factor in improving educational standards and curricula; leading to an increase in length of the diploma education program from 2 to 3 years (Chipchase et al., 2006). It also strengthened the professional bond and respect between medicine and physiotherapy, resulting in medicine affording physiotherapy professional creditability and recognition (Bentley & Dunstan, 2006; Kell & Owen, 2008).

The Australian physiotherapy profession, like other allied health disciplines, has evolved using similar educational methods such as hospital-based teaching and an apprentice-style approach that relied heavily on medicine supporting its clinical practice (both in hospitals and universities) (Chipchase et al., 2006; Kell & Owen, 2008; McMeeken, 2008). Physiotherapy in Australia now offers entry-level educational programs at the undergraduate Bachelors (first offered in 1959), masters, and clinical doctorate level as well as postgraduate specialised programs. The base qualification is a Bachelor degree on offer at twelve universities in Australia (Chipchase et al., 2006) and is well-recognised nationally for its demanding theoretical and practical content and standards (Higgs et al., 1999). The transition to Higher Education has made significant contributions to its unique body of knowledge, which in turn has informed and improved clinical practice and patient outcomes. Sparkes (2002) noted that “physiotherapists have become responsible for their own ‘clinical reasoning’ – the assessment, treatment planning and evaluation of their own caseloads. Credit for this, however, has been largely placed upon the advent of the degree level program of study” (p. 484).

As outlined in the previous chapter, the Vocational and Higher Education sectors underwent significant changes following several Federal Government inquiries and

reforms. The Martin Committee's Report (1964-1965) established the binary system and John Dawkin's Green Paper (1987) established the Unified National System. These developments provided significant milestones for the physiotherapy profession and its education and training developments. Following the recommendations of the Martin Report, physiotherapy education was provided by Colleges of Advanced Education (CAEs), as were other health care disciplines such as nursing and occupational therapy (Bentley & Dunstan, 2006). Bentley and Dunstan (2006) succinctly summarise the reasons for the Report's recommendation that physiotherapy be delivered by CAEs:

The Martin Report recognised the problems that beset not just physiotherapy, but many of the other paramedical therapies: inadequate training facilities, the shortage of trained teachers and the loss of trained personnel by the gender balance being heavily weighted to women who were more likely to leave the profession on marriage. However, it also expressed doubts of the inclusion of physiotherapy and other paramedical practices as university courses feeling it would raise the standards in the profession beyond the level required for effective performance (p. 163).

These recommendations saw mixed reactions from some physiotherapy education providers, particularly at universities such as the University of Queensland, which had a close alliance and intellectual input from medicine and the behavioural sciences (Bentley & Dunstan, 2006; McMeeken, 2008). Despite the proposed recommendations, division of labour still existed through the health care hierarchical status headed by physicians, both in practice and education. In 1975 the clinical practice subordination to medicine and opportunity to practice more autonomously was first publicly suggested (Bentley & Dunstan, 2006; Galley, 1977; Struber, 2003). In 1976, the APA rescinded the ethic requiring referrals from a medical practitioner (Chipchase et al., 2006). The practice was referred to as '*first-contact practitioner*' and was the first move towards a more autonomous, holistic, and community-based scope of physiotherapy practice (Struber, 2003). The opportunity for independent practice in physiotherapy gained significant momentum nationally. The APA seized the opportunity and directed its efforts in a unified approach to achieving a stronger national identity in its quest for greater autonomy and extension in its clinical boundaries of practice (Bentley & Dunstan, 2006).

This approach was successful; Wong, Galley, and Sheehan (1994) suggest that medical practitioners subsequently actually expected greater levels of autonomy from physiotherapists. Higgs et al. (2001) noted that physiotherapy clinical autonomy exists, “In some countries, Australia and Canada for instance, professional autonomy and the right to first contact has been established” (p. 86).

Following the abolishment of the binary system during the Dawkins’ era all physiotherapy teaching in CAEs ceased in 1991, and a new era of education and training emerged for physiotherapy with all undergraduate programs being provided by Higher Education (Chipchase et al., 2006). Combined with the move to university based education, the 1990s also saw the advancements in medical informatics and technology diagnostics. Together these factors provided physiotherapy with an opportunity to develop a greater body of knowledge, research culture, and clinical practice based on scientific standards validated by rigorous research (Struber, 2003). One example of this clinical scholarship has been the shift towards patient-centred practice: the shift away from manual physiotherapy techniques to therapeutic exercise. The move to Higher Education offered the physiotherapy discipline the ability to strengthen its right to be classified as a profession. It also provided the opportunity for academic administrators to closely examine and standardise entry-level course curriculum, to benchmark and accredit programs, operationalise graduate attributes, and prepare students for clinical practice and lifelong learning (Higgs & Hunt, 1999; Hunt, Adamson, Higgs, & Harris, 1998).

Whilst the transition from Vocational Training to the Higher Education arena has strengthened physiotherapy’s professional status, other organisational dilemmas have emerged (Struber, 2003). Chipchase et al. (2006) noted “Challenges facing university educational programs today include curriculum development to incorporate the ever changing and expanding scope of practice of physiotherapy to ensure graduates have entry-level competencies for immediate registration to practice as first-contact practitioners” (p. 6). Despite the close investigation and analysis of physiotherapy education and training in the Higher Education sector, the profession still suffers from a

relatively high attrition rate post-graduation that has been estimated to be over 20% annually (McMeeken, 2008). Potential contributing factors to the high attrition rates include lack of financial incentives (e.g., limited earning capacity), lack of perceived career structure and career pathways (e.g. specialisation pathways), limited advances in treatment techniques, stressful and rigid work environments (e.g., acute care hospitals), job dissatisfaction, and lack of interest (Struber, 2003).

Another concern raised within the physiotherapy discipline is the mismatch between the relatively few undergraduate physiotherapy programs and the growth required for the health workforce (Chipchase et al., 2006). This mismatch has led physiotherapy to investigate its disciplinary boundaries and examine other service delivery alternatives such as physiotherapy practitioners who are able to prescribe and undertake some minor surgical interventions (McMeeken, 2008). Struber (2003) noted that “Current developments in health service delivery models, with an increased emphasis on skill mixing and a team approach are anticipated to lead to further shifts in the boundaries” (p. 2).

As outlined above, the transition from vocational education to the Higher Education sector in itself was a major factor in physiotherapy achieving professional status as was the notion of first-contact practitioner roles that emerged in the late 1970s (e.g., some physiotherapists work in emergency room departments and will see clients initially before they are seen by a physician). This transition provided the profession with an opportunity to pursue a positivist approach that ultimately aided in the development of a specialised body of knowledge along with clinical practice autonomy, leading to greater validation, respect and confidence from the medical profession, other health care practitioners and the community at large. The development of its own body of knowledge and clinical practice autonomy clearly distinguishes physiotherapy from other health professions, such as occupational therapy, social work, chiropractic and osteopathy (Higgs et al., 2001). These professional traits have also formed the basis in the establishment of self-regulation, integration of evidence-based practices, professional association, improved

status among the health professions, and an improved public perception (McMeeken, 2008; Turner, 2001).

In 1964 Harold Wilensky developed a model to achieve professional status based upon Medicine, Law and Ministry. The Wilensky model (Professional Inventory (PI)) has been referred to in the physiotherapy literature (Blattel-Mink & Kuhlmann, 2003; French & Sims, 2004; Kell & Owen, 2008) and has the following characteristics:

- i) Unique body of knowledge and technical competence,
- ii) Professional association,
- iii) Self-regulation,
- iv) Autonomy,
- v) Altruistic and
- vi) Service to public.

According to Wilensky's PI physiotherapy is a legitimate fully fledged profession because it has successfully achieved each of the six professional characteristics. Characteristics i - iii) have been demonstrated through the move to Higher Education, the introduction of first-contact practitioner roles and the surge of research-led practice. This has undoubtedly propelled physiotherapy along the professionalisation continuum to full professional status (Higgs et al., 1999; Turner, 2001). Of note, physiotherapy is continuing to push its disciplinary boundaries to expand and define its identity as a profession through activities such as political lobbying (e.g., for National health insurance rebates), extended scope of practice, and a formalised and accredited specialisation pathway within the profession. In addition the National Physiotherapy Association has a well-established accreditation program for new university education programs as well as reaccreditation of existing programs, acting as a gate-keeper in this capacity.

While not necessarily questioning the notion of physiotherapy being a profession in Australia, some authors have nevertheless been critical of the underpinning research

adding to the distinct body of knowledge in an international context (Turner, 2001). Others have argued that physiotherapy has in fact developed a significant body of knowledge not only in musculoskeletal injuries, but also in areas such as health and well-being, health promotion, and preventive treatments (Bentley & Dunstan, 2006; Higgs et al., 2001). In doing so, it has earned professional respect among other health care agencies and is also viewed by the public as being legitimate, trustworthy and having high clinical standards. In summary, physiotherapy has been able to locate, establish, and carve out a niche area within health care, independent and not in direct competition with medicine (Mahony, 2003), and thus characteristics iv - vi) are recognised.

The next segment of this chapter will illustrate where the paramedic discipline currently fits on the professionalisation continuum. Informed by the previous examples of nursing and physiotherapy, the next section will outline current shortcomings and what needs to be undertaken to move the paramedic discipline towards becoming a full profession.

The Australian paramedic discipline: what are our shortcomings in developing as a profession?

The final section will outline the gaps that the Australian paramedic discipline currently faces in its quest to become a profession. Using the previous examples of nursing and physiotherapy, this section will outline and examine the ‘professional status’ of the Australian paramedic discipline. This analysis will provide an overview of what is needed, and how this might be achieved by the paramedic sector.

As described above, for almost a century a range of scholars have postulated what it takes to become a profession and what constitutes a profession. Given the range of characteristics that have been put forth, there appears to be consensus with certain professional traits (e.g., altruism, body of knowledge, code of ethics, etc). One theory that encompasses these consistently cited traits is Greenwood’s (1957) model that includes the following five attributes:

- i) Unique body of knowledge,
- ii) Authority,
- iii) Community sanctions,
- iv) Ethical codes, and
- v) A professional culture.

In her examination of the professional status of paramedics Reynolds (2004) uses Greenwood's inventory to argue that the occupation cannot yet be termed a profession because in general there is no recognised authority and no distinct and uncontested body of knowledge. In contrast, both nursing and physiotherapy tick all the boxes. Two comments may be added. First there is no reason to assume that anything has changed in regard to the two 'missing' characteristics since Reynolds's paper. Second a convincing argument could be mounted that nationally paramedics are yet to develop a consistent professional culture. A professional culture, it is argued, is as much part of the professionalisation process as it is of a profession. Paramedics need to believe themselves to be and to act as professions before they can be acknowledged as such.

The focus of this section will compare and contrast with the nursing and physiotherapy disciplines and examine what they did to achieve their professional titles, thus providing a reference point for the paramedic discipline in its quest of becoming a profession.

In comparing the professionalisation trajectories of the nursing and physiotherapy disciplines, the major factors in both fields in achieving professional status stemmed from their alliance and subordination with medicine and subsequent acceptance of the divisions of labour. This then allowed both fields opportunities to develop specific occupational niches or areas of profession-specific 'turf'. The transition from vocational education to the Higher Education sector provided the context for specific and unique bodies of knowledge and research-led practice to be developed for both fields. Furthermore this *unique knowledge* also contributed to the establishment of greater autonomy and extended scope in clinical practice, such a nurse practitioner or physiotherapy specialist.

The nursing and physiotherapy professions also achieved national registration and regulation through national accreditation and professional associations. These associations have produced accredited education programs with national curriculum standards and clinical practice consistent with industry in each respective state or territory. Both professions were also able to regulate the admission and evaluation of foreign trained nurses and physiotherapists into the country for migration purposes. In other words, they were able to control their *own* scope of practice and *own* body of knowledge. The formation of professional associations was another critical factor in the professionalisation process: political influence and lobbying powers. These influences worked both explicitly and implicitly on governments, medicine, other allied health professions, service payers (e.g., private health insurance companies in the case of physiotherapists), and the general public. Moreover, they developed a professional culture and recognition amongst its members, which further reinforced the respect and trust it projected to other disciplines and the broader public. These influences also instigated regular media releases and other reports effecting public policy and health care provision. Another example of involving the media to promote the public knowledge of the two professional disciplines is the professional associations sponsoring ‘national physiotherapy week’ and ‘national nursing week’. Both professions voicing concerns (regarding reduced clinical independence) and opposition to the proposed single registered body by COAG demonstrated a more recent example of this ‘professional influence’.

The development of a unique body of knowledge and establishment of a professional association that provides self-regulation is evolutionary; however having political influence is not mutually inclusive of these two features. If the paramedic discipline was to learn one thing from the socio-historic developments of the nursing and physiotherapy professions, it would be the need for the establishment of a national body or association that was an active and unified ‘voice’ in terms of both political and strategic actions, as well as an education program accreditation system (ACAP, 2009d). For example, why was there no voice for the paramedic discipline when there is public debate and discourse on how to assist in the national shortage of General Practitioners in rural areas, or the

continued issues surrounding indigenous health? Why is there no national professional accreditation body for new paramedic education programs and re-accreditation of all existing programs, particularly since some university paramedic courses have been running for almost ten years?

Despite the establishment and development of the CAA (which is a peak body and corporate identity for the discipline) and the ACAP (which provides some governance and national benchmarks), neither of these bodies, until very recently, provided the strategic, unified, powerful ‘voice’ that the paramedic discipline urgently needs.

A good example of being ‘heard’ by health care colleagues and the public would be the associated issue with work position title terminology. Anecdotally it would seem a significant proportion of the Australian public and health care workforce would still view paramedics as ‘*Ambulance Drivers*.’ Whilst the title of Ambulance Driver was suitable in the period prior to the 1970s (Howie-Willis, 2009), the notion of simply driving patients to hospital without appropriate care is not reflected in today’s expectations. Phillips (2007) adds, “Sadly, the profession is named for the vehicle that conveys the practitioner and patient rather than reflect the knowledge and skills of the operator” (p. 1). Another example of being ‘heard’ by national health bodies (such as the National Health and Hospitals Reform Commission) has been the recent decision to change the title of the Australian College of Ambulance Professionals to either i) *Paramedics Australasia*, or ii) *Australasian College of Paramedics* (ACAP, 2010c).⁹ This reflects one of two things. Either the ACAP board recognise that calling themselves professionals does not automatically equate to being a profession, or the new title will provide better representation of contemporary paramedic practice to external stakeholders such as governments and other lobby groups.

The next section will examine the first (professional authority) of the two gaps in Greenwood’s PI faced by the paramedic discipline and will provide an overview of where the discipline is in relation to national registration and self-regulation.

⁹ The new title Paramedics Australasia was officially endorsed by ACAP on 25th February 2011.

Can paramedics achieve national registration and regulation?

The paramedic discipline now offers rigorous T&L approaches across the 14 programs offered at Australian universities, in turn creating pressure for the discipline to be recognised as a profession. The maximum benefits of a new paramedic education system to a national audience will be severely limited without two features – *National Registration and Regulation* (ACAP, 2008a, 2008d, 2010d; Patrick, 2007).

Registration, in the context of health care professionals, is the process of licensing and registering practitioners to practice at a uniform national standard of care (CAA, 2008c; Productivity Commission, 2005). Registration aims to protect the public by ensuring a measure of quality assurance is provided by each profession in their provision of clinical services to members of the public (Edburn & Bendall, 2010). It also provides a framework and accreditation guidelines that can inform education and training development to achieve national consistency (ACAP, 2009d; CAA, 2008a).

The Australian paramedic discipline has never been registered at the state, territory, or national level despite recent lobbying efforts, and a growing number of privately owned paramedic organisations (ACAP, 2008c; Burgess et al., 2003; Cannon & McDonell, 2008; Eburn & Bendall, 2010; Prass, 2008). It seems unlikely in the near future especially when the CAA (2008c) has noted “there will be no rapid progress in advancing the issue of registration of paramedics” (p. 8). Furthermore in the review of their ambulance service, the New South Wales Government (2008) did not perceive any major operational benefits of registration. They state:

It is likely that more momentum for registration of ambulance paramedics will ensue as the industry in Australia continues its transition from one that transports patients to hospitals to one where paramedics are recognised for the quality of healthcare provided to patients (2008, p. 92).

It is important to highlight, that despite the clear challenges that are faced by some states in Australia, at the same point in time, the New Zealand Government has recommended that its paramedic sector urgently form a national registration body. They noted:

We believe that it is essential for paramedics to be registered under the Act [Health Practitioners Competence Assurance Act 2003] and urge the industry to take the necessary steps to be considered for registration ... we recommend that work to achieve registration proceed (2008, p. 11).

Internationally, registration already exists in countries with comparable paramedic systems that have similar skill sets, educational standards, and service delivery such as the United Kingdom (UK), Canada, and South Africa or the United States (US) (ACAP, 2010d). In the UK, registration is provided by the British Paramedic Association College of Paramedics which is legislated under the Health Professions Order 2001 (Donaghy, 2008; Whitmore & Furber, 2006; Wood, 2000). In Canada, paramedic registration and national occupational competency profiles is provided by the Paramedic Association of Canada (Symons & Shuster, 2004). In the US, registration is maintained by the National Registry of Emergency Medical Technicians and national curricula standards are maintained by the National Highway Traffic Safety Administration (Stoy & Margolis, 1998). New Zealand is the only other comparable paramedic system without national registration, but as highlighted above, with the support of its National Government, this should be achieved in the very near future (Kedgley, 2008). It would appear that Australia has not kept up with other comparable national jurisdictions in relation to paramedic registration.

Having professional registration has many benefits including the provision of self-regulation, quality standards, accreditation of education programs, continuing education, portable qualifications, improving public perceptions, whilst achieving positive and safe outcomes for patients (ACAP, 2009b, 2009d; Fleming, 2008; Whitmore & Furber 2006). A recent example where a paramedic was found to have forged his qualifications in his capacity as a Justice of the Peace further illustrates the risks to public safety when registration does not exist (Leys, 2010).

Whilst other allied health care disciplines such as nursing, optometry, physiotherapy, psychology, and podiatry have national registration, the majority of these emerging health professions have all justified their professional status since moving away from the medical model (Fleming, 2008; Productivity Commission, 2005) and thus can provide the paramedic discipline with a potential road map to follow in its quest to achieve professional registration.

The paramedic discipline, in its pursuit of achieving professional registration, has recently had a significant setback. The COAG has proposed that a single national system of registration be established for 10 of the health care professions (medical practitioners, nurses and midwives, pharmacists, physiotherapists, psychologists, osteopaths, chiropractors, optometrists, and dentists) by July 2010, a list that disappointingly does not include paramedics (CAA, 2008c; COAG, 2007). The disappointment of not producing a more convincing argument for inclusion is also echoed by the National President of ACAP Ian Patrick (2007) who stated “it was an anomaly that paramedics had to date not been registered as health professionals, given that the everyday clinical practices of the profession and the administration of potentially dangerous medications and interventions pose exceptional risks to public health and safety” (p.1). Whilst this national health workforce reform is seen as a way of providing standardised health care nationally and a more responsive and flexible health care workforce (COAG, 2007), it has not been without its controversy. Some of the health professions (physiotherapy, medicine, and psychology) are currently opposed to the single registration proposal as it diminishes the professional autonomy and independence of each professional body (Australian Medical Association, 2007; Ryan, 2008). Other health care professions such as occupational therapy, podiatry, dietetics and nutrition and speech therapy are similarly excluded from the proposed single national system of registration. An example of this difference of opinion regarding the national registration body is noted by the Australian Psychological Society (cited in Productivity Commission, 2005) who stated:

The concept of national registration of professions is eminently sensible ... But if this proposal suggests that there can be one national registration structure across all health professions, then ... it is both impractical and unrealistic ... There would still need to be profession-by-profession regulation structures heavily involving members of the profession within that regulatory process (p. 139).

In contextualising why the paramedic discipline is not likely to be part of the single registration proposal and why national registration is not likely to occur in the near future, one must consider how the discipline is perceived on a national scale (CAA, 2008c). Until the paramedic discipline is recognised as a distinct professional entity by the state and Commonwealth governments (as opposed to ‘Miscellaneous Health Workers’ as described by AIHW) (Fleming, 2008), it is likely that the issue of national registration will remain untenable.

The next section will now address the notion of regulation. Higgs et al. (2001) defined regulation in the following terms:

The usual purpose of regulation is to protect the public from unqualified people assuming positions of responsibility who do not have the capacity to maintain standards of care. It can also be a means of tracing and managing qualified professionals whose practice falls below acceptable standards (p. 88).

Typically, regulation occurs via two avenues: accreditation and registration bodies (Fleming, 2008). Despite the scope of regulation varying between disciplines and countries (Fitzgerald & Bange, 2007a), it does have consistent functions that include: setting minimum entry-to-practice standards, establishment of professional standards, implementation of complaints and grievances procedures, and providing transparency of standards.

As there is no national regulation system for paramedics in Australia (Fitzgerald & Bange, 2007b), attempts have been made to achieve some form of standardisation through accreditation. The CAA commissioned a trial accreditation program titled

Paramedic Education Programs Accreditation Program (PEPAP) with two universities - Charles Sturt University and Edith Cowan University (Walker, Osborne, Behrens, & Binet, 2007). Outcomes of this initial trial suggest that more formal attempts are urgently required in standardising paramedic curricula. The main objectives of this project were to investigate a sample of Australian undergraduate paramedic programs and examine the learning consistencies and standards between the programs ensuring employability skills are properly reflected in curriculum (CAA, 2009c; Walker, 2009). Despite these efforts, obtaining national educational consistency still appears to be in the distant future. A brief overview of the CAA and ACAP who provide and support governing issues such as registration and regulation will now be discussed.

The CAA was first formed in 1962 following ‘haphazard’ ambulance administration during the late 19th to mid 20th century, coupled with a quest for greater public and medical recognition (Kaye-Eddie, 1996). The CAA offers not only a national corporate identity, but also represents the ambulance organisations on other matters relating to clinical standards, clinical practice, T&L, and research agendas. The CAA’s membership encompasses all the Australian public ambulance services, as follows:

- St John Ambulance Western Australia
- South Australian Ambulance Service
- St John Ambulance Northern Territory
- Queensland Ambulance Service
- New South Wales Ambulance Service
- Australian Capital Territory Ambulance Service
- Ambulance Victoria
- Tasmanian Ambulance Service
- Ambulance New Zealand.

The CAA also deals with statutory, business, and education issues for all ambulance services in Australia, and observer status for both New Zealand (Ambulance New Zealand), and Papua New Guinea (St John Ambulance Service Papua New Guinea)

(Kaye-Eddie, 1996). The ambulance service chief executive officers provide governance for CAA with other personnel, such as heads of university departments and senior clinical/education managers from ambulance services (Howie-Willis, 2009). Commissioned positions on special interest groups or steering committees for strategic planning and development of policies and procedures are offered to select individuals. It would seem that the CAA is best placed to take the lead in establishing a national accreditation system for paramedic education programs in the Higher Education sector (Walker et al., 2007).

The advent of the CAA has played an important part in the formation of the Institute of Ambulance Officers (Australia) (30 July 1973) charged with the development of national clinical and education standards (Wilde, 1999). This national benchmarking process continues today by the CAA's National Accreditation Project Trial (CAA, 2006a; Walker et al., 2007). The accreditation trial commissioned by the CAA examined two universities that house paramedic undergraduate programs: Charles Sturt University and Flinders University. The project has developed guidelines to assist facilitation of assessment and accreditation of paramedic programs in an attempt to ensure workforce competencies are correctly reflected in the education and training programs (CAA, 2006a; Walker et al., 2007). The formation of a national paramedic education accreditation committee has since occurred providing the required leadership and governance.

The introduction of the national competencies dates back to the early 1970s when the first National Education Committee was commissioned to address the uneven standards of education and training across Australia (Fitzgerald & Bange, 2007a; Kaye-Eddie, 1996; McLeod, 1984, Walker, 2009; Wilde, 1999). In 2004 at the national CAA symposium greater momentum was demonstrated ensuring that competencies aligned ambulance services and universities with learning objectives that best met local and national expectations and requirements (Walker, 2004). It is anticipated that with regulation, quality assurance, consistency, graduate attributes and standardisation are ensured so that the knowledge and skill parameters set by industry are also then met. As qualifications

become consistent and transparent across Australia, they will provide easier transferability and mutual recognition of credentials for paramedic employees and paramedic employers alike.

At present, consistent qualification transparency does not exist between the state ambulance services, and recognised prior learning (RPL) and credit transfer in some areas are often disregarded. One example is the highest clinical qualification in New South Wales the Level 5 Paramedic, who are considered equivalent to their Victorian contemporaries who qualify as Mobile Intensive Care Ambulance (MICA) Paramedics. Despite the clear educational, training, and practice similarities, only minimal RPL is provided between each ambulance service, thus highlighting the existing inadequacies, inconsistencies, and misunderstandings that present in the current system. The alternative scenario exists between ambulance officers in Western Australia and Victoria where clinical practice is markedly different due to different standards in medical informatics and clinical governance, making the achievement of national standards and portability of qualifications a signal for enormous change and opportunity (Fitzgerald & Bange, 2007a). These scenarios should be avoided with the establishment of national qualifications based upon a set of standardised graduate attributes.

The Australian College of Ambulance Professionals (ACAP) was initially formed in 1973 as the Institute of Ambulance Officers (Australia) (Howie-Willis, 2009). The ACAP has a similar organisational structure to other medical and allied colleges (e.g., Royal Australasian College of Physicians, and Australian Physiotherapy Association) and provides governance and best practice benchmarks at a state and national level (Howie-Willis, 2009). The ACAP, whilst constitutionally independent from the CAA, still works closely with CAA on many issues and is managed by a national board with associated state branches. It represents volunteer, casual, and professional paramedics through professional policies, a code of conduct, and professional recognition (Fitzgerald & Bange, 2007a). In recent times, the college has supported the move towards registration and regulation providing support to the inaugural voluntary National Professional Recognition (NPR) Program established to improve portability of qualifications, right to

practice, and self-regulation (Marr, 2003). However, while attempting to professionalise the paramedic discipline, the program has largely been unsuccessful given its voluntary nature (Joyce et al., 2009). Whilst considered beneficial, the program does not lie within a legislative framework that is enforceable (Fitzgerald & Bange, 2007b). Despite these attempts, national regulation in a more formal sense is seen as a necessity for the paramedic professional evolution. A recent statement made by the National ACAP President, Mr Ian Patrick (2007), summarises this point particularly well:

Regulation has been viewed as a necessary adjunct in the evolution of a profession now requiring enhanced educational foundations, and with practitioners engaged in clinical roles and exercising professional independence in unpredictable environments (2007, p. 1).

In summary, Greenwood's PI suggested that in order to become a profession, the paramedic discipline requires professional authority. Professional authority is achieved by registration and regulation. Registration, regulation, and external accreditation provides quality assurance that programs are responsive and relevant to the needs of industry, the discipline, and communities. They also provide assurance that graduates are competent to practice safely and effectively as novice level paramedics (Fitzgerald & Bange, 2007a).

The final section of this chapter will examine whether the paramedic discipline can develop its own *unique body of knowledge* (the second of Greenwood's two identified gaps) and how this process has been shaped by the transition into the Higher Education sector.

Can the paramedic discipline develop a unique body of knowledge?

The progression of the paramedic discipline from a marginal-profession to a semi-profession has seen the move from stretcher-bearer to independent proactive health care practitioner (Wilde, 1999). The first ambulance paramedic course offered in 1961 signalled one of the initial steps in its move from a vocation to a semi-profession and

could be seen as the first authentic attempt at creating a paramedic-specific body of knowledge.

As Wilde (1999) and Reynolds (2004) correctly point out, paramedic education and training and its body of knowledge are simply a sub-set of medicine. Historically, paramedics could be viewed as ‘knowledge borrowers’ from other fields like medicine and nursing. Wilde (1999) also adds that “one of the problems ambulance officers have faced from the beginning is that they have not owned their own body of knowledge” (p. 103). Thus, the question remains: has the discipline developed a unique body of knowledge since its transition to the Higher Education sector, or has it simply reinforced its practical skill base and extended its scope of practice without basing it upon a unique body of knowledge (Reynolds, 2004). In other words, are skills being defined through empirically-based evidence, research scholarship and the culmination of knowledge, or are they simply being refined using a technical/behavioural approach, such as Competency-Based Training?

As outlined in the previous registration and regulation section, despite the attempts at standardising national education programs, these have been largely unsuccessful (ACAP, 2005). In 2004, paramedic education and training (in an attempt to stabilise inconsistent national learning outcomes and competency-standards) relinquished jurisdiction to the Australian Quality Training Framework (AQTF). These national standards built on the earlier work by a project team (1992) from the CAA who were given the task to ensure that paramedic qualifications fairly matched the Australian Standard Framework (Field, 1994; Kaye-Eddie, 1996). Under the auspices of the AQTF, in 2002 the National Ambulance Training Package (Diploma of Paramedical Science - Ambulance) was commissioned by the Federal Government to provide national objective competencies at an undergraduate diploma level and attempt to describe the skills and knowledge required of novice paramedic practitioners (O’Donnell, 2006; Reynolds & O’Donnell, 2009; Yates, 2009). HLT07 is a representation of the associated skills and knowledge required as a novice ambulance paramedic and currently contains 36 separate competencies at an undergraduate diploma level. The training package is used as a guide for university-

based paramedic curriculum structure and development and basic skill competencies in undergraduate programs (O'Donnell, 2006). However, as highlighted earlier, these competencies are set no higher than an undergraduate diploma level, meaning a clear incongruence exists between the competency expectations and coursework which leads to ongoing variations between university training programs (degree-based), standards and graduate attributes beyond these formative competencies.

The above training package is undoubtedly mismatched with 12 paramedic Bachelor level degrees now being offered in Australia and the current learning objectives, learning requirements and standards of the higher-level Bachelor qualification. Fitzgerald and Bange (2007a) added that “While this training framework provides a suitable structure for the VET [Vocational Education and Training] level qualifications it has not addressed the University level programs” (p. 9). Nonetheless, this package has played an important role in providing a foundational basis to basic entry-level paramedic care, allowing graduates to practice competently, safely, and efficiently as novice paramedics (Fitzgerald & Bange, 2007a). The training package (HLT07) urgently needs to be revised and updated. Creating a higher-level series of defined graduate attributes/competencies for the paramedic Bachelor level degrees is urgently required. They are essential as without them there is a potential to create unintended educational inconsistencies in what should be expected as the minimum standard for paramedic practice. These higher-level attributes must match the contemporary syllabus and curriculum within a rapidly changing health system. Some of the attributes/competencies and knowledge expectations might include: research skills, critical thinking and analysis, ethical practice, reflection, and problem-solving skills.

The curriculum mismatch, inconsistencies, and challenges are further compounded by an uncertainty of what specific graduate attributes are required for practice in the paramedic field as addressed in Chapters 1 and 2. This curriculum-graduate attribute disparity raises the question; how can the paramedic discipline truly develop a solid and unique body of knowledge, when its curriculum on a national scale is inconsistent, has no national regulation on standards, and is unclear about what specific or generic graduate attributes

are required during and following undergraduate paramedic qualifications. These very questions have also been raised by the Council of Australian Governments (COAG, 2008) in the ongoing consideration of membership to the national registration and accreditation scheme of health care professions.

There is evidence that the paramedic discipline has *some* elements of a unique body of knowledge (Joyce et al., 2009; Sheather, 2009). Reynolds (2004) stated that, “researched-based enquiry will generate new knowledge that is owned and directed by paramedics in distinguishing pre-hospital care in its own right” (p. 2). With the integration of research-led teaching into undergraduate education, evidence-based practice is now being published in peer-reviewed paramedic journals, book chapters, and paramedic-specific textbooks, thus adding to the emerging body of paramedic scholarship and knowledge (Joyce et al., 2009; Sheather, 2009). It should be noted, however, the number of paramedics with doctoral qualifications in Australia is quite small, but slowly increasing. Therefore, the responsibility for generating the discipline-specific body of knowledge falls on the shoulders of a small group of individuals.

A closer examination follows as to how fundamental changes (development of national graduate attributes, increased professional status and improved communication) are necessary before serious attempts can be made at developing a unique and discipline-specific body of knowledge. It is clear that a disconnection exists among the relevant stakeholders involved in paramedic education and training. These stakeholders include universities involved in paramedic education, providers of clinical education placements, ambulance services providing provision of prehospital health services, ACAP, ACC, Commonwealth Government, and State/Territorial Governments. This disconnection creates three major issues.

Firstly, Australian universities are not mandated to include the national ambulance competencies in their coursework programs (O'Donnell, 2006; Yates, 2009). Present undergraduate diploma competencies, whilst providing foundational skills and knowledge at a novice level, are quickly superseded (usually in the first year of study) by the higher

Bachelor level qualifications. The author concludes that the undergraduate diploma competencies become educationally incongruent since a clear linkage between learning objectives and activities cannot be achieved or matched in the final years of study, both in coursework and clinical placement learning. Therefore a new set of empirically-based national attributes needs to be developed that are beyond the national ambulance competency level and at a higher educational level than a diploma. These graduate attributes would potentially solve the notion of work-readiness versus job-readiness, as the industry expectations would match the quality of graduates.

Secondly, at present little unified advocacy at State or Federal Government level is being provided by the CAA or ACAP. Despite current potential for professional encroachment, the notion of a non-professional identity continues to create an imbalance in national education, training, and provision of standards. This uncertainty not only impacts the potential transition into extended scope of practice roles such as physician assistant and paramedic practitioner roles, but is fundamentally undermining what is defined as a *paramedic*. Other professions such as nursing, medicine, dentistry, and physiotherapy have achieved national standards, national accreditation, a sense of work-readiness versus job-readiness and fitness for practice, and a set of prescribed graduate attributes. The Australian paramedic discipline presently has none of these and is failing to achieve professional status. Therefore continued lobbying attempts at gaining professional status should be increased and maintained by the CAA, ACAP and individual members.

Thirdly, greater communication must occur between universities, ambulance services, CAA, ACAP, and state health departments to ensure employability of graduates, and that graduates have the necessary skills, knowledge, and attributes. At present, this does not effectively occur on a local, state, or national basis. The product of this ineffectiveness and uncertainty of graduate attributes is manifested by education and training inefficiencies, and reinforces the confusion surrounding work-ready versus job-ready and the notion of fitness for practice. For example, university graduates, once employed, are generally re-trained by the ambulance service that employs them over a lengthy period (often 12-18 months), creating extensive educational overlap and the potential for 'de-

learning'. Anecdotal evidence from former graduates and clinical educators from industry suggest that graduates with Bachelor level qualifications, once employed by an ambulance service, are then trained at a reduced VET sector level beyond their formative undergraduate qualification.

The de-training process demonstrates poor economies of scale particularly when many of these graduates already have a medical/health-oriented degree prior to entering their paramedic degree (e.g., nursing, physiotherapy, or occupational therapy). In other words, some students will have completed 5-6 years of health oriented undergraduate/postgraduate preparation, yet this is viewed by the paramedic industry (who employs the new graduates) as not being 'enough' to be a 'true' paramedic. Two conclusions could be drawn from this: either the students do not have 'adequate' education, or the education is not really what they 'need to know'. Therefore, the ambulance services, based on their assumptions and beliefs, have the new graduates they employ undertake further on-the-job training via a vocational philosophy. Whilst being economically impractical, this has serious educational implications. Duplication of education and training and little standardisation of training programs is leading to inconsistent levels of knowledge and practice within the industry. In turn, this could lead to potential contradictions compromising patient safety. Should the key stakeholders agree on a prescribed set of graduate attributes, they could not only inform the curriculum taught to students at university, but also produce what the ambulance industry *actually* wants and needs? This process could translate obvious economic benefits and provide a robust, responsive, and informed education system minimising the potential for unintended inconsistency in knowledge and practice. The system clearly needs a prescribed set of graduate attributes, core competencies and standardisation of curriculum. If not, this leaves the discipline at risk of i) not achieving professional status, ii) potential encroachment by other health care professions, and iii) status quo in service delivery and scope of practice.

Until universities, ambulance services, the national paramedic associations such as CAA or ACAP and state government policymakers set up an open, transparent, mutual

dialogue and agree upon a common set of desired graduate attributes or core competencies that are uniform and industry-relevant, then educational and financial inadequacies will continue to exist. In addition, a disconnect between the Higher Education sector that provides paramedic education and the state ambulance services that employ paramedic graduates will continue to exist. Given the complex and challenging context of the current Australian healthcare system and the need for alternative service delivery, the ambulance services cannot effectively offer more than it currently does on a national basis without registration, regulation, education program standardisation, and understanding the desired graduate attributes required for paramedic practitioners. The establishment of these attributes will also assist the paramedic discipline in its quest to become a *profession*, by developing a defined *standardised* and specialised unique body of knowledge based on research-led, evidence-based practice (Reynolds & O'Donnell, 2009).

Summary

This chapter has outlined the characteristics of a profession whilst also providing examples of the professionalisation process and where the Australian paramedic discipline currently fits on this continuum. The historical review and analysis of how the nursing and physiotherapy disciplines developed into professions was also examined, providing the paramedic discipline with a 'comparative roadmap' of what elements are still required in its quest to achieve professional status. In doing so, these outlined particular features such as national registration, regulation, education program standardisation, and the establishment of a unique body of knowledge all still to be achieved by Australian paramedics. It also raises the question whether the paramedic membership wants to be a profession. The one solution to these gaps is the development of a set of graduate attributes for paramedics leading to a standardised curriculum. The evolving nature of primary and public health sectors means a systematic consideration of curriculum content and how training programs will prepare graduates for the workplace. Furthermore, consideration of the professional context needs to underpin the development of an optimal education program that will allow paramedics as a discipline to meet future

challenges. It is imperative that a set of graduate attributes is developed to meet the evolving needs of the Australian health care system, the Australian ambulance services and, most importantly, ensuring community service delivery to the general public is competent and safe.

The next chapter will outline the details of the pilot study methods and results related to generating a preliminary set of paramedic graduate attributes. A working version of a prescribed set of graduate attributes will be developed and agreed upon by the relevant stakeholders. This will eventually provide the blueprint or benchmark in standardising paramedic curriculum based on these agreed graduate attributes. This process will be informed by reviewing the graduate attribute literature and comparison of international paramedic discourse. These graduate attributes will not only assist the professionalisation process (to achieve professional authority and a unique body of knowledge), but will also provide the paramedic discipline with a defined professional identity as it moves towards the proposed transdisciplinary period.

SECTION 2: The Study

Chapter 4

The Development of the Questionnaire Instrument and Pilot Study

Introduction

The previous chapter described the challenges the Australian paramedic discipline currently faces in its attempt to become a fully fledged profession. These challenges were illustrated by reviewing socio-historical models of professionalism and challenges faced by other related cognate disciplines, such as nursing and physiotherapy, and exploring how they advanced towards becoming recognised as legitimate health care professions. These comparisons have provided the paramedic discipline with a 'roadmap' of the process as well as a list of the traits and elements still required to become a recognised profession. What emerged from the previous chapter included the defining characteristics of a profession and what paramedics are yet to achieve:

- i) A unique body of knowledge, skills, and attitudes that identify it as a profession and is maintained and developed by the profession, and
- ii) National registration and regulation

The chapter then argued that the skills, knowledge, and attitudes that define the profession should align with the intended learning outcomes of the national training and accreditation programs. In essence the skills, knowledge, and attitudes of the profession ought to be the graduate attributes of the education and training programs. In this way, national registration and education program accreditation becomes the mechanism by which the graduate attributes are validated. Identification of these attributes is anticipated to overcome the current shortcomings currently faced by the paramedic discipline in becoming a recognised health care profession.

However, questions surrounding the professional state-of-play for the sector also require examination. For example, does the discipline believe it is a profession presently, or, if not, does it want to actually become a profession? Furthermore, what professional traits do we currently lack as a profession? Examination of our professional status will inform how graduate attributes can assist in the professionalisation process of the paramedic discipline. Identification, consensus, and dissemination of these graduate attributes are fundamental in addressing the professionalisation of the paramedic sector. Establishing standardised graduate attributes will assist in developing a unique profession-specific body of empirical knowledge, national registration through the provision of national accreditation, and ultimately leading to standardised paramedic curriculum for programs around Australia for the first time in its education history.

The chapter provides an overview of the three stages involved in the development of the Paramedic Graduate Attribute Scale (PGAS) which was used to investigate i) whether the paramedic membership wanted to become a profession, and ii) what were the most desirable graduate attributes for paramedic personnel. In order to answer these questions and to test the feasibility of the study and utility of the instrument, a three stage approach was adopted. The stages were:

1. Questionnaire development
2. Pre-pilot validation process
3. Pilot study

Stage one (questionnaire development) involved developing a practical and informative survey that was informed by reviewing the graduate attributes literature from paramedic and non-paramedic sources. The purpose of stage two (pre-pilot) was to provide validation, feedback, and/or refinement for the stage three (pilot study) of the PGAS. The pilot study, its methodology and findings led to the construction of the final PGAS which will be described in Chapter 5.

Stage 1: Questionnaire Development

The PGAS was developed to elicit opinions from the paramedic sector in regard to attitudes about professionalisation and which graduate attributes best suited the paramedic discipline. The process also focussed on testing the feasibility of the research process and assessing the strengths, weaknesses, and utility of the instrument (Roberts & Taylor, 2002). The pilot PGAS (see Appendix A) was structured around three sections:

Section 1: Demographics

Section 2: Professionalisation

Section 3: Graduate attributes

A brief background and rationale of why each section was included will now be discussed.

Section 1 included items such as gender, age, employment location, how long respondents had been employed, and where they lived. It was intended that this section would allow comparisons to be made with data from sections 2 and 3. In other words, were there going to be intergenerational differences given the probable differences in qualifications and experience of paramedic respondents? Were personnel from the ambulance industry likely to have different views from academic staff? And finally, given that university-based education is still quite novel in some Australian states, was this going to reveal meaningful results?

Section 2 was informed by the preceding work on professional models, the process of professionalisation, and the professionalisation roadmap elicited from the nursing and physiotherapy professions. Based on this work, and the assumption that the paramedic discipline may not yet be considered a profession, several questions addressed the professional traits. For example, unique body of knowledge, and exhibiting clinical autonomy. Other questions surrounded the idea of aligning with other professions such as nursing or medicine, and whether the paramedic discipline depends on Higher Education to achieve professional status.

Section 3 - graduate attributes was based and developed on national and international literature (Kilner 2004a, 2004b; O’Neil, 1993, 1998; Sivamalai, 2008; Spielman, Fulmer, Eisenberg, & Alfano, 2005; Verma, Paterson, & Medves, 2006; Walker, 2007), including both paramedic and other cognate health care sources. The other sources included: nursing, medicine, dentistry, occupational therapy, physiotherapy, pharmacy, and physician assistants. Undertaking a literature search of multiple health care professions ensured that graduate attributes were sourced from all aspects within the health care system, providing a multidimensional and relevant set of graduate attributes. The results of the literature search yielded 50 graduate attributes. The next step involved grouping the individual graduate attributes into meaningful conceptual categories. This process of analysis and matching allowed the researcher to construct and name five ‘professional graduate attribute’ categories (see Table 4.1) that were labelled:

1. Core Personal Attributes
2. Core Interpersonal/Communication Attributes
3. Core Education Attributes
4. Core Professional Attributes
5. Core Practical Attributes

Table 4.1: Paramedic Graduate Attributes Questionnaire (Pilot) – Section 3

CORE PRACTICAL ATTRIBUTES	
<ul style="list-style-type: none"> • 3.01 Clinical competence • 3.02 Counselling skills • 3.03 Think critically • 3.04 Good understanding of their patients’ welfare • 3.05 Practice preventative healthcare • 3.06 Integrate population-based care into their practice • 3.07 Understand their role in providing a primary care health service • 3.08 Critical thinking • 3.09 Clinical reasoning skills • 3.10 Autonomous 	
CORE PROFESSIONAL ATTRIBUTES	
<ul style="list-style-type: none"> • 3.11 Adhere to local practice guidelines and policies 	

- 3.12 Contribute to continuous improvement within the healthcare system
- 3.13 Adaptable to changes in clinical practice
- 3.14 Attempt to attain high clinical status within the healthcare system
- 3.15 Understand the role of paramedic care within the broader healthcare system
- 3.16 Operate within appropriate ethical and legal boundaries
- 3.17 Follow evidence-based practice
- 3.18 Committed to the discipline
- 3.19 Adhere to a code of ethics
- 3.20 Aware of, and regard for, professional issues such as; accountability and confidentiality

CORE EDUCATION ATTRIBUTES

- 3.21 Specialist knowledge (e.g. Practitioner or extended scope roles)
 - 3.22 Ability to learn including the ability to use reflection and learn from experience
 - 3.23 Willing to undertake ongoing education
 - 3.24 Apply knowledge of the basic sciences
 - 3.25 Respond to changes in the provision of health care due to evolving community expectations
 - 3.26 Continue to learn and to help others to learn
 - 3.27 Capacity to undertake self-directed approaches to learning
 - 3.28 Capacity for enquiry and research
 - 3.29 Theoretical knowledge
 - 3.30 Commitment to self-development
-

CORE INTERPERSONAL AND COMMUNICATION ATTRIBUTES

- 3.31 Capacity to use communication and information technology effectively and appropriately
 - 3.32 Effective written and oral communication skills
 - 3.33 Literate and numerate
 - 3.34 Good listener
 - 3.35 Accept guidance from colleagues
 - 3.36 Value the importance of teamwork
 - 3.37 Able to work in interdisciplinary teams
 - 3.38 Ability to work independently as well as a member of a team
 - 3.39 Able to provide leadership, mentoring and supervision skills
 - 3.40 Able to take responsibility for quality of care and health outcomes
-

CORE PERSONAL ATTRIBUTES

- 3.41 Selfless
 - 3.42 Trustworthy
 - 3.43 Able to see things from the patients' point of view
 - 3.44 Non-judgemental and non-discriminatory
 - 3.45 Caring and empathic
 - 3.46 Self-aware, recognising personal responsibilities and limitations
 - 3.47 Respectful and consider moral, ethical, social, religious aspects of healthcare
 - 3.48 Responsible for their actions
 - 3.49 Embrace social responsibility
 - 3.50 Culturally sensitive and have an inclusive approach to differences
-

Whilst no new graduate attributes were developed by the researcher, several modifications were made to terminology that would be more coherent and relevant to the sample group. Once the three sections were completed, a draft version was developed and formatted for review.

Stage 2: Pre-pilot Validation Process

In trialling this instrument, a variation of the Delphi technique was employed (Isaac & Michael, 1997) to obtain independent opinions from content experts, academics, educators, and researchers in paramedics and other health care disciplines. All participants were known to the researcher. A small pre-pilot study was conducted with the intention of testing the face validity and content validity of the PGAS. Face validity refers to the extent to which an instrument or test appears to measure what it purports to measure, while content validity refers to how well a scale's items represent the intended content area (Gay, 1987; Isaac & Michael, 1997; Warner, 2008). The pre-pilot study was also important for identifying and removing any measurement error, resulting from poor question wording and/or questionnaire construction (Dillman, 2007). Ten educators, researchers and content experts from cognate and non-cognate disciplines (paramedics, medicine, nursing, occupational therapy, nursing and education) were invited to complete the questionnaire in mid-August 2008.

Following agreement to participate, each respondent was provided with verbal instructions that included the purpose of the request and how the validation process would inform the pilot study. Respondents were also provided with an explanatory letter (Appendix B) that accompanied the questionnaire that provided an outline and the purpose of the study as well as a description of tasks to be undertaken. The participants were asked to comment on their understanding of the questions, the style of the questions, and overall clarity of the questionnaire. Feedback from the ten respondents was provided within a week of distribution. They were also asked to make editorial corrections and comment on the ease and the time taken to complete the questionnaire. Discussing the questionnaire proposal with colleagues, it was clear that the notion of investigating paramedic graduate attributes was well supported and that professionalisation of the

paramedic discipline was viewed as timely and relevant. Each respondent was advised that feedback on the questionnaire would be collected within two weeks of distribution.

Several changes were incorporated into the initial questionnaire based on feedback from participants. These changes included minor alterations to general appearance and structure of questionnaire. According to Roberts and Taylor (2002) attention to presentation and style of the questionnaire provides participants with confidence in the researcher's ability and encourages frankness and honesty in responses (Isaac & Michael, 1997). Further, several questions were revised based on reviewer feedback thus providing clearer understanding for participants. These changes are described in Table 4.2. The time to complete the questionnaire was found to be reasonable and not too challenging. Albeit two participants noted that the open-ended questions added substantial time in completing the questionnaire.

Table 4.2: Summary of changes following pre-pilot process

Variable/Question	Questionnaire Section	Comment
Which of the following roles best describes your current employment?	Demographics – Section 1	Changed to: 'What is your current role?'
The Australian Paramedic sector already has a high degree of clinical autonomy	Professionalisation – Section 2	The following was added: 'in the provision of emergency health care'
Regulation	Professionalisation – Section 2	Term confusing with registration which is often used interchangeably. The term 'regulation' was deleted
International outlook, cultural sensitivity and inclusive approach to differences	Graduate attributes – Section 3	Term 'international outlook' deleted
Rigorously practice preventive healthcare	Graduate attributes – Section 3	The term 'rigorously' deleted
Clinical dexterity	Graduate attributes – Section 3	Term 'dexterity' replaced with 'competence'

Care, empathic and values life	Graduate attributes – Section 3	The term ‘values life’ deleted
Attainment of clinical prestige	Graduate attributes – Section 3	The following was adopted: ‘attain high clinical status within the healthcare system’
Understands the role of primary care	Graduate attributes – Section 3	The following was adopted: ‘understand their role in providing a primary care health service’
Take responsibility for quality of care and health outcomes at all levels	Graduate attributes – Section 3	The terms at ‘all levels’ was deleted

Given that a number of the graduate attributes were sourced from the non-paramedic literature, it was felt that providing a paramedic pre-descriptor in each graduate attribute question would assist to orient respondents. Therefore each item had the following phrase inserted prior to each graduate attribute, for example: “A professional paramedic should (be) ...” for example “*A professional paramedic should be selfless*” or “*A professional paramedic should value the importance of teamwork*”.

Other notable changes included the removal of two open-ended questions (professionalisation – section 2) asking respondents to explain why they believed the paramedic discipline does or does not exhibit the characteristics of a profession. The decision to remove these questions was based upon feedback from the pre-pilot participants and a pragmatic decision taken by the researcher to minimise the time needed to complete the questionnaire. It was also felt these responses would not add any significant new information. The other noteworthy change was the decision to change from a ten centimetre Semantic Differential Scale to a 5-point Likert-scale (1=Strongly Disagree and 5=Strongly Agree). The rationale for this decision was based upon a short time frame of entering and analysing the pilot study results and the development of the final study questionnaire which was due for dissemination shortly thereafter.

Stage 3: Pilot study

Background

An opportunity to recruit national and international leaders in paramedic education and training for the pilot study arose in early September 2008, this opportunity emerged within a funded project (Paramedic education: developing depth through networks and evidence-based research) from the Australian Learning and Teaching Council entitled 'Paramedic Network Meeting'. The inaugural meeting aimed to form a collaborative network of paramedic academics from Australia and New Zealand, for the enrichment of education and research within the discipline. There were numerous advantages of undertaking a pilot study at that time, including re-defining the hypotheses, and providing constructive feedback, and an opportunity for alterations and improvements to the main study (Borg & Gall, 1989).

Sampling/Participants

A non-probability convenience sample was used for the pilot study. This type of sampling technique is commonly used in pilot studies (Roberts & Taylor, 2002). Participants were invited from all states and territories in Australia and New Zealand. All participants had qualifications or positions directly involved in the education and training or paramedic personnel from the ambulance or health industry and/or university or polytechnic sector. Seventy-nine people confirmed interest in attending the meeting with a total of seventy-five attending on the day representing all but one state/territory from Australia. Staff from all universities/polytechnics from Australia and New Zealand that offered paramedic education programs were included. All university course co-ordinators, heads of paramedic education programs, and the majority of paramedic academics and senior ambulance educators were in present, highlighting a significant proportion of content experts were in attendance.

Instrumentation

As indicated the pilot questionnaire (Appendix A) contained three sections:

Section 1: Demographics (6 questions)

Section 2: Professionalisation (8 questions)

Section 3: Graduate Attributes (50 questions)

The pilot study questionnaire required participants to enter relevant demographic data (section 1) and rate the importance of each question from (sections 2 and 3) using a 5-point Likert-type scale (1 strongly disagree to 5 strongly agree). All questions were polarised to be positive. Section 1 asked participants about their personal and professional characteristics, while section 2 asked participants about their views on the current and future standing of the professionalisation of the Australian paramedic discipline. The third section was composed of 50 graduate attributes questions. Initially these 50 attributes were listed from 1 to 50 without sub-headings or categories. However, the researcher decided that some 'structure' or 'categorisation' be given to these attributes, rather than a long list of attributes. However, listing the attributes under categories may have generated biased answering or influenced respondent's rating of questions (Roberts & Taylor, 2002).

An optional open-ended question was offered to participants following the graduate attributes – Section 3. This question asked respondents if there were any other attributes they felt should have been included in addition to the previous 50 graduate attributes providing an opportunity to capture other common or generally agreed attributes that were unaccounted for in the literature.

Procedures

Educators and academics attending the Paramedic Network Meeting held in Melbourne, Victoria on the 4th September 2008 were informed about the study via a short verbal description and paper-based explanatory statement. Participants were informed that the questionnaire was anonymous and no identifying codes or names would be used or

collected. Following the description of the study, participants were asked to complete the 64-item questionnaire. It took respondents approximately 10 to 15 minutes to complete the PGAS.

Ethical Issues

Ethical approval was sought and received from the Monash University Standing Committee on Ethics in Research Involving Humans (SCERH). Participants were informed about the study via an explanatory letter distributed during the Paramedic Network Meeting, prior to completing the questionnaire. There were no exclusion criteria. Participants were advised of the anonymous and confidentiality nature of the study and that they could withdraw from the study prior to submitting the questionnaire. No incentives were offered and one questionnaire format was used for all participants who agreed to take part. All questionnaires were collected by an individual not involved in the study with questionnaires being placed in a cardboard drop-box. The drop-box was then given to the researcher.

Data Analysis

Data processing included the entry of all results into Statistical Package for the Social Sciences (SPSS) Version 17.0, SPSS Inc., Chicago, Illinois, U.S.A. Descriptive statistics and *t*-test or one-way analysis of variance (ANOVA) test was used to compare the differences between gender, age group, occupation, residence and length of occupation. Parametric tests were used despite ordinal level data (Norman, 2010; Wright, 1997; 2003). All confidence intervals (CIs) were 95%, $p < 0.05$ was considered statistically significant, and all tests are 2-tailed unless otherwise stated. The data were also analysed via Exploratory Factor Analysis using Principal Components Analysis (PCA) followed with Varimax Rotation.

Factor Analysis

While factor analysis has origins dating back 100 years, through the work of Pearson (1901) and Spearman (1904) the practical application of this approach has been suggested

to be in fact a modern occurrence. As Kieffer (1999, cited in Henson & Roberts, 2006) noted,

Spearman, through his work on personality theory, provided the conceptual and theoretical rationale for both exploratory and confirmatory factor analysis. Despite the fact that the conceptual bases for these methods have been available for many decades, it was not until the wide-spread availability of both the computer and modern statistical software that these analytic techniques were employed with any regularity (p. 2).

Factor analysis is commonly used in the fields of psychology and education (e, Hines, Kromry, Ferron, & Mumford, 2005) and is considered the method of choice for interpreting self-reporting questionnaires (Byrant, Yarnold, & Michelson, 1999). Factor analysis is a multivariate statistical procedure that has many purposes (Gorsuch, 1983; Hair, Anderson, Tatham, & Black, 1995; Tabachnick & Fidell, 2007; Thompson, 2004), three of which will be noted here. Firstly, factor analysis analyses and reduces a large number of variables into a smaller set of variables (also referred to as factors). Secondly, it establishes underlying dimensions between measured variables and latent constructs, thereby allowing formation of theory generation. And thirdly, it provides information about the construct validity of self-reporting scales. Nunnally (1978, cited in Thompson, 2004) adds that “factor analysis is intimately involved with questions of validity ... Factor analysis is at the heart of the measurement of psychological constructs” (p. 5).

There are two major classes of factor analysis: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Broadly speaking EFA is heuristic. In EFA, the investigator has no expectations of the number or nature of the variables and as the title suggests, is exploratory in nature. That is, it allows the researcher to *generate* a theory, or model from a relatively large set of latent constructs (Henson & Roberts, 2006; Swisher, Beckstead, & Bebeau, 2004; Thompson, 2004). Whereas, in CFA the researcher uses this approach to *test* a proposed hypothesis, theory, or model and in contrast to EFA, has assumptions and expectations based on priori theory regarding the number of factors, and which factor theories or models best fit. Based on these descriptions, the pilot study data will be analysed using an EFA approach given that there

is no suitable priori theory. As such, all results and descriptions in this chapter will follow this method.

It is important to note that factor analysis as a statistical approach is not without controversy or criticism; although according to Thompson (2004) most of these criticisms apply themselves to EFA rather than CFA. These criticisms are largely based on the subjectiveness of the results which are determined by the researcher (Henson & Roberts, 2006). Cronkhite and Liska (1980, cited in Thompson, 2004) somewhat sarcastically noted:

Apparently, it is so easy to find semantic scales which seem relevant to [information] sources, so easy to name or describe potential/hypothetical sources, so easy to capture college students to use the scales to rate the sources, so easy to submit those rates to factor analysis, so much fun to name the factors when one's research assistant returns with the computer printout, and so rewarding to have a guaranteed publication with no fear of nonsignificant results that researchers, once exposed to the pleasures of the factor analytic approach, rapidly become addicted to it (p. 106).

Tabachnick and Fidell (2007) also address the limitations of EFA, who note that "Decisions about number of factors and rotational scheme are based on pragmatic rather than theoretical criteria" (p. 611). To limit the subjectiveness of EFA, the researcher must be systematic, thoughtful, and apply sound judgement to latent variables and factor reduction and construction (Henson & Roberts, 2006).

Reliability and homogeneity

If any significant factors emerged from the factor analysis results, then item reliability of these scales will be explored using Pearson's Correlation Coefficient (r) depending upon the factor analysis results. Cronbach's alpha (α) coefficient calculation of construct reliability and homogeneity would also be explored depending on the results from the pilot study. Cronbach α is the most common assessment of reliability in multiple-item scales (Warner, 2008).

Pilot study - Results

The importance of examining and refining data before factor analysis should not underestimated as it leads to better prediction and modelling of latent variables (Hair et al., 1995). Therefore all questionnaires were checked for missing item responses and for evidence of carelessness or patterned responses. Evidence of patterned response was found in one questionnaire (Table 4.3) and it was consequently discarded from the data analysis.

Response rate of questionnaires

Table 4.3: Summary of returned questionnaires

Pilot Study	<i>n</i> (%)
Issued	66
Returned	64 (96.9)
Discarded	1 (1.5)
Used	63 (95.5)

The characteristics of the participants are described in relation to age, gender, state of residence, employment status, current professional role, and length of current professional role. The response rate was 96.9%.

Section 1- Demographic Results

The ages of participants ranged from 25 to 63. The overall mean age was 43.92 years with a standard deviation of 8.60. The participants' ages were recorded individually in the questionnaire; Table 4.4 reports the age distribution of participants.

Table 4.4: Age of the participants

Age Group	<i>n</i>	%
25-29	3	4.8
30-34	4	6.3
35-39	13	20.6
40-44	15	23.8
45-49	12	19.0
50-54	9	14.3
55-59	3	4.8
> 60	4	6.3
Total	63	100%

As expected the number of male participants was higher than their female counterparts given the traditional male dominated paramedic workforce. Forty (63.5%) of the participants were male and $n=23$ (36.5%) were female.

The majority of participants lived in Victoria $n=22$ (34.9%) or South Australia $n=13$ (20.6%). Over $n=8$ (12%) of participants were from New Zealand, providing an international dimension to the data. The Northern Territory was the only state/territory not to have any participants. Table 4.5 reports the state of residence distribution of participants.

Table 4.5: State of residence

Residency	<i>n</i>	%
Victoria	22	34.9
Tasmania	3	4.8
New Zealand	8	12.7
Australian Capital Territory	1	1.6
Queensland	7	11.1
South Australia	13	20.6
Western Australia	1	1.6
New South Wales	8	12.7
Total	63	100%

The majority of participants either worked at a University $n=34$ (54%) or Ambulance Service $n=27$ (42.9%) with the remaining participants $n=2$ (3.2%) working at a hospital. The distribution of results can be seen in Table 4.6.

Table 4.6: Employment status

Employment Status	<i>n</i>	%
Ambulance Service	27	42.9
University	34	54
Hospital	2	3.2
Total	63	100%

The majority of participants were in academic roles $n=34$ (54%) closely followed by paramedic-specific roles (paramedic, paramedic manager, paramedic clinical instructor) $n=27$ (42.8%). The distribution of professional roles is listed in Table 4.7.

Table 4.7: Current professional role

Current Role	<i>n</i>	%
Paramedic	8	12.7
Paramedic Manager	4	6.3
Paramedic Clinical Educator	15	23.8
Academic	34	54.0
Doctor	2	3.2
Total	63	100%

Participants were employed in their current professional role ranging from 1 to 25 years with a mean of 5.57 (SD=5.19). The length of employment were recorded individually on the questionnaire, Table 4.8 reports the distribution.

Table 4.8: Length of professional role

Length of Employment	<i>n</i>	%
1-5	42	66.7
6-10	12	19.1
11-15	6	9.6
16-20	1	1.6
> 21	2	3.2
Total	63	100%

The next section will summarise the descriptive statistics of Section 2 – Professionalisation and Section 3 – Graduate Attributes. This will also include the factor analysis of Section 3 - graduate attributes and assessment of the variable loading in the development of the final questionnaire.

Section 2 - Professionalisation Results

The majority of participants reported that the paramedic discipline would benefit from being recognised as a full profession ($M=4.62$, $SD=0.77$) and that the higher education sector has an important part to play in this process. These results are further reinforced with the moderate mean score of 3.10/5 ($SD=1.10$) that the discipline already exhibits the traits of a professional body. The majority of participants reported that national registration would not occur within the next 2 years ($M=2.52$, $SD=1.12$). Regarding whether the discipline should align itself with nursing or medicine to improve its chances of becoming a profession, paramedic participants felt this alliance should be with medicine ($M=3.29$, $SD=1.30$), compared with nursing ($M=2.05$, $SD=1.14$). Further distribution of scores is described in Table 4.9.

Table 4.9: The professionalisation of paramedics (n=63)

Professionalisation of Paramedics	Mean	CI 95%	SD
The Australian Paramedic sector will benefit from becoming recognised as a profession.	4.62	4.42-4.81	0.77
The Australian Paramedic sector already exhibits the characteristics of a profession.	3.10	2.82-3.37	1.10
The Australian Paramedic sector already possesses its own unique body of knowledge.	3.37	3.09-3.64	1.08
The Australian Paramedic sector already has a high degree of clinical autonomy in the provision of emergency health care.	3.30	3.03-3.57	1.07
The Australian Paramedic sector will have national registration within the next 2 years.	2.52	2.24-2.81	1.12
The Australian Paramedic sector should align itself with Nursing to enhance its chances of becoming a profession.	2.05	1.76-2.34	1.14
The Australian Paramedic sector should align itself with Medicine to enhance its chances of becoming a profession.	3.29	2.96-3.61	1.30
The Australian Paramedic sector depends upon Higher Education to enhance its chances of becoming a profession.	4.49	4.31-4.68	0.74

The findings from the pilot study suggest two points in relation to professionalism. Firstly, the paramedic discipline *does not* see itself as a profession. And secondly, the paramedic discipline *wants* to become recognised as a profession. Additional findings suggest that the sector believes that achieving this goal is some way off. This is evident especially in the rather pessimistic responses to the items that investigate the achievement of national registration in the near future.

In order to compare results between different sub-groups, providing important contexts for the larger study, the use of independent-sample *t*-test and ANOVA with post-hoc tests was employed. Undertaking such an approach allows further analysis in determining whether section 1 factors such as age, gender, where they worked, what positions participants held and for how long, and where participants lived had a meaningful effect on section 2 results. These will be now briefly discussed.

To determine if differences exist between Higher Education employees and ambulance service employees an independent-sample *t*-test was conducted on each of the items in

section 2. The item regarding if the paramedic discipline possessed clinical autonomy was statistically significant for ambulance service employees ($M=3.70$, $SD=0.95$) and Higher Education employees ($M=3.67$, $SD=1.03$; $t(59) = 2.45$, $p=0.016$).

A one-way ANOVA with post-hoc test was conducted to evaluate the relationship between where participants lived (Western Australia and Australian Capital Territory were excluded in the analysis due to each only have one participant). There was a statistically significant difference at the <0.05 level in several items within section 2. Participants from South Australia and New Zealand produced a significant effect regarding whether the discipline possessed clinical autonomy, $F(4, 53) = 3.5$, $p=0.013$. Post-hoc comparisons using Tukey HSD indicated that the mean score for South Australia ($M=2.62$, $SD=0.87$) was significantly different from New Zealand ($M=4.25$, $SD=0.87$).

Whether the discipline would achieve national registration produced a significant effect between participants from Victoria, New Zealand and Queensland, $F(4, 53) = 5.7$, $p=0.001$. Post-hoc comparisons using Tukey HSD indicated that the mean score for South Australia ($M=2.23$, $SD=0.92$) and Victoria ($M=2.32$, $SD=1.04$) was significantly different from New Zealand ($M=4.00$, $SD=0.92$).

Whether the sector should align itself with the Medicine profession produced a significant effect between Victoria and Queensland $F(4, 53) = 3.1$, $p=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean score for Victoria ($M=2.91$, $SD=1.44$) was significantly different from Queensland ($M=4.71$, $SD=0.48$).

Interestingly, further independent t -tests and ANOVA analyses did not reveal statistically significant findings from other dependent variables such as gender, age, or length of employment.

While the pilot study suggests the discipline wants to become recognised as a profession, the data also implies comparing dependant variables will importantly inform the larger

study and assist in identifying why these differences may (or may not) exist. For example, will there be differences in states where university-based education has existed longer than others? Are there likely to be intergenerational differences, will these be gender based? Will personnel from industry differ significantly from academic staff? Will industrial campaigning for professional rates of pay in states such as South Australia have any significant effects? Results from section 3 – graduate attributes will be now discussed.

Section 3 – Graduate Attribute Results

The majority of attributes were seen to be desirable, with the 47 of the 50 graduate attributes obtaining mean scores over 4.00. The three graduate attributes scoring less than 4.00 included: being selfless (M=3.27, SD=1.13), adhering to local practice guidelines and policies (M=3.97, SD=0.95), and having specialist knowledge (M=3.95, SD=0.81). There were five graduate attributes that were rated 4.75 or higher, these included: able to think critically (M=4.84, SD=0.36), demonstrate critical thinking (M=4.83, SD=0.38), demonstrate clinical reasoning skills (M=4.78, SD=0.49), operate within appropriate ethical and legal boundaries (M=4.75, SD=0.43), and should have clinical competence (M=4.75, SD=0.50). The rating distribution of graduate attributes is reported in Table 4.10.

Table 4.10: Graduate attributes (*n*=63)

Attributes	Mean	CI 95%	SD
CORE PRACTICAL ATTRIBUTES			
• A professional paramedic should have clinical competence.	4.75	4.62-4.87	0.50
• A professional paramedic should have developed counselling skills.	4.11	3.90-4.32	0.84
• A professional paramedic should be able to think critically.	4.84	4.75-4.93	0.36
• A professional paramedic should have a good understanding of their patients' welfare.	4.56	4.42-4.69	0.53
• A professional paramedic should practice	4.24	4.05-4.43	0.75

- preventative healthcare.
- A professional paramedic should integrate population-based care into their practice. 4.03 3.85-4.21 0.71
- A professional paramedic should understand their role in providing a primary care health service. 4.49 4.34-4.65 0.61
- A professional paramedic should demonstrate critical thinking. 4.83 4.73-4.92 0.38
- A professional paramedic should demonstrate clinical reasoning skills. 4.78 4.65-4.90 0.49
- A professional paramedic should be autonomous. 4.29 4.10-4.47 0.75

CORE PROFESSIONAL ATTRIBUTES

- A professional paramedic should adhere to local practice guidelines and policies. 3.97 3.73-4.21 0.95
- A professional paramedic should contribute to continuous improvement within the healthcare system. 4.48 4.33-4.63 0.59
- A professional paramedic should be adaptable to changes in clinical practice. 4.68 4.56-4.80 0.46
- A professional paramedic should attempt to attain high clinical status within the healthcare system. 4.43 4.25-4.61 0.71
- A professional paramedic should understand the role of paramedic care within the broader healthcare system. 4.56 4.42-4.69 0.53
- A professional paramedic should operate within appropriate ethical and legal boundaries. 4.75 4.64-4.86 0.439
- A professional paramedic should follow evidence-based practice. 4.56 4.41-4.70 0.56
- A professional paramedic should be committed to the discipline. 4.43 4.26-4.60 0.68
- A professional paramedic should adhere to a code of ethics. 4.54 4.38-4.70 0.61
- A professional paramedic should be aware of, and regard for, professional issues such as; accountability and confidentiality. 4.70 4.57-4.82 0.49

CORE EDUCATION ATTRIBUTES

- A professional paramedic should have specialist knowledge (e.g. practitioner or extended scope roles). 3.95 3.75-4.16 0.81
- A professional paramedic should have an 4.63 4.50-4.77 0.51

ability to learn including the ability to use reflection and learn from experience.			
• A professional paramedic should be willing to undertake ongoing education.	4.51	4.36-4.66	0.59
• A professional paramedic should be able to apply knowledge of the basic sciences.	4.40	4.23-4.56	0.66
• A professional paramedic should be able to respond to changes in the provision of health care due to evolving community expectations.	4.49	4.36-4.63	0.53
• A professional paramedic should be able to continue to learn and to help others to learn.	4.46	4.32-4.60	0.56
• A professional paramedic should have the capacity to undertake self-directed approaches to learning.	4.49	4.34-4.64	0.59
• A professional paramedic should have the capacity for enquiry and research.	4.29	4.12-4.45	0.65
• A professional paramedic should have theoretical knowledge.	4.57	4.45-4.70	0.49
• A professional paramedic should have a commitment to self-development.	4.57	4.44-4.70	0.53

CORE INTERPERSONAL AND COMMUNICATION ATTRIBUTES

• A professional paramedic should have the capacity to use communication and information technology effectively and appropriately.	4.30	4.13-4.47	0.68
• A professional paramedic should have effective written and oral communication skills.	4.63	4.51-4.76	0.48
• A professional paramedic should be literate and numerate.	4.60	4.47-4.74	0.52
• A professional paramedic should be a good listener.	4.49	4.34-4.64	0.59
• A professional paramedic should be able to accept guidance from colleagues.	4.56	4.42-4.69	0.53
• A professional paramedic should value the importance of teamwork.	4.70	4.57-4.82	0.496
• A professional paramedic should be able to work in interdisciplinary teams.	4.54	4.40-4.68	0.56
• A professional paramedic should have the ability to work independently as well as a member of a team.	4.60	4.48-4.73	0.49
• A professional paramedic should be able to	4.43	4.27-4.59	0.64

- provide leadership, mentoring and supervision skills.
- A professional paramedic should be able to take responsibility for quality of care and health outcomes. 4.38 4.16-4.60 0.86

CORE PERSONAL ATTRIBUTES

• A professional paramedic should be selfless.	3.27	2.98-3.56	1.13
• A professional paramedic should be trustworthy.	4.62	4.50-4.74	0.24
• A professional paramedic should be able to see things from the patients' point of view.	4.16	3.98-4.34	0.70
• A professional paramedic should be non-judgemental and non-discriminatory.	4.56	4.43-4.68	0.50
• A professional paramedic should be caring and empathic.	4.48	4.35-4.60	0.50
• A professional paramedic should be self-aware, recognising personal responsibilities and limitations.	4.56	4.42-4.69	0.53
• A professional paramedic should be respectful and consider moral, ethical, social, religious aspects of healthcare.	4.52	4.39-4.66	0.53
• A professional paramedic should be willing to be responsible for their actions.	4.65	4.53-4.77	0.48
• A professional paramedic should embrace social responsibility.	4.32	4.32-4.17	0.59
• A professional paramedic should be culturally sensitive and have an inclusive approach to differences.	4.46	4.32-4.60	0.56

While the majority of graduate attributes were considered desirable by the expert group, undertaking comparisons between the independent and dependent variables would provide an important context for the larger study, and determine if specific factors were responsible for any significant differences. The use of independent-sample *t*-test and ANOVA with post-hoc tests was employed to analyse if differences occurred between groups identified in section 1. As was employed in section 2, undertaking such an approach, would allow further analysis in determining if the independent variables had a meaningful affect on section 3 results. These will be now briefly discussed.

An independent-samples *t*-test was conducted on each of the items in section 3 – graduate attributes for participants employed from Higher Education and ambulance service. The

item that paramedics should understand the role of paramedic care within the broader healthcare system was significantly different between Higher Education employees ($M=4.71$, $SD=0.46$) and ambulance service employees ($M=4.37$, $SD=0.56$; $t(61) = -2.24$, $p=0.016$).

The item suggesting paramedics should follow evidence-based practice was exhibited statistically significant difference between respondents in Higher Education ($M=4.76$, $SD=0.43$) and ambulance service ($M=4.33$, $SD=0.62$; $t(61) = -3.20$, $p=0.002$).

The item suggesting the paramedic should be able to apply knowledge of the basic sciences was significantly different between Higher Education employees ($M=4.59$, $SD=0.50$) and ambulance service employees ($M=4.19$, $SD=0.78$; $t(61) = -3.20$, $p=0.018$). Furthermore, the item advocating that paramedics should have the ability to work independently as well as a member of a team again significantly different between Higher Education employees ($M=4.74$, $SD=0.44$) and ambulance service employees ($M=4.48$, $SD=0.50$; $t(61) = -2.06$, $p=0.043$).

An independent-samples *t*-test was also conducted on each of the items in section 3 for male and female participants. The item suggesting paramedics should have effective written and oral communication skills was statistically significantly different between female ($M=4.83$, $SD=0.38$) and male ($M=4.53$, $SD=0.50$; $t(61) = -2.46$, $p=0.016$) respondents. In addition, there was a statistically significant difference between female ($M=4.78$, $SD=0.42$) and male ($M=4.50$, $SD=0.55$; $t(61) = -2.11$, $p=0.039$) respondents on the item stating that a paramedic should be literate and numerate.

The item stating that paramedics should take responsibility for quality of care and health outcomes was also statistically significantly different between males ($M=4.58$, $SD=0.63$) and females ($M=4.04$, $SD=1.14$; $t(61) = 2.42$, $p=0.018$). And finally, the item suggesting paramedics should embrace social responsibility was significantly different between male ($M=4.45$, $SD=0.55$) and female ($M=4.09$, $SD=0.59$; $t(61) = 2.44$, $p=0.018$) respondents.

A one-way ANOVA with post-hoc test was conducted to evaluate the relationship between where participants lived. There was a statistically significant difference at the <0.05 level in several items within section 3. Participants from Victoria, New South Wales, and Queensland, produced a significant effect regarding the notion that paramedics should follow evidence-based practice, $F(4, 53) = 4.79, p=0.002$. Post-hoc comparisons using Tukey HSD indicated that the mean score for Victoria ($M=4.23, SD=0.61$) was significantly different from New South Wales ($M=4.88, SD=0.35$) and Queensland ($M=5.00, SD=0.00$).

Whether paramedics should be able to respond to changes in the provision of health care produced a significant effect between participants from Victoria and New South Wales, $F(4, 53) = 3.58, p=0.01$. Post-hoc comparisons using Tukey HSD indicated that the mean score for Victoria ($M=4.32, SD=0.47$) and South Australia ($M=4.31, SD=0.63$) was significantly different from New South Wales ($M=5.00, SD=0.00$).

The notion that paramedics should have the commitment to self-development also produced a significant effect between participants from South Australia and New South Wales, $F(4, 53) = 3.04, p=0.025$. Post-hoc comparisons using Tukey HSD indicated that the mean score for South Australia ($M=4.31, SD=0.48$) was significantly different from New South Wales ($M=5.00, SD=0.00$).

The item stating that paramedics should be trustworthy produced a significant effect between participants from South Australia and New Zealand, $F(4, 53) = 3.50, p=0.01$. Post-hoc comparisons using Tukey HSD indicated that the mean score for South Australia ($M=4.31, SD=0.48$) was significantly different from New Zealand ($M=5.00, SD=0.00$).

The item stating that a professional paramedic should be respectful and consider moral, ethical, social, and religious aspects of healthcare produced a significant effect between participants from Victoria and New Zealand, $F(4, 53) = 3.05, p=0.02$. Post-hoc

comparisons using Tukey HSD indicated that the mean score for Victoria ($M=4.27$, $SD=0.55$) was significantly different from New Zealand ($M=4.88$, $SD=0.35$).

Further independent t-tests and ANOVA analyses did not reveal statistically significant findings from other dependent variables such as gender, age, or length of employment. Hence it seems a reasonable conclusion to suggest that Higher Education especially influences the underlying conceptions of professional behaviours.

While results from the pilot study have guided and informed the researcher of the potential strengths and weaknesses of the research project and therefore the basis to undertake the larger national study, specific results should be interpreted with caution, particularly given the small sample size. Despite this limitation, the results between different groups have raised some interesting questions, thus providing the researcher with a broader sense of why certain dependent variables may or may not be casual in nature. In addition, this has informed the researcher of potential reasons why differences may or may not occur between respondent subgroups in the national study. The next section will discuss the factor analysis methodology and results.

Factor Analysis Protocol

Prior to undertaking factor analysis, a systematic flow-chart approach was developed (adopted from Hair et al., 1995). This flow-chart provided a reference point in developing clear decision pathways. This can be seen in Figure 4.1 below.

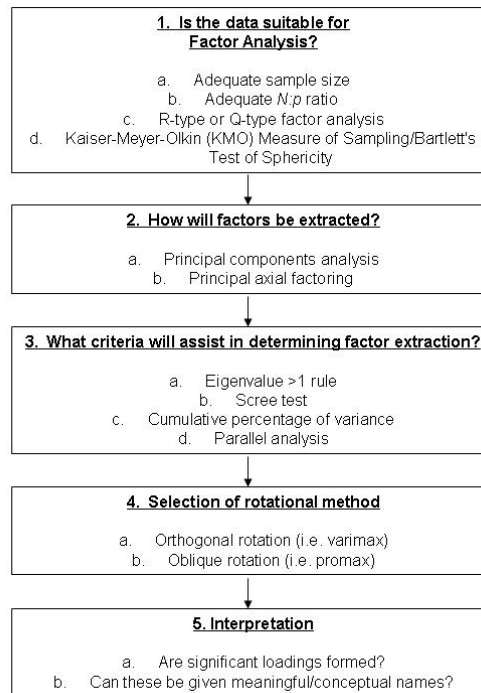


Figure 4.1: Systematic approach to factor analysis (adopted from Hair et al., 1995).

Suitability of the Respondent Data for Factor Analysis

Although sample size is important in factor analysis, there are varying opinions, and several guiding rules of thumb are cited in the literature (Gorsuch, 1983; Hair et al., 1995; Hogarty et al., 2005; Kieffer, 1999; Tabachnick & Fidell, 1996). The lack of agreement is noted by Hogarty et al. (2005) “These disparate [sample size] recommendations have not served researchers well” (p. 203). General guides include, Tabachnick’s rule of thumb (Tabachnick & Fidell, 1996) that suggests having at least 300 cases are needed for factor analysis. Hair et al. (1995) suggested that sample sizes should be 100 or greater. A number of textbooks (Gorsuch, 1983; Hair et al., 1995; Pett, Lackey, & Sullivan, 2003; Tabachnick & Fidell, 1996) cite the work of Comrey (1973) in their guide to sample

sizes: 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1000 or more as excellent.

According to MacCallum, Widaman, Zhang, and Hong (1999, cited in Henson & Roberts, 2006) such rules of thumb can at times be misleading and often do not take into account many of the complex dynamics of a factor analysis. “They illustrated that when communalities are high (greater than 0.60) and each factor is defined by several items, sample sizes can actually be relatively small” (p. 402). Others such as Guadagnoli and Velicer (1988, cited in Tabachnick & Fidell, 1996) found that solutions with correlation coefficients >0.80 require smaller sample sizes while Sapnas and Zeller (2002, cited in Tabachnick & Fidell, 1996) point out that even 50 cases may be adequate for factor analysis. Based on this, the sample size in the pilot study was considered suitable to complete factor analysis.

Another set of recommendations also exist providing researchers with guidance regarding how many participants are required for each variable, often termed, the sample to variable ratio (often denoted as $N:p$ ratio) (Hogarty et al., 2005). The same disparate recommendations also occur for sample to variable ratios as they do for determining adequate sample sizes (Hogarty et al., 2005; Hair et al., 1995). For example, rules of thumb range anywhere from 3:1, 6:1, 10:1, 15:1, or 20:1 (Everitt, 1975; Gorsuch, 1983; Hair et al., 1995; Pett, Lackey, & Sullivan, 2003; Tabachnick & Fidell, 1996). To highlight this ambiguity, investigators such as Hogarty et al. (2005) and MacCallum, Widaman, Zhang, and Hong (1999) have undertaken studies to test these guides. Hogarty et al. (2005) noted that, “our results show that there was not a minimum level of N or $N:p$ ratio to achieve good factor recovery across conditions examined” (p. 222). While the $N:p$ ratio for the pilot study was $<1.5:1$, given the recent results from Hogarty et al. (2005) it was considered suitable to analyse using factor analysis.

A correlation matrix was used in the EFA process that displayed the relationships between individual variables from the pilot study. Henson and Roberts (2006) point out that a correlation matrix is most popular among investigators. Tabachnick and Fidell

(1996) recommend inspecting the correlation matrix (often termed Factorability of *R*) for correlation coefficients over 0.30. Hair et al. (1995) categorise these loadings using another rule of thumb: as ± 0.30 =minimal, ± 0.40 =important, and ± 0.50 =practically significant. If no correlations go beyond 0.30, then the researcher should reconsider whether factor analysis is the appropriate statistical method to utilise (Hair et al., 1995; Tabachnick & Fidell, 1996).

Prior to using PCA to extract factors, several tests were used to assess the suitability of the paramedic respondent data for factor analysis: Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Kaiser, 1970, 1974), and Bartlett's Test of Sphericity (Bartlett, 1950). The KMO index, in particular, is recommended when the cases to variable is less 1:5. The KMO index ranges from 0 to 1, with 0.50 considered suitable for factor analysis (Hair et al., 1998; Tabachnick & Fidell, 1996). The Bartlett's Test of Sphericity should be significant ($p < 0.05$) for factor analysis to be suitable (Hair et al., 1995; Tabachnick & Fidell, 1996). The distribution of these findings is shown in Table (4.11).

Table 4.11: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.536
Bartlett's Test of Sphericity	Approx. Chi-Square	2582.571
	Df	1225
	Sig.	0.000

Systematically addressing each of these guides described above, the pilot data was considered suitable for factor analysis.

Method of Factor Extraction

There are numerous ways to extract factors: PCA, principal axis factoring (PAF), image, maximum likelihood, alpha, and canonical (Tabachnick & Fidell, 1996; Thompson, 2004). However, PCA and PAF are used most commonly in the published literature

(Henson & Roberts, 2006; Tabachnick & Fidell, 1996; Thompson, 2004). The decision whether to use PCA and PAF is fiercely debated among analysts (Henson & Roberts, 2006), although according to Thompson (2004, 1992, cited in Henson & Roberts, 2006) the practical differences between the two are often insignificant, particularly when variables have high reliability, or where there are 30 or more variables (Gorsuch, 1983). Thompson (2004) noted that PCA is the default method in many statistical programs, and thus, is most commonly used in EFA. It is also recommended when no priori theory or model exists (Gorsuch, 1983). Pett, Lackey and Sullivan (2003) suggested using PCA in establishing preliminary solutions in EFA. In this pilot study, PCA was utilised.

No single criteria should be assumed to determine factor extraction. This is reinforced by Thompson and Daniel, (1996) who add, “The simultaneous use of multiple decision rules is appropriate and often desirable” (p. 200). Hair et al. (1995) point out that the majority of factor analysts typically use multiple criteria. Many extraction rules and approaches exist including: Kaiser’s criteria (eigenvalue > 1 rule) (Kaiser, 1960), scree test (Cattell, 1966), cumulative percent of variance extracted, and parallel analysis (Horn, 1965). Traditionally, at least two or three variables must load on a factor for it to be considered viable so it can be given a meaningful interpretation (Henson & Roberts, 2006; Isaac & Michael, 1997).

Factor Extraction Results

Analysis of the 50 items revealed thirteen factors with eigenvalues above 1, accounting for 77.3% of the total variance. Items with loadings greater than ± 0.40 , with the factor in question, were used to characterise the factor solutions. Cumulative percentage of variance (criterion) is another area of disagreement in the factor analysis approach, particularly in different disciplines, for example, natural sciences, psychology and humanities (Henson & Roberts, 2006). No fixed threshold exists, although certain percentages have been suggested. According to Hair et al. (1995) in the natural sciences, factors should be stopped when at least 95% of the variance is explained. In humanities, the explained variance is commonly as low as 50-60% (Hair et al., 1995; Pett, Lackey, &

Sullivan, 2003). The explained variance of 77.3% in the pilot study is well within the accepted explained variance range.

Inspection of the scree plot and eigenvalues produced a departure from linearity coinciding with a 10-factor construct (Figure 4.2). As noted by Thompson (2004), interpreting scree plots is subjective, requiring researcher judgement. Thus, disagreement over which factors should be retained is often open for debate.

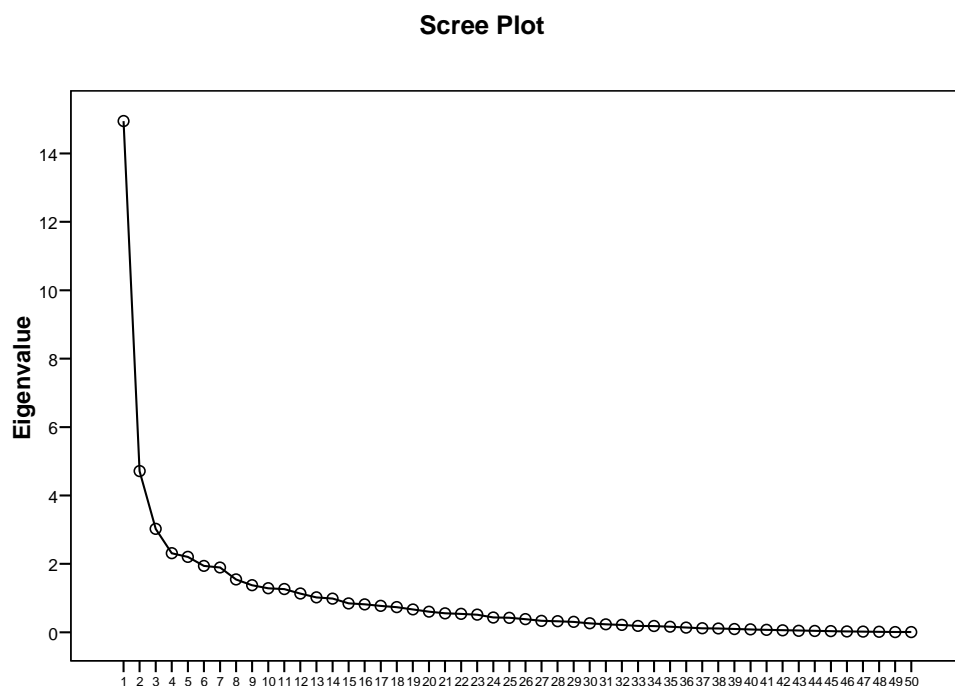


Figure 4.2: Scree test criterion

Parallel analysis is under-used as a factor extraction technique (Henson & Roberts, 2006) and is often not reported in the literature. One possible reason for the under utilisation of parallel analysis is the analysis procedure is not readily available in conventional statistical programs such as SPSS (Thompson & Daniel, 1996). However, authors suggest the analysis has both merit and application in extracting factors (Henson & Roberts, 2006; Thompson & Daniel, 1996). Thompson (2004) adds that “... parallel

analysis appears to be among the best methods for deciding how many factors to extract or retain” (p. 34). It is used in the current study for that purpose.

In parallel analysis, actual eigenvalues are compared with random order eigenvalues. Factors are retained when actual eigenvalues surpass random ordered eigenvalues. The distribution of these results can be seen in Table 4.12.

Table 4.12: Parallel Analysis (adapted from Pallant, 2005)

Component Number	Actual eigenvalue from PCA	Random order from parallel analysis	Decision
1	14.947	3.2670	Accept
2	4.714	3.0052	Accept
3	3.025	2.8050	Accept
4	2.312	2.6318	Reject
5	2.204	2.4668	Reject
6	1.940	2.3386	Reject
7	1.893	2.2110	Reject
8	1.546	2.0936	Reject
9	1.375	1.9715	Reject
10	1.287	1.8606	Reject
11	1.265	1.7701	Reject
12	1.133	1.6712	Reject
13	1.020	1.5861	Reject

The results from the four different factor extraction techniques are located in Table 4.13. While similar factor numbers were identified by the eigenvalue > 1 rule, scree test, and explained variance, the parallel analysis identified substantially less with only three factors. This variation was likely due to the small sample size used in the pilot study. Despite the large variation between the parallel analysis results and the other three techniques, by applying thoughtful judgement, the best fit from the pilot data was considered a 10-factor solution.

Table 4.13: Factor identification following multiple factor extraction techniques

Factor Extraction Technique	Factors Identified
Eigenvalue > 1 rule	13
Scree Test	10
Explained variance	13
Parallel Analysis	3

Selection of Rotational Method

Principal Component Analysis was applied to identify the number of factors followed by Orthogonal Varimax rotation. There are two common rotation techniques: orthogonal rotation and oblique rotation. Orthogonal Varimax rotation first developed by (Kaiser, 1958) is the most common rotational technique used in factor analysis (Kieffer, 1999; Thompson, 2004). This type of rotation was used in the pilot study for the following reasons: firstly, it provides easier interpretation of results; secondly, the assumption that factors would independent, and finally, the solution is often more parsimonious in pilot studies (Hair et al., 1995; Kieffer, 1999; Pallant, 2007).

As suggested by Pett, Lackey, and Sullivan, (2003) and Kieffer, (1999), following PCA analysis, PAF should also be examined for comparison and assessment for best fit. The PAF rotated solution on the pilot data, while producing 13 factors, did not intuitively or conceptually provide the same appropriateness and conceptually meaningful results that were provided by the rotated PCA.

Following rotation items were examined and assessed for factorial suitability. Those not loading or unable to be assigned to a factor using the above guides were discarded. This is explained in Table 4.14.

Table 4.14: Reasons for item deletion

Item Deleted	Reason for Deletion
Q3.10: A professional paramedic should be autonomous	Difficult to assign a factor Several low loadings
Q3.11: A professional paramedic should adhere to local practice guidelines and policies	No loading
Q3.41: A professional paramedic should be selfless	Difficult to assign a factor Several low loadings

Labelling of Factors

The labelling of factors is both subjective and intuitive. Henson and Roberts (2006) note “... the meaningfulness of latent factors is ultimately dependent on researcher definition” (p. 396). The labelling process included examination of the factor pattern matrix for high loadings and if these loadings could be interpreted into meaningful and objective constructs. Following this interpretation, ten item constructs were developed, defined, operationalised (see Table 4.15 and 4.16), and labelled. These included:

Factor 1 was labelled *Personal characteristics*. There were 8 items that loaded on this factor, with loadings ranging from 0.76 to 0.58 (explained variance 29.5%). The top item within the factor was: ‘A professional paramedic should be non-judgemental and non-discriminatory’. Factor 1 included characteristics such as trustworthy, caring, empathetic, self-aware and respectful of others.

Factor 2 was labelled *Clinical reasoning skills*. There were 8 items that loaded on this factor, with loadings ranging from 0.80 to 0.46 (explained variance 9.4%). The top item within the factor was: ‘A professional paramedic should understand their role in providing a primary health care service’. Factor 2 included characteristics such as critical thinking, counselling skills, clinical competence and adaptable to changes in clinical practice.

Factor 3 was given the label *Interpersonal and team skills*. There were 8 items that loaded on this factor, with loadings ranging from 0.82 to 0.51 (explained variance 6.0%). The top item within the factor was: 'A professional paramedic should be literate and numerate'. Factor 3 included characteristics such as effective communicators and listeners, able to work in interdisciplinary teams and work independently as a member of a team.

Factor 4 was labelled *Professionalism*. There were 4 items that loaded on this factor, with loadings ranging from 0.79 to 0.47 (explained variance 4.6%). The top item within the factor was: 'A professional paramedic should adhere to a code of ethics'. Factor 4 included characteristics such as adhering to a code of ethics, committed to the discipline and respecting issues such as confidentiality.

Factor 5 was labelled *Continuing professional development*. There were 5 items that loaded on this factor, with loadings ranging from 0.71 to 0.45 (explained variance 4.4%). The top item within the factor was: 'A professional paramedic should have a commitment to self-development'. Factor 5 included characteristics such as committed to self-development, and self-directedness, and providing leadership and mentorship.

Factor 6 was given the label *Social awareness*. There were 3 items that loaded on this factor, with loadings ranging from 0.69 to 0.58 (explained variance 3.8%). The top item within the factor was: 'A professional paramedic should contribute to continuous improvement within the healthcare system'. Factor 6 included characteristics such as social responsibility and empowering others to learn.

Factor 7 was labelled *Flexible learning*. There were 4 items that loaded on this factor, with loadings ranging from 0.76 to 0.51 (explained variance 3.7%). The top item within the factor was: 'A professional paramedic should be able to apply knowledge of the basic sciences'. Factor 7 included characteristics such as undertaking ongoing education and training and application of basic sciences in the broader health care sector.

Factor 8 was labelled *Accountability*. There were 2 items that loaded on this factor, with loadings ranging from 0.78 to 0.64 (explained variance 3.0%). The top item within the factor was: ‘A professional paramedic should be able to take responsibility for quality of care and health outcomes’. Factor 8 included characteristics such as taking responsibility for quality care and clinical reasoning skills.

Factor 9 was labelled *Evidence base practice*. There were 3 items that loaded on this factor, with loadings ranging from 0.83 to 0.40 (explained variance 2.7%). The top item within the factor was: ‘A professional paramedic should be able to integrate population-based care into their practice’. Factor 9 included characteristics such as integrating preventative health care into practice and enquiry and research-led practice.

Factor 10 was labelled *Self-directed practice*. There were 2 items that loaded on this factor, with loadings ranging from 0.78 to 0.53 (explained variance 2.5%). The top item within the factor was: ‘A professional paramedic should have specialist knowledge (e.g. practitioner or extended scope roles)’. Factor 10 included characteristics such as implementing critical reflection into practice and working independently.

Table 4.15: Operationalisation of factor constructs

Factor Number	Factor Construct	Items	% Variance Accounted For By Factor
1	Personal characteristics	3.44, 3.46, 3.47, 3.48, 3.42, 3.45, 3.50, 3.43	29.5%
2	Clinical reasoning skills	3.07, 3.04, 3.08, 3.16, 3.03, 3.02, 3.13, 3.01	9.4%
3	Interpersonal and team skills	3.33, 3.37, 3.31, 3.32, 3.35, 3.34, 3.38, 3.36	6.0%
4	Professionalism	3.19, 3.20, 3.17, 3.18	4.6%
5	Continuing professional development	3.30, 3.14, 3.39, 3.27, 3.29	4.4%
6	Social awareness	3.12, 3.49, 3.26	3.8%
7	Flexible learning	3.24, 3.25, 3.23, 3.15	3.7%
8	Accountability	3.40, 3.09	3.0%
9	Evidence base practice	3.06, 3.05, 3.28	2.7%
10	Self-directed practice	3.21, 3.22	2.5%
11	Not assigned	-	2.5%
12	Not assigned	-	2.2%
13	Not assigned	-	2.0%
Total Variance Accounted			77.3%

Table 4.16: Correlation matrix (Principal Components Analysis with Varimax Rotation)

Item	Factors													h ²
	1	2	3	4	5	6	7	8	9	10	11	12	13	
3.44 Non-judgemental and non-discriminatory	.761	.178	.087	.191	.143	.068	.146	.078	.063	.027	-.086	-.137	.077	.743
3.46 Self-aware, recognising personal responsibilities and limitations	.734	.226	.268	.080	.069	-.042	.051	.008	-.048	.034	.175	.016	.175	.742
3.47 Respectful and consider moral, ethical, social, religious aspects of healthcare	.692	-.048	.026	.105	.043	.213	.311	.180	.028	.080	.131	-.054	.130	.713
3.48 Responsible for their actions	.656	.393	.092	.072	.285	.113	.152	.172	.208	.028	-.062	.038	.112	.807
3.42 Trustworthy	.631	.024	.254	.350	.196	.004	-.091	.159	.180	.215	.132	.103	.170	.794
3.45 Caring and empathic	.616	.057	.459	.165	.089	.177	.050	.216	-.139	.027	-.165	-.068	.025	.762
3.50 Culturally sensitive and have an inclusive approach to differences	.605	-.071	.401	-.068	.104	.392	.096	.082	-.008	.167	-.105	.032	.083	.763
3.43 Able to see things from the patients' point of view	.508	.190	.134	.052	.106	.260	.175	.415	-.062	.260	-.013	-.065	.082	.679
3.07 Understand their role in providing a primary care health service	.138	.803	.068	.193	.045	.049	.059	.076	.004	.081	.222	.023	.035	.777
3.04 Good understanding of their patients' welfare	.136	.742	.101	-.129	-.018	.275	.083	.014	.131	.134	-.026	-.021	.137	.734
3.08 Critical thinking	.142	.689	.047	.099	-.016	.060	.112	.038	.241	.421	.101	.044	.306	.866
3.16 Operate within appropriate ethical and legal boundaries	.173	.681	.025	.440	-.060	.068	.190	.225	.066	.079	.132	.081	.086	.824
3.03 Think critically	.195	.591	.103	.152	.061	-.063	.237	.148	.334	.403	-.051	-.076	.030	.791
3.02 Counselling skills	-.139	.581	.116	-.295	.137	-.275	-.057	.372	-.036	.034	.130	-.235	.017	.768
3.13 Adaptable to changes in clinical practice	.160	.559	.209	.381	.294	.154	.143	.151	-.068	.025	-.100	-.110	.185	.742
3.01 Clinical competence	.295	.467	.112	.341	.085	.198	.129	.183	.243	.152	-.047	.185	.020	.649
3.33 Literate and numerate	.240	.125	.823	.240	-.011	-.089	.104	.095	.055	.093	.235	-.002	.005	.902
3.37 Able to work in interdisciplinary teams	.042	.233	.701	.029	-.020	.404	.108	.006	.125	.064	.115	.121	.042	.773
3.31 Capacity to use communication and information technology effectively and	-.028	-.135	.687	.062	.230	.179	.100	.126	.054	.162	-.070	.272	.125	.729

appropriately														
3.32 Effective written and oral communication skills	.227	.084	.645	.325	.277	-.050	.048	.018	-.035	.129	.161	-.088	.115	.727
3.35 Accept guidance from colleagues	.419	.110	.638	.109	.191	.035	-.062	.138	-.081	.050	-.153	.008	.132	.717
3.34 Good listener	.368	-.010	.590	.005	.255	.105	.097	.238	.092	.125	-.120	-.362	.163	.822
3.38 Ability to work independently as well as a member of a team	.251	.073	.535	-.026	.273	.379	.093	.055	.149	.197	-.122	-.278	.222	.788
3.36 Value the importance of teamwork	.391	.237	.518	.080	.202	.206	-.022	.056	.306	.170	-.154	.162	.001	.742
3.19 Adhere to a code of ethics	.125	.141	.122	.790	-.031	.129	.008	.068	.288	.114	-.101	-.028	.136	.822
3.20 Aware of, and regard for, professional issues such as; accountability and confidentiality	.367	.156	.165	.717	.125	-.053	.197	.124	.103	.087	-.043	-.057	.124	.812
3.17 Follow evidence-based practice	.026	.106	.375	.596	.048	.017	.255	.334	-.151	.031	.063	-.163	.099	.751
3.18 Committed to the discipline	.191	.034	.438	.476	.343	.311	.035	.152	-.237	.123	-.106	-.033	.059	.782
3.30 Commitment to self-development	.177	.135	.107	.163	.710	.264	.293	.246	.080	.126	-.096	.039	.021	.841
3.14 Attempt to attain high clinical status within the healthcare system	.210	.092	.215	-.030	.701	.066	.021	.017	-.012	.043	.241	.227	.025	.709
3.39 Able to provide leadership, mentoring and supervision skills	.211	-.089	.419	-.038	.663	.122	.123	.193	.250	.068	.024	.088	.047	.814
3.27 Capacity to undertake self-directed approaches to learning	.138	-.002	.184	.163	.459	.438	.198	.262	-.037	.180	.146	-.060	.116	.663
3.29 Theoretical knowledge	.354	.092	.274	.297	.456	-.035	.106	.404	.137	.058	.114	.111	.110	.741
3.12 Contribute to continuous improvement within the healthcare system	.064	.282	.114	.355	.264	.697	.058	.076	-.051	.207	.125	.048	.009	.850
3.49 Embrace social responsibility	.315	.174	.139	-.062	.015	.668	.176	.100	.211	.019	.085	.143	.028	.713
3.26 Continue to learn and to help others to learn	.170	.119	.247	.021	.289	.584	.323	.064	.117	.115	-.150	.071	.003	.691
3.24 Apply knowledge of the basic sciences	.118	.174	.080	.161	.128	.066	.763	.047	.117	.093	.154	.028	.071	.733
3.25 Respond to changes in the provision of health care due to evolving community expectations	.368	-.109	.125	.102	.089	.209	.722	.037	.131	.025	.185	-.030	.133	.818
3.23 Willing to undertake ongoing education	.120	.233	.071	-.002	.062	.146	.701	.279	-.113	.141	-.146	.232	.116	.790

3.15 Understand the role of paramedic care within the broader healthcare system	.009	.397	.050	.095	.291	.115	.514	.218	.051	.026	.008	-.118	.404	.759
3.40 Able to take responsibility for quality of care and health outcomes	.017	.185	.073	.072	.147	.138	.106	.108	.788	.156	.027	.067	.081	.766
3.09 Clinical reasoning skills	.101	.463	.072	.309	-.024	.024	.021	.109	.641	.303	-.047	-.100	.172	.884
3.06 Integrate population-based care into their practice	.030	.221	.068	-.098	.101	-.034	.168	.090	-.048	.107	.836	-.019	.095	.833
3.05 Practice preventative healthcare	-.092	.540	-.147	.006	.067	.243	-.076	.110	.129	.072	.545	.010	.091	.730
3.28 Capacity for enquiry and research	.204	-.337	.179	.054	.255	.265	.119	.385	-.003	.368	.408	-.035	.107	.802
3.21 Specialist knowledge (e.g. Practitioner or extended scope roles)	-.104	-.113	.095	-.209	.206	.104	.057	.112	.058	.210	-.024	.785	.181	.842
3.22 Ability to learn including the ability to use reflection and learn from experience	-.011	.232	-.023	.216	.337	.150	.390	.209	.010	.308	-.016	.535	.110	.826
Eigenvalues	14.9	4.7	3.0	2.3	2.2	1.9	1.8	-	1.5	-	1.3	1.2	-	-
Explained Variance	29.5%	9.4%	6.0%	4.6%	4.4%	3.8%	3.7%	-	3.0%	-	2.7%	2.5%	-	-

Note. Bolded factor loadings highlight item allocation for final questionnaire for national study.
h² = communality.

Internal Consistency and Reliability of the Data

Cronbach's α reliability coefficients were analysed for each of the ten constructs identified from the PCA. The Cronbach α calculation produced a high reliability ($r=.83$) (Table 4.17). Seven of the ten factor constructs produced Cronbach's α scores above 0.70, indicating good reliability, particularly for exploratory research (Hair et al., 1995; Muijs, 2004).

Table 4.17: Reliability of pilot study (Factors 1-10)

	All Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
Cronbach's α	0.83	0.87	0.83	0.88	0.79	0.82	0.73	0.77	0.66	0.47	0.58

Pearson reliability coefficient for the 10 factors ranged between ($r=.04$ to $r=.64$) (Table 4.18). These findings suggest correlation coefficients ranged from negligible to strong correlation (Pett, Lackey, & Sullivan, 2003). Interpretation of Pearson's reliability is commonly used by rules of thumb indicating high to low correlation (Franzblau, 1958). Simpler interpretation rules do exist however, for example, Hinkle, Wiersma, and Jurs (1994) suggested that correlation coefficients of less than 0.30 suggest very little relationship between variables.

Table 4.18: Pearson's correlation coefficient (Factors 1-10)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
Factor 1	1									
Factor 2	.422	1								
Factor 3	.641	.359	1							
Factor 4	.491	.387	.570	1						
Factor 5	.564	.320	.641	.447	1					
Factor 6	.553	.419	.533	.448	.576	1				
Factor 7	.481	.427	.354	.386	.477	.518	1			
Factor 8	.218	.431	.263	.260	.248	.322	.268	1		
Factor 9	.232	.368	.184	.077	.371	.345	.287	.199	1	
Factor 10	.105	.105	.176	.044	.409	.345	.311	.105	.165	1

** Correlation is significant at the 0.01 level (2-tailed).

Pilot Study – Interpretation of Results and Discussion

The findings from the pilot study indicate two points in relation to professionalism. Firstly, the paramedic discipline is not currently viewed as a full profession by those sampled. And secondly, the paramedic discipline *wants* to become recognised as a full profession. Additional findings suggest that the paramedic sector believes that achieving this goal lies in the far future. This is evident especially in the rather low responses to the items that asked questions about the achievement of national registration in the near future. Analyses of the descriptive and EFA determining which graduate attributes were deemed the most applicable for the paramedic membership produced a 10-factor solution. These factors demonstrated both theoretical and practical application for the paramedic discipline. The discussion section will provide an outline of the interpretation and

analysis from the descriptive statistics and EFA. Each of these sections will be presented in two parts:

- Part 1 will include analysis and discussion of the professionalisation section.
- Part 2 will provide analysis and discussion of the graduate attribute section.

Part 1: Professionalisation Section

In comparing the professionalisation process of other related health disciplines such as nursing and physiotherapy, the main factors in both fields related to achieving professional status stemmed from their alliance with and subordination to the medical profession and subsequent acceptance of the resultant divisions of labour (Freidson, 1970; Reynolds, 2004). This allowed both fields the opportunity to develop specific occupational niches or areas of profession-specific expertise. Results from this study suggest that the strategic alliance with medicine could be considered ($M=3.29$, $SD=1.30$), particularly as a way of protecting professional boundaries and improving the chances of achieving national registration. However, no clear explanation can be given for the statistical difference ($p=0.02$) between participants from Victoria and Queensland. Findings suggest that the paramedic membership do not believe aligning with the nursing profession would enhance its chances of achieving the status of becoming a profession ($M=2.05$, $SD=1.14$). Anecdotally this finding could stem from the resentment of the dominance and influence nursing still has on paramedic education and training in Australia. In part, this is due to the difficulties in attracting practicing paramedics to take up academic positions in universities plus the small number of paramedics with postgraduate qualifications (O'Meara, 2006).

In the health care disciplines, an important part of evolution from semi-professional to full profession status was the successful transition from vocational education to the Higher Education sector. The transition provided the context for specific and unique bodies of knowledge and research-led practice to develop. Furthermore this unique knowledge also contributed to the establishment of greater autonomy and extended scope in clinical practice. Participants reported that the paramedic field possessed clinical

autonomy ($M=3.30$, $SD=1.07$), with this being statistically significantly different between Higher Education employees (educators) and ambulance service employees ($p=0.01$).

While this item did not refer to specific clinical hierarchies (e.g., ambulance officer, ambulance paramedic, or intensive care paramedic), it would be interesting to investigate if any significant differences in autonomy existed among paramedic clinicians.

The first ambulance paramedic course offered in 1961 signalled one of the initial steps in the move from a vocation to a semi-profession. This could be seen as the first authentic attempt at creating a paramedic-specific body of knowledge, which can be described as the development of skills, knowledge, behaviours, and attitudes that are unique and specific to disciplines (Cruess & Cruess, 2009). Development of a unique knowledge is best achieved within the Higher Education sector, particularly given the capacity to establish and implement evidenced-based practice, and participate in collaborative research projects. Put simply, Higher Education is the hallmark of full professional status (Reid, 1994). The shift from its vocational origins to the Higher Education environment was seen as an important part of the paramedic professionalisation process in the pilot study results with a mean rating scores of $M=4.49/5$ ($SD=0.74$). Reynolds (2004) notes that “researched-based enquiry will generate new knowledge that is owned and directed by paramedics in distinguishing pre-hospital care in its own right” (p. 2). With the integration of research-led (both quantitative and qualitative) teaching into paramedic education, evidence-based practice is now being published in peer-reviewed paramedic journals, book chapters, and paramedic-specific textbooks thus adding to the emerging body of paramedic scholarship and knowledge (Sheather, 2009)..

Further independent *t*-tests and ANOVA analyses did not reveal statistically significant findings from other dependent variables such as gender, age, or length of employment. While not expecting significant differences in gender, given the recent changes in paramedic education from its former vocational roots to Higher Education, one may have expected statistical differences in age and length of employment, particularly as this move in some quarters is still seen as contentious.

Part 2: Graduate Attribute Section

The relatively recent decision to move training programs into the Higher Education sector has meant that questions such as benchmarking Australian undergraduate paramedic education programs by means of graduate attributes have yet to be formally addressed. Without national standardised curriculum guidelines, this continues to cause educational duplication, uncertainty, and financial inefficiencies in many sectors of the paramedic discipline. The findings of this study help to address some of these issues by providing a preliminary set of graduate attribute factors that can be built upon. Given the exploratory intent of this pilot study, only 3 items failed to load onto a factor solution, indicating most of the attributes were deemed to be acceptable for Australian paramedics. This is perhaps not surprising since the original 50 graduate items were sourced from well established cognate health care professions, suggesting the graduate attributes are well recognised by other health disciplines.

In 2004, a set of ‘national ambulance competencies’ were created that were benchmarked at a vocational diploma level (Fitzgerald, 2007). However, these competencies are not applicable to the Bachelor level learning expectations and requirements of paramedic students and thus have emphasised a need for graduate competency reform, particularly as broader health care issues including intradisciplinary health management and extended scope practitioner models are currently being considered (ACAP, 2009b). Factor solution 3 (Interpersonal and team skills) embraces attributes supportive of the mounting interest in intradisciplinary education and practice in Australia, with items such as being able to work in intradisciplinary teams, and valuing the importance of teamwork being identified. These attributes have also been acknowledged by Hammick, Freeth, Koppel, Reeves, and Barr (2007) as being important characteristics of intradisciplinary practitioners for the 21st century.

Without graduate attribute reform, three major issues come to the fore. Firstly, a new set of empirically-based national attributes need to be developed, validated, trialled and revised that are at a higher level than a vocational diploma. Present undergraduate diploma competencies, whilst providing foundational skills and knowledge at a novice

level, these are quickly superseded (usually in the first year of study) by the higher Bachelor level qualifications. The reality is the undergraduate diploma level competencies have become educationally incongruent since a clear linkage between learning objectives and activities cannot be achieved or matched in the final years of study both in coursework and clinical placement learning contexts (ACAP, 2009b). The findings of this pilot study provide the Australian paramedic discipline with a set of national graduate attributes that are i) empirically-based for the Australian context, and ii) geared for reforming tertiary-level curriculum and employment requirements. This offers a potential solution to the ongoing issue surrounding the notion of work-readiness versus job-readiness, as the paramedic industry expectations would match the quality of paramedic graduates (CAA, 2006a; Edwards, 2011; Willis, Pointon, & O'Meara, 2009a).

Secondly, this educational ambiguity creates the potential for professional encroachment, with the notion of a non-professional identity continuing to create an imbalance in national education, training, and provision of standards. This uncertainly not only impacts the potential transition into extended scope of practice roles such as physician assistant and paramedic practitioner roles, but is fundamentally undermining what is defined as a *paramedic*. Other professions such as nursing, medicine, dentistry, and physiotherapy, as well as a number of international paramedic groups (United States, Canada, and United Kingdom) have achieved national standards, national accreditation, a sense of work-readiness versus job-readiness and fitness for practice, and a set of prescribed graduate attributes. The Australian paramedic discipline presently has none of these and consequently remains a *semi-profession*, without national registration or regulation (Williams, Onsman, & Brown, 2009).

Thirdly, greater communication must occur between universities, ambulance services, paramedic peak bodies, state health departments, state and federal governments, and registration/regulation boards needs to occur. This will ensure the employability of paramedic graduates and that graduates have the necessary skills, knowledge, and attributes that best meet their local needs, but also the broader health care requirements. At present, this does not effectively occur on a local, state, or national basis. The product

of this ineffectiveness and uncertainty of graduate attributes is manifested by education and training inefficiencies and reinforces the confusion surrounding work-ready versus job-ready and notion of fitness for practice (Willis, et al., 2009a; Willis, Williams, Brightwell, O'Meara, & Pointon, 2010). For example, university graduates, once employed, are generally re-trained by the ambulance service that employs them over a lengthy period (often 12-18 months) creating extensive educational overlap and the potential for 'de-learning'.

The first paper (Kilner, 2004a) of the two-part series concluded that paramedic education and training continued to develop curriculum without being informed, clearly articulating, or acknowledging what desirable attributes staff would exit their training programs. In the second part of this series, Kilner (2004b) informed by earlier findings from a Delphi study, used factor analysis to explore the inter-relations between three paramedic occupational groups. Kilner argued that paramedic education and training has not responded to changes from both within the paramedic discipline or from the broader health care sector, views that are held by many in paramedic circles in Australia. Similar educational imbalances between pedagogical purpose and desirable professional attributes were also highlighted up by Kilner (2004a) where he argued that similar curriculum disparity occurred due to large components of the curriculum not being linked between what was taught and what was needed. While different benchmarks exist between paramedic education and training in United Kingdom and Australia, parallels do exist with what should be included in core paramedic curriculum. These parallels are reflected in similar item loading between Kilner's study (2004b) and this pilot study. For example, factor 1 (Personal characteristics) in both studies included items such as non-judgemental, non-discriminatory, caring, empathic and recognising personal limitations, again indicating that graduate attributes between the two countries have some unity. Given the differences in governance, educational models, and when these two studies were undertaken, opportunities exist for the investigation of international paramedic curriculum in determining if correlations or associations exist. In other words, should an international paramedic curriculum blueprint or educational consensus be created?

It is argued that the Australian paramedic discipline has not established its own a unique body of knowledge (Williams et al., 2009). The establishment of these attributes will assist the paramedic discipline in its quest to becoming a fully recognised *profession*, by developing a defined *standardised* and specialised unique body of knowledge base based on research-led, evidence-based practice. For example, factor solution 9 (Evidence base practice) included attributes such as integrating preventative health care into clinical care and incorporating enquiry and research into practice. Reynolds (2004) has argued that research-led practice not only generates unique knowledge, but also importantly differentiates paramedics from others in the divisions of labour.

Many other health care disciplines such as nursing, midwifery, medicine, dentistry, occupational therapy, physiotherapy, pharmacy, optometry, and speech pathology provide examples of the use and necessity for both generic graduate attributes and discipline-specific competencies. Graduate attributes are required underpin registration and regulation requirements (Council of Australian Governments, 2008). Some of these disciplines emphasise the need for explicit graduate attributes and competencies that establish the relevant learning outcomes that best meet professional, industry, societal, and health care needs. This point is illustrated by the work undertaken by Kilner (2004a; 2004b).

A range of issues and potential strategies have been raised in the rhetoric and arenas of critical debate. However, a number of areas are most applicable to the paramedic discipline including understanding employer and graduate needs, and secondly, how to ensure graduate attributes are integrated into undergraduate curriculum. These areas have yet to be adequately articulated and researched from an Australian paramedic context.

While results from the pilot study have guided and informed the researcher of the potential strengths and weaknesses of the research project and therefore the basis to undertake a larger national study, specific results and generalisability should be interpreted with caution, particularly given the small sample size. Another limitation of the study was the use of convenience sampling. Despite this limitation, the results

between different groups have raised some interesting questions. Recommendations for future research include establishing further construct and content validity using a larger sample size from a broader cross-section and randomised sampling methods of the paramedic population, and utilising these graduate attributes in the development of a paramedic curriculum framework.

Summary

This chapter has covered the development of the instrument including a literature search, a pre-pilot study validation, pilot study, and pilot study results. A literature search of graduate attributes from paramedic and non-paramedic sources was first undertaken followed by pre-pilot questionnaire which was undertaken by ten educators and researchers known to the researcher to test face validity and content validity as well as gather constructive feedback. The literature search and pre-pilot validation process provided the foundation to the pilot study which was comprised of three sections (demographics, professionalisation, and graduate attributes) and 64 questions. The pilot study (Paramedic Graduate Attribute Scale [PGAS]) was completed by 63 participants during a Paramedic Academic Network, involving paramedic personnel from around Australia and New Zealand, this provided a further opportunity for review and input by a group of content experts. The descriptive results have been examined and reported. In addition, an EFA was undertaken on the graduate attribute section of the PGAS that produced 10 factors that were internally consistent and reliable.

The development of the pilot results of the PGAS have yet to be undertaken or reported in the Australian paramedic literature, emphasising the importance of this study and development of new knowledge these results bring. Informed by the pilot study, and the EFA findings, the next chapter will outline the full National Study.

Chapter 5

The National Study

Introduction

The previous chapter described the development of the questionnaire instrument, and described the three stages of the process: stage 1: *questionnaire development*, stage 2: *pre-pilot validation process* and stage 3: *pilot study*. The objectives of the pilot study were to determine whether the paramedic membership wanted to become a profession and establish construct validity on the most important paramedic graduate attributes. Analyses of the professionalisation results highlighted two points. Firstly, the paramedic discipline is *not* considered to be a profession by practitioners. And secondly, practitioners in the paramedic discipline *want* to become recognised as a profession.

Examination of the graduate attributes, their construct validity and underlying factor structure were undertaken using exploratory factor analysis (EFA), providing an assessment and evaluation of their unidimensionality. Using EFA, the best fit for the pilot study data generated a 10-factor solution. In addition to the reduction of the number of items, an examination of the internal consistency of the 10 factor scales indicated that Cronbach alpha coefficients were well above the required levels in exploratory research studies. These analyses subsequently assisted in developing the Paramedic Graduate Attribute Scale (*PGAS*), the instrument which was used for the National Study. While the pilot study results proved that factor analysis was an appropriate data analysis approach, the larger National Study sample size served two purposes. Firstly, the larger sample size improved the robustness of the *PGAS* while reducing measurement error and secondly, offered a broader cross-sectional analysis of the results.

The purpose of the National Study was to investigate whether the paramedic membership wanted to become a profession and establish the construct validity of the most important

paramedic graduate attributes. The chapter will provide an overview of the National Study, its methodology, analysis, and findings. Each of these components will be presented in 4 parts. Part 1 will include the procedures, sample group, administration of the questionnaire, ethical implications and considerations, data collection methods, and data analysis. Part 2 will examine the descriptive and comparative results. Part 3 will describe the factor analysis results and part 4 will discuss Rasch analysis findings.

The purpose of this chapter is to describe the National Study which, builds on the exploratory work generated from the pilot study, seeks to examine the professional state of the discipline, to develop and test paramedic graduate attribute models, and further examine the construct validity of the graduate attributes using the Rasch analysis model. The factor subscales provide the paramedic discipline with its first set of empirically-based graduate attributes, thus offering the discipline an opportunity to standardise its university-based curriculum nationally. Informed by the pilot study findings, this chapter will outline the questionnaire refinement, methodology, and results from the National Study. Subscale validity and construct validity will be analysed and evaluated.

Part 1: Methodology

Background

Following the analysis of the pilot study and the best-fit solution of 10 factors, the *PGAS* was formatted for distribution for the National Study (Appendix C). The distribution of the *PGAS* was via a mail-out to all financial members of the Australian College of Ambulance Professionals (ACAP). Distribution of the *PGAS* coincided with the *Response Magazine* (Spring Edition), which is the national paramedic magazine circulated to all ACAP members on a quarterly basis. While ethical approval was granted for the study, further consent for distribution was sought from the ACAP National Secretary (Mr Les Hotchin) and Magazine Editor (Mrs Amy Cotton). A total of 3800 questionnaires, explanatory statements, and replied paid envelopes were posted to the distribution company for mail out on the 4th of October 2008. Several telephone conversations took place between the distribution company manager and researcher.

These discussions outlined the aims of the questionnaire, costing, thus ensuring that the questionnaire, explanatory statement, and replied paid envelopes were inserted inside the magazine. Three thousand eight hundred members received the *Response Magazine* (Spring Edition) during the last two weeks of October 2008.

Sampling/Participants

A non-probability convenience sampling approach was used for the National Study. This type of sampling is commonly used and appropriate for validating instruments (Roberts & Taylor, 2002). Participants who were invited to take part in this study were financial members (e.g., paid membership fees) of ACAP ($n=3800$). The latest salaried-paramedic employment figures are quoted at 9,491 (Council of Ambulance Authorities [CAA], 2008), suggesting that approximately 40% of all Australian paramedic personnel were sampled. This figure may be slightly less given the move towards student ACAP memberships, which are not identified in the salaried membership. Members from all states and territories were included in the sample.

Sampling error, while beyond the control of the researcher (Gay, 1987) is an important factor in selecting sample sizes. Once such example in this sample group was the likely occurrence of gender error, particularly given the traditional male dominated paramedic workforce. Potential selection bias and sampling bias were at least partially reduced by the large representative sample size, although attempts at reducing selection bias and sampling bias were anticipated by the large representative sample size; although it is important to note that large sample sizes do not necessarily eliminate sampling bias (Graziano & Raulin, 2007; Huck, 2008; Isaac & Michael, 1997).

Instrumentation

A cross-sectional survey design using a paper-based self-report questionnaire was adopted for the National Study. As outlined above, the *PGAS* was developed to investigate two broad areas: professionalisation and paramedic graduate attributes. The *PGAS* contained three sections:

Section 1: Demographics (6 questions)

Section 2: Professionalisation (8 questions)

Section 3: Graduate Attributes (47 questions)

The questionnaire used a five point Likert-type scale in order of increasing importance in Sections 2 and 3 where:

1 = Strongly disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly agree

The PGAS required participants to enter relevant demographic data (Section 1) and rate the importance of each question from (Sections 2 and 3) using a 5-point Likert-type scale. Section 1 asked participants about their personal and professional characteristics, while section 2 asked participants about their views on the current and future standing of the professionalisation of the Australian paramedic discipline. The third section was composed of 47 graduate attributes questions. Unlike the pilot study, the 47 attributes were not categorised under any section title or sub-heading, and were randomly ordered throughout section 3. This approach was taken to minimise any influence or bias that the headings or titles might have had on item responses given by respondents.

Procedures

Members of ACAP who received a copy of the Spring Edition of *Response Magazine* were informed about and invited to participate in the study. Each magazine included the PGAS, attached explanatory statement and replied paid envelopes. While no empirical evidence suggests that replied paid envelopes directly increase questionnaire completion rates, their potential positive influence is nevertheless well documented in the literature (Armstrong & Luske, 1987; Dillman, 1991, cited in Dillman, 2007).

In addition to the explanatory statement and replied paid envelopes a cover page was also attached to the PGAS. The cover page included several probing questions (e.g., what best defines what we do as paramedics? Do you have views on what we should be teaching paramedic undergraduates?) with the anticipation of encouraging participation while at the same time respecting what each potential participant could offer the study. The inclusion of the cover page served two purposes. Firstly, as a marketing strategy to ‘capture’ participants attention to the importance of the study. Secondly, to highlight the positive regard the researcher had for each potential participant. This positive approach has been suggested to improve questionnaire completion rates (Thibaut & Kelley, 1959, cited in Dillman, 2007).

Participants were informed that the questionnaire was anonymous and no identifying codes or names would be used or collected by the researcher. Following the description of the study, participants were asked to complete the 61-item questionnaire. Participants were also advised that the questionnaire would take approximately 15 minutes to complete. While there is no evidence that reducing the questionnaire pages will improve response rates (Dillman, 2007), it is likely that a short questionnaire would facilitate a higher response rate. The *PGAS* was contained in 3 pages, with the cover page and explanatory statement 1 page each. The 5 page questionnaire comfortably fitted inside the replied paid envelope ensuring that respondents were able to complete and return it in a simple and uncomplicated fashion.

Ethical Issues

Several ethical issues were considered in undertaking this study, including addressing formal approval processes, ensuring the confidentiality and anonymity of participants and the secure storage of data. As with any study involving humans, privacy and anonymity of participants and their information was an important factor within this study.

According to Roberts and Taylor (2002), anonymity must ensure that individuals will not be identified or compromised. Ethical approval was sought and received from the Monash University Standing Committee on Ethics in Research Involving Humans (SCERH - CF08/1124). Participants were informed about the study and its aims via an

explanatory letter distributed with the *PGAS*. Participants were advised that the explanatory letter was for them to keep, allowing them to make contact with the researcher or the SCERH if they wanted to.

Ethical research involves full disclosure of the study to potential respondents. Gaining consent from potential participants prior to commencing data collection was an important consideration in this study. Consent involves an agreement that participants will take part and contribute to the study (Roberts & Taylor, 2002). It also involves informing potential participants about the overall purpose of the research, its aims, possible benefits, risks (if any), what is involved in the research, and how much time the research will take (Roberts & Taylor, 2002). There were no exclusion criteria.

Participants were advised of the anonymous nature of the study and that they were under no obligation to consent to participate in the study. However if consent was given, they could only withdraw from the study prior to submitting the questionnaire. The return of the *PGAS* implied consent on the part of the study participant. There was a follow-up email to ACAP members seeking unreturned questionnaires. No incentives were offered and the same questionnaire format was used for all participants who agreed to take part. Questionnaires were returned by replied paid envelopes addressed to the researcher. All questionnaires were collected by administration staff at the researcher's academic department. All cover pages, explanatory statements (that were not kept by participants) were removed from the *PGAS*. Each *PGAS* was then placed in a cardboard box that was located in a secure location inside the academic department administration office. The *PGAS* were then collected by the researcher for data entry.

Data Analysis

All data was entered in an Excel spreadsheet. Data was then exported into the Statistical Package for the Social Sciences (SPSS) Version 17.0, SPSS Inc., Chicago, Illinois, U.S.A. Descriptive statistics and *t*-test or one-way analysis of variance (ANOVA) test was used to compare the differences between gender, age group, occupation, geographic location and length of occupation. Parametric tests were used despite the data being

ordinal level. Although methodologists hotly debate the use parametric testing with ordinal level data, a growing body of literature now support its use (Norman, 2010; Wright, 1997; 2003). For example, Norman (2010) notes, "... but fail to account for the robustness of parametric tests, and ignore a substantial literature suggesting that parametric statistics are perfectly appropriate" (p. 626). All confidence intervals (CIs) were 95%, $p < 0.05$ was considered statistically significant, and all tests were 2-tailed unless otherwise stated.

Effect sizes (d) were also calculated. Effect sizes are a measure of the difference between the group means, and make the important distinction between statistical significance and practice significance (Graziano & Raulin, 2007, Huck, 2008; Wright, 2003). Moreover, Wilkinson and the APA Task Force on Statistical Inference (1999, cited in Fan, 2001) noted that researchers should "Always provide some effect-size estimate when reporting a p value" (p. 277). An effect size of 0.02 is considered small, a 0.05 is considered medium and 0.08 is considered large (Cohen, 1992).

The data were also analysed via Exploratory Factor Analysis using Principal Components Analysis (PCA) followed with Oblimin Rotation. The identified viable factors were then subjected to analysis using the Rasch Model using Rating Scale Model (Andrich (1978). The Rasch analyses investigated three aspects of the *PGAS*: i) item fit, ii) unidimensionality, and iii) differential item functioning (DIF).

Data Management

While data management and documentation is often considered unexciting (Peat & Barton, 2005), its thoroughness and level of detail is critical in the final statistical analyses. A thorough approach to data management will minimise data errors and inaccurate data that ultimately can compromise research outcomes (Kranenzle & Deenan, 2004). In preparing for data collection, a comprehensive coding sheet was developed for the data entry personnel. Coding instructions were presented on one page, and were made as clear as possible to avoid confusion; given that this is perhaps unavoidable despite best efforts. Kranenzle and Deenan (2004) add "Because human error will occur

with even the best training complete and accurate data collection can be enhanced with careful design of the data collection forms” (p. 125). In addition to this, the coding sheet also included a brief background on data entry ‘do’s’ and ‘don’ts’.

All data was collected on an Excel spreadsheet and saved as one file. The accuracy of data was checked comparing original questionnaire data and a random selection of 15% from the computer data set. The selection of 15% has been suggested to be an adequate method for data verification (Barhyte & Bacon, 1998). All missing data were excluded from the analysis. While it is common practice to replace missing values particularly in clinical longitudinal studies, in data sets where missing values are small and occur randomly, it is suggested they are removed (Peat & Barton, 2005).

Following data verification, each variable was examined for skewness and kurtosis in determining whether data were normally distributed. In examining distribution, the above +3 and below -3 rule suggested by (Peat & Barton, 2005) was used. Furthermore visual inspection for univariate outliers was undertaken using Q-Q plots checking for normality. The next section will now report the descriptive and comparative results.

Part 2: Descriptive and Comparative Results

A total of $n=818$ questionnaires were initially returned over a 4-week period. A follow-up email was sent to ACAP members highlighting that having an agreed set of graduate attributes would not only assist in standardising paramedic curriculum, but would also strengthen the claims for registration and pursuit of professional status. The follow-up email attracted a further $n=72$ participants increasing the return rate from 21.5% to 23.4%.

The characteristics of the participants are described in relation to age, gender, geographic location, employment status, current professional role, and length of current professional role. The overall response rate was 23% (Table 5.1)

Table 5.1: Summary of returned questionnaires

National Study	
	<i>n</i> (%)
Issued	3800
Returned	890 (23.4)
Discarded	18 (2.0)
Used	872 (22.9)

Section 1 - Demographic Results

The ages of participants ranged from 18 to 75, indicating adequate representation of the paramedic membership. The overall mean age was 40.71 years with a standard deviation of 9.92. Currently, 81% of the Australian workforce is aged less than 50 years of age (CAA, 2009a). The participants' ages were recorded individually in the questionnaire; Table 5.2 reports the age distribution of participants.

Table 5.2: Age of the participants

Age Group	<i>n</i>	%
<20	4	0.5
20-24	44	5
25-29	81	9.3
30-34	89	10.2
35-39	174	20.0
40-44	168	19.3
45-49	137	15.7
50-54	105	12
55-59	44	5
> 60	26	3.0
Total	872	100%

As expected the number of male participants was higher than their female counterparts given the traditional male dominated paramedic workforce. Actual gender distribution is not reported (CAA, 2009a). Over-thirds of participants were male ($n=650$; 74.5%) with the remaining number ($n=222$; 25.5%) being female.

The majority of participants lived in New South Wales ($n=342$; 39.2%), Victoria ($n=160$; 18.3%) or Queensland ($n=135$; 15.5%). Only two participants lived outside of Australia. All states and territories were represented in the national study. Table 5.3 reports the distribution of where participants lived.

Table 5.3: Geographic location

Residency	<i>n</i>	%
Victoria	160	18.3
Tasmania	32	3.7
New Zealand	1	0.1
Australian Capital Territory	26	3.0
Queensland	135	15.5
South Australia	87	10.0
Western Australia	72	8.3
New South Wales	342	39.2
Northern Territory	16	1.8
South Africa	1	0.1
Total	872	100%

Regarding where participants were employed, the vast majority of participants worked for an ambulance service ($n=807$; 92.5%), followed by university undergraduates ($n=24$; 2.8%), and academic staff members ($n=22$; 2.5%). The remaining participants were employed either in a hospital, defence department, or other setting (e.g., health department). The distribution of results can be seen in Table 5.4.

Table 5.4: Employment status

Employment Status	<i>n</i>	%
Ambulance Service	807	92.5
University	22	2.5
Hospital	7	0.8
University Student	24	2.8
Defence	8	0.9
Other	4	0.5
Total	872	100%

The vast majority of participants were paramedics ($n=701$; 80.4%), followed by paramedic clinical instructors ($n=62$; 7.1%), paramedic managers ($n=45$; 5.2%), and undergraduate and graduate paramedic students ($n=32$; 3.7%). The distribution of professional roles is listed in Table 5.5.

Table 5.5: Current professional role

Current Role	<i>n</i>	%
Paramedic	701	80.4
Paramedic Manager	45	5.2
Paramedic Clinical Educator	62	7.1
Academic	21	2.4
Student	32	3.7
Nursing	4	0.5
Other	7	0.8
Total	872	100%

Participants were employed in their current professional role ranging from 3 months to 45 years with a mean of 9.41 (SD=8.48). Table 5.6 reports the distribution.

Table 5.6: Length of professional role

Length of Employment	<i>n</i>	%
< 12 months	13	1.5
1-5	383	43.9
6-10	178	20.4
11-15	123	14.1
16-20	91	10.4
21-25	29	3.3
26-30	32	3.7
>31 years	23	2.6
Total	872	100%

The next section will summarise the descriptive statistics of Section 2 – Professionalisation and Section 3 – Graduate Attributes. This will also include the factor analysis of Section 3 - graduate attributes and assessment of the item loadings in the development of the final questionnaire.

Section 2 - Professionalisation Results

The majority of participants rated highly that the paramedic discipline would benefit from being recognised as a full profession ($M=4.75$, $SD=0.54$) and that the Higher Education sector has an important part to play in this process. These results are highlighted with the moderate mean score of 3.83 ($SD=0.94$) indicating that the discipline already exhibits the traits of a professional body. The majority of participants agreed that they believed that national registration would not occur within the next 2 years ($M=2.90$, $SD=1.03$). In response to the question of whether the discipline should align itself with nursing or medicine to improve its chances of becoming a profession, participants preferred an alliance with medicine ($M=3.31$, $SD=1.16$) to, one with nursing ($M=2.37$, $SD=1.17$). Further distribution of scores is reported in Table 5.7.

Table 5.7: The professionalisation of paramedics (n=872)

Professionalisation of Paramedics	Mean	CI 95%	SD
The Australian Paramedic sector will benefit from becoming recognised as a profession.	4.75	4.72-4.79	0.54
The Australian Paramedic sector already exhibits the characteristics of a profession.	3.83	3.77-3.89	0.94
The Australian Paramedic sector already possesses its own unique body of knowledge.	3.95	3.89-4.01	0.85
The Australian Paramedic sector already has a high degree of clinical autonomy in the provision of emergency health care.	3.78	3.71-3.84	0.96
The Australian Paramedic sector will have national registration within the next 2 years.	2.90	2.84-2.97	1.03
The Australian Paramedic sector should align itself with Nursing to enhance its chances of becoming a profession.	2.37	2.29-2.45	1.17
The Australian Paramedic sector should align itself with Medicine to enhance its chances of becoming a profession.	3.31	3.23-3.39	1.16
The Australian Paramedic sector depends upon Higher Education to enhance its chances of becoming a profession.	3.98	3.91-4.04	0.96

The findings from the National Study suggest two points in relation to the professional status of paramedics in Australia. Firstly, the paramedic discipline is *not* a profession. And secondly, the paramedic discipline *wants* to become recognised as a full profession. Other findings suggest alignment with other professions such as nursing and medicine is not strongly supported. This fact is reinforced by the results indicating that respondents believed that the discipline can function independently by demonstrating high levels of autonomy and possessing a unique body of knowledge. Results also suggest Australian paramedics do not believe the discipline will obtain national registration within the next two years.

In order to determine if significant differences exist between identifiable subgroups (i.e., gender, geographic location, number of years of work experience) within the national paramedic sample, independent-sample *t*-test and one-way ANOVA with post-hoc tests were utilised. Undertaking this type of analysis provided insight about whether section 1 factors (such as age, gender, where they worked, what positions participants held and for

how long, and where participants lived) had an impact on section 2 results. These will now be briefly discussed.

Gender

An independent-samples *t*-test was conducted on each of the items in section 2 for male and female participants. All but one of the items ('the Australian Paramedic sector already exhibits the characteristics of a profession') was statistically significant indicating a large trend of differing opinions between male and female respondents. The item suggesting 'paramedics will benefit from becoming recognised as a profession' was significantly different for both female ($M=4.86$, $SD=0.38$) and male ($M=4.72$, $SD=0.58$; $t(870) = -3.39$, $p=0.001$) respondents. The magnitude of the differences in the mean scores (mean difference = $-.143$, 95% CI: $-.226$ - $-.061$) was large ($d=0.14$). The item suggesting the paramedic sector already possesses its own unique body of knowledge was also statistically significantly different for female ($M=4.10$, $SD=0.80$) and male ($M=3.90$, $SD=0.86$; $t(870) = -3.15$, $p=0.002$) respondents. The magnitude of the differences in the mean scores (mean difference = $-.208$, 95% CI: $-.338$ - $-.079$) was large ($d=0.11$). Other results are reported in Table 5.8.

Age groups

A one-way ANOVA with post-hoc test was conducted to evaluate the impact of respondents' age. There was a statistically significant difference at the <0.05 level in several items within section 2. Responses from participants from the 25-29, 30-34, 40-44, and 55-59 year age groups produced a significant effect regarding whether the 'paramedic discipline exhibited characteristics of a profession', $F(9, 862) = 2.66$, $p=0.005$, $d=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean scores for 30-34 year age group ($M=4.04$, $SD=0.81$), 25-29 year age group ($M=3.96$, $SD=0.94$), and 40-44 year age group ($M=3.90$, $SD=0.83$) were all significantly different to 55-59 year age group ($M=3.39$, $SD=1.22$). Although statistical significance was reached, the effect size was small.

Participants from the 20-24, 35-39, 40-44, 45-49, and 60-75 year age groups produced a significant effect regarding the notion that the 'paramedic sector possessed a unique body of knowledge', $F(9, 862) = 3.55, p < 0.0001, d = 0.03$. Post-hoc comparisons using Tukey HSD indicated that the mean scores for 20-24 year age group ($M=3.75, SD=0.86$), 35-39 year age group ($M=3.75, SD=0.94$), 40-44 year age group ($M=4.07, SD=0.82$), and 45-49 year age group ($M=3.88, SD=0.92$) were significantly different from the 60-79 year age group ($M=4.50, SD=0.51$). Again, although statistical significance was reached the effect size was small.

Participants from the 25-29, 30-34, 35-39, and 60-75 year age groups produced a significant effect regarding the notion that the 'paramedic sector possessed clinical autonomy', $F(9, 862) = 4.24, p < 0.0001, d = 0.04$. Post-hoc comparisons using Tukey HSD indicated that the mean scores for 25-29 year age group ($M=4.09, SD=0.82$), 30-34 year age group ($M=4.06, SD=0.77$), 60-75 year age group ($M=4.27, SD=0.66$) were significantly different from the 35-39 year age group ($M=3.53, SD=1.08$).

Table 5.8: Independent samples test (Gender - Section 2)

		t-test for Equality of Means								
		Levene's Test for Equality of Variances								
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Recognised as a profession	Equal variances assumed	42.234	.000	-3.398	870	.001	-.143	.042	-.226	-.061
	Equal variances not assumed			-4.146	586.773	.000	-.143	.035	-.211	-.075
Exhibits characteristics of profession	Equal variances assumed	7.467	.006	-1.202	870	.230	-.089	.074	-.234	.056
	Equal variances not assumed			-1.277	428.635	.202	-.089	.069	-.225	.048
Unique body of knowledge	Equal variances assumed	.682	.409	-3.159	870	.002	-.208	.066	-.338	-.079
	Equal variances not assumed			-3.271	407.790	.001	-.208	.064	-.333	-.083
Clinical autonomy	Equal variances assumed	4.235	.040	-2.534	870	.011	-.190	.075	-.337	-.043
	Equal variances not assumed			-2.569	392.050	.011	-.190	.074	-.335	-.045
Registration with two years	Equal variances assumed	1.420	.234	-4.475	870	.000	-.357	.080	-.514	-.201
	Equal variances not assumed			-4.633	407.562	.000	-.357	.077	-.509	-.206

Alignment with Nursing	Equal variances assumed	.614	.433	-2.890	870	.004	-.263	.091	-.442	-.084
	Equal variances not assumed			-2.942	395.195	.003	-.263	.089	-.439	-.087
Alignment with Medicine	Equal variances assumed	.847	.358	-2.036	870	.042	-.183	.090	-.359	-.007
	Equal variances not assumed			-2.084	398.692	.038	-.183	.088	-.355	-.010
Depends on Higher Education	Equal variances assumed	.030	.862	-2.374	870	.018	-.177	.075	-.324	-.031
	Equal variances not assumed			-2.441	402.214	.015	-.177	.073	-.320	-.034

Responses from participants from the 25-29, 35-39, 40-44, 45-49, and 50-54 year age groups produced a significant effect regarding the notion that the paramedic sector depends on Higher Education to achieve professional status, $F(9, 862) = 3.84, p < 0.0001, d = 0.03$. Post-hoc comparisons using Tukey HSD indicated that the mean scores for 25-29 year age group ($M = 4.10, SD = 0.93$), 35-39 year age group ($M = 4.20, SD = 0.89$), 40-44 year age group ($M = 4.05, SD = 0.85$) were significantly different from the 50-54 year age group ($M = 3.59, SD = 1.13$). Again, although statistical significance was reached the effect size was small.

The remaining results can be found in Table 5.9.

Table 5.9: One-way ANOVA (Age - Section 2)

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Recognised as a profession	Between Groups	1.811	9	.201	.672	.735
	Within Groups	258.178	862	.300		
	Total	259.990	871			
Exhibits characteristics of profession	Between Groups	21.214	9	2.357	2.661	.005
	Within Groups	763.666	862	.886		
	Total	784.881	871			
Unique body of knowledge	Between Groups	22.642	9	2.516	3.555	.000
	Within Groups	610.036	862	.708		
	Total	632.678	871			
Clinical autonomy	Between Groups	34.509	9	3.834	4.247	.000
	Within Groups	778.330	862	.903		
	Total	812.839	871			
Registration with two years	Between Groups	30.989	9	3.443	3.268	.001
	Within Groups	908.111	862	1.053		
	Total	939.100	871			
Alignment with Nursing	Between Groups	16.425	9	1.825	1.325	.219

	Within Groups	1187.190	862	1.377		
	Total	1203.615	871			
Alignment with Medicine	Between Groups	15.084	9	1.676	1.255	.258
	Within Groups	1151.315	862	1.336		
	Total	1166.399	871			
Depends on Higher Education	Between Groups	31.229	9	3.470	3.848	.000
	Within Groups	777.265	862	.902		
	Total	808.494	871			

Geographic location

A one-way ANOVA with post-hoc test was conducted to examine if the geographical location where participants lived impacted the way that individuals responded. The results indicated that there is a significant difference at the <0.05 level in the responses from the various subsets in regard to all but one item ('paramedic sector possessing a unique body of knowledge') in section 2. New Zealand and South Africa respondents were excluded from the data analysis because of low sample sizes. Participants produced a significant effect regarding the notion that the 'paramedic sector will benefit from becoming recognised as a profession', $F(7, 862) = 3.27, p < 0.002, d = 0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants from Victoria ($M=4.62, SD=0.67$) was significantly different from Queensland ($M=4.87, SD=0.42$), and South Australia ($M=4.87, SD=0.36$).

Participants from each geographical region produced a significant effect regarding the notion that the 'paramedic sector already exhibits the characteristics of a profession', $F(7, 862) = 6.56, p < 0.001, d = 0.05$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants from Tasmania ($M=3.53, SD=0.83$) was significantly different from the Australian Capital Territory ($M=4.31, SD=0.67$) and South Australia ($M=4.24, SD=0.92$).

Participants from each geographical region produced a significant effect regarding the notion that the 'paramedic sector depends upon Higher Education to enhance its chances of becoming a profession', $F(7, 862) = 5.03, p < 0.001, d = 0.03$. Post-hoc comparisons

using Tukey HSD indicated that the mean score for participants from Victoria (M=3.79, SD=1.11) and Queensland (M=3.88, SD=0.95) were significantly different from South Australia (M=3.88, SD=0.08) and Western Australia (M=4.35, SD=0.73). Although statistical significance was reached, the effect size was small. The ANOVA results are reported in Table 5.10.

Table 5.10: One-way ANOVA (Geographic location - Section 2)

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Recognised as a profession	Between Groups	6.730	7	.961	3.274	.002
	Within Groups	253.138	862	.294		
	Total	259.868	869			
Exhibits characteristics of profession	Between Groups	39.547	7	5.650	6.564	.000
	Within Groups	741.952	862	.861		
	Total	781.499	869			
Unique body of knowledge	Between Groups	5.237	7	.748	1.034	.405
	Within Groups	623.637	862	.723		
	Total	628.875	869			
Clinical autonomy	Between Groups	43.137	7	6.162	7.001	.000
	Within Groups	758.804	862	.880		
	Total	801.941	869			
Registration with two years	Between Groups	22.139	7	3.163	2.988	.004
	Within Groups	912.505	862	1.059		
	Total	934.644	869			
Alignment with Nursing	Between Groups	69.045	7	9.864	7.519	.000
	Within Groups	1130.798	862	1.312		
	Total	1199.844	869			
Alignment with Medicine	Between Groups	29.014	7	4.145	3.147	.003
	Within Groups	1135.193	862	1.317		
	Total	1164.207	869			
Depends on Higher	Between Groups	31.697	7	4.528	5.031	.000

Education	Within Groups	775.843	862	.900
	Total	807.540	869	

Current role

An independent-samples *t*-test was also completed on each of the items in section 2 for participants from the paramedic industry and Higher Education. The item suggesting the ‘paramedic sector should align itself with nursing to enhance its chances of becoming a profession’ was statistically significant for academics ($M=2.95$, $SD=1.13$) and paramedic staff ($M=2.35$, $SD=1.18$ $t(827) = -3.09$, $p=0.002$). The magnitude of the differences in the means (mean difference = $-.604$, 95% CI: -1.10 - $-.101$) was large ($d=0.25$). The item suggesting the ‘paramedic sector depends upon Higher Education to enhance its chances of becoming a profession’ was statistically significant for academics ($M=4.41$, $SD=1.09$) and paramedic staff ($M=3.96$, $SD=0.95$; $t(827) = -2.44$, $p=0.01$). The magnitude of the differences in the means (mean difference = $-.448$, 95% CI: $-.856$ - $-.039$) was large ($d=0.21$). Other results can be found in Table 5.11.

Table 5.11: Independent samples test (Current role - Section 2)

		t-test for Equality of Means								
		Levene's Test for Equality of Variances							95% Confidence Interval of the Difference	
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Recognised as a profession	Equal variances assumed	3.116	.078	-.878	827	.380	-.107	.122	-.347	.132
	Equal variances not assumed			-1.328	22.576	.197	-.107	.081	-.274	.060
Exhibits characteristics of profession	Equal variances assumed	1.902	.168	.664	827	.507	.140	.211	-.274	.555
	Equal variances not assumed			.950	22.277	.352	.140	.148	-.166	.446
Unique body of knowledge	Equal variances assumed	1.831	.176	-1.925	827	.055	-.360	.187	-.727	.007
	Equal variances not assumed			-3.416	23.684	.002	-.360	.105	-.578	-.142
Clinical autonomy	Equal variances assumed	6.837	.009	-.445	827	.656	-.095	.213	-.513	.323
	Equal variances not assumed			-.645	22.343	.525	-.095	.147	-.399	.210
Registration with two years	Equal variances assumed	5.276	.022	-.912	827	.362	-.210	.231	-.663	.242
	Equal variances not assumed			-.715	20.627	.483	-.210	.294	-.823	.402

Alignment with Nursing	Equal variances assumed	.136	.712	-3.094	827	.002	-.806	.261	-1.318	-.295
	Equal variances not assumed			-2.954	20.953	.008	-.806	.273	-1.374	-.239
Alignment with Medicine	Equal variances assumed	.852	.356	-.146	827	.884	-.038	.258	-.544	.468
	Equal variances not assumed			-.159	21.272	.875	-.038	.236	-.528	.453
Depends on Higher Education	Equal variances assumed	.011	.916	-2.447	827	.015	-.520	.212	-.936	-.103
	Equal variances not assumed			-2.874	21.485	.009	-.520	.181	-.895	-.144

Length of employment

A one-way ANOVA with post-hoc test was conducted to investigate the relationship between how long participants had been employed and how they rated some items. There was a statistically significant difference at the <0.05 level in all items (see Table 5.12). Participants from each group produced a significant effect regarding whether the ‘paramedic sector will benefit from becoming recognised as a profession’, $F(6, 852) = 2.28, p=0.03, d=0.01$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants employed between 1-5 years ($M=4.79, SD=0.44$) was significantly different from those employed between 21-25 years ($M=4.45, SD=1.24$). Although statistical significance was reached the effect size was small.

Participants also produced a significant effect regarding whether the ‘paramedic sector depends upon Higher Education to enhance its chances of becoming a profession’ $F(6, 852) = 3.24, p=0.04, d=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants employed between 1-5 years ($M=4.07, SD=0.88$), and 11-15 years ($M=4.02, SD=0.91$) was significantly different from those employed > 30 years ($M=3.35, SD=1.49$). Although statistical significance was reached the effect size was small.

Participants also generated a significant effect regarding whether the ‘paramedic sector would achieve national registration within the next 2 years’ $F(6, 852) = 7.60, p=0.00, d=0.05$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants employed between 1-5 years ($M=3.14, SD=0.98$) was significantly different from those employed between 6-10 years ($M=2.74, SD=0.99$), 11-15 years, ($M=2.74, SD=1.10$), 16-20 years ($M=2.57, SD=0.96$), and 21-25 years ($M=2.48, SD=0.68$). Although statistical significance was reached the effect size was medium.

Other statistically significant post-hoc comparison results can be found in Appendix D (Vol II).

Table 5.12: One-way ANOVA (Length of employment - Section 2) *n*=872

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Recognised as a profession	Between Groups	4.078	6	.680	2.284	.034
	Within Groups	253.600	852	.298		
	Total	257.679	858			
Exhibits characteristics of profession	Between Groups	26.999	6	4.500	5.129	.000
	Within Groups	747.525	852	.877		
	Total	774.524	858			
Unique body of knowledge	Between Groups	22.809	6	3.801	5.416	.000
	Within Groups	598.039	852	.702		
	Total	620.847	858			
Clinical autonomy	Between Groups	34.181	6	5.697	6.345	.000
	Within Groups	764.904	852	.898		
	Total	799.085	858			
Registration with two years	Between Groups	46.581	6	7.764	7.606	.000
	Within Groups	869.607	852	1.021		
	Total	916.189	858			
Alignment with Nursing	Between Groups	36.534	6	6.089	4.509	.000
	Within Groups	1150.511	852	1.350		
	Total	1187.045	858			
Alignment with Medicine	Between Groups	19.932	6	3.322	2.495	.021
	Within Groups	1134.157	852	1.331		
	Total	1154.088	858			
Depends on Higher Education	Between Groups	17.876	6	2.979	3.241	.004
	Within Groups	783.337	852	.919		
	Total	801.213	858			

The results from section 2 generated noteworthy findings surrounding the professional positioning of the Australian paramedic sector. Results suggest that the paramedic discipline aspires to achieve professional status; however how this will be achieved given

the pessimistic views regarding national registration is somewhat perplexing. In addition, tensions also appear to exist between some groups regarding the importance of tertiary-level paramedic education programs. While statistically significant results between gender existed, these differences are difficult to contextualise with no clear reason or causality apparent. However, significant results between length of employment and age and the resultant intergenerational differences assumptions are more obvious. For example, it is not surprising that those individuals employed for more than 30 years were unconvinced that the transition to the Higher Education sector was desirable. Conversely, those either younger or employed between 1-5 years supported the idea of the move to Higher Education sector, but were more optimistic regarding the likelihood of national registration, perhaps because they were less confronted to these ongoing political issues. Results from section 3 – graduate attributes will be now presented.

Section 3 – Graduate Attribute Results

The majority of attributes were rated as desirable, with the 45 of the 47 graduate attributes obtaining mean rating over 4. The two graduate attributes scoring less than 4 were: ‘integrating population-based care into practice’ (M=3.87, SD=0.78), and having ‘specialist knowledge’ (M=3.88, SD=0.90). There were seven graduate attributes rated 4.70 or higher; these included: ‘being trustworthy’ (M=4.83, SD=0.37), having ‘clinical competence’ (M=4.80, SD=0.40), ‘demonstrate critical thinking’ (M=4.73, SD=0.46), ‘willing to be responsible for their actions’ (M=4.73, SD=0.47), ‘being aware of accountability and confidentiality’ (M=4.71, SD=0.49), ‘operate within appropriate ethical and legal boundaries’ (M=4.70, SD=0.46), and able to ‘think critically’ (M=4.70, SD=0.48). The rating distribution of graduate attributes is reported in Table 5.13.

Table 5.13: Graduate attributes (n=872)

Attributes	Mean	CI 95%	SD
Factor 1: (Personal Characteristics)			
3.01 A professional paramedic should be non-judgemental and non-discriminatory.	4.60	4.57-4.64	0.54
3.45 A professional paramedic should be self-aware, recognising personal responsibilities and limitations.	4.49	4.45-4.53	0.56
3.03 A professional paramedic should be respectful and consider moral, ethical, social, religious aspects of healthcare.	4.67	4.63-4.70	0.50
3.11 A professional paramedic should be willing to be responsible for their actions.	4.73	4.70-4.76	0.47
3.05 A professional paramedic should be trustworthy.	4.83	4.80-4.85	0.37
3.27 A professional paramedic should be caring and empathic.	4.53	4.50-4.57	0.52
3.12 A professional paramedic should be culturally sensitive and have an inclusive approach to differences.	4.53	4.49-4.56	0.55
3.08 A professional paramedic should be able to see things from the patient's point of view.	4.54	4.42-4.66	1.79
Factor 2: (Clinical Reasoning Skills)			
3.09 A professional paramedic should understand their role in providing a primary care health service.	4.64	4.61-4.67	0.48
3.22 A professional paramedic should have a good understanding of their patients' welfare	4.48	4.44-4.52	0.55
3.04 A professional paramedic should demonstrate critical thinking	4.73	4.70-4.76	0.46
3.26 A professional paramedic should operate within appropriate ethical and legal boundaries.	4.70	4.66-4.73	0.46
3.13 A professional paramedic should be able to think critically	4.70	4.67-4.73	0.48
3.14 A professional paramedic should have developed counselling skills	4.01	3.95-4.06	0.80
3.15 A professional paramedic should be adaptable to changes in clinical practice	4.64	4.60-4.67	0.48
3.29 A professional paramedic should have clinical competence	4.80	4.77-4.82	0.40
Factor 3: (Interpersonal and Team Skills)			
3.06 A professional paramedic should be literate and numerate	4.66	4.62-4.69	0.50
3.18 A professional paramedic should be able to work in interdisciplinary teams.	4.46	4.42-4.50	0.57
3.19 A professional paramedic should the capacity to use communication and information technology effectively	4.35	4.32-4.39	0.57

and appropriately.

3.43 A professional paramedic should have effective written and oral communication skills.	4.53	4.50-4.57	0.50
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3.21 A professional paramedic should be able to accept guidance from colleagues.	4.57	4.53-4.60	0.51
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3.16 A professional paramedic should be a good listener.	4.58	4.54-4.62	0.53
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3.40 A professional paramedic should have the ability to work independently as well as a member of a team.	4.69	4.66-4.72	0.47
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3.24 A professional paramedic should value the importance of teamwork.	4.58	4.54-4.61	0.50
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Factor 4:

(Professionalism)

3.25 A professional paramedic should adhere to a code of ethics.	4.66	4.62-4.69	0.49
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3.07 A professional paramedic should be aware of, and regard for, professional issues such as; accountability and confidentiality	4.71	4.68-4.74	0.49
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3.10 A professional paramedic should follow evidence-based practice	4.44	4.40-4.49	0.63
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3.32 A professional paramedic should be committed to the discipline.	4.24	4.19-4.28	0.65
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Factor 5:

(Continuing Professional Development)

3.17 A professional paramedic should have a commitment to self-development	4.52	4.48-4.56	0.57
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3.30 A professional paramedic should attempt to attain high clinical status within the healthcare system.	4.26	4.20-4.32	0.88
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3.20 A professional paramedic should be able to provide leadership, mentoring and supervision skills.	4.43	4.38-4.47	0.65
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3.28 A professional paramedic should have the capacity to undertake self-directed approaches to learning.	4.40	4.35-4.44	0.67
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3.33 A professional paramedic should have theoretical knowledge	4.46	4.43-4.50	0.55
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Factor 6:

(Social Awareness)

3.34 A professional paramedic should contribute to continuous improvement within the healthcare system	4.21	4.16-4.26	0.74
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3.35 A professional paramedic should embrace social responsibility.	4.12	4.07-4.17	0.74
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3.36 A professional paramedic should be able to continue to learn and to help others to learn.	4.43	4.39-4.46	0.58
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Factor 7:

(Flexible Learning)

3.37 A professional paramedic should be able to apply knowledge of the basic sciences	4.31	4.27-4.35	0.66
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3.38 A professional paramedic should be able to respond to changes in the provision of health care due to evolving community expectations.	4.30	4.25-4.34	0.61
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3.39 A professional paramedic should be willing to undertake ongoing education.	4.43	4.39-4.48	0.62
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3.23 A professional paramedic should understand the role of paramedic care within the broader healthcare system	4.46	4.43-4.50	0.56
Factor 8: (Accountability)			
3.41 A professional paramedic should be able to take responsibility for quality of care and health outcomes.	4.46	4.42-4.50	0.58
3.42 A professional paramedic should demonstrate clinical reasoning skills.	4.61	4.58-4.65	0.49
Factor 9: (Evidence-based Practice)			
3.31 A professional paramedic should integrate population-based care into their practice	3.87	3.81-3.92	0.78
3.44 A professional paramedic should practice preventative healthcare	4.07	4.01-4.13	0.84
3.02 A professional paramedic should have the capacity for enquiry and research	4.49	4.45-4.53	0.60
Factor 10: (Self-directed Practice)			
3.46 A professional paramedic should have specialist knowledge (e.g. practitioner or extended scope roles).	3.88	3.82-3.94	0.90
3.47 A professional paramedic should have an ability to learn including the ability to use reflection and learn from experience.	4.53	4.50-4.57	0.52

The use of independent-sample *t*-test and ANOVA with post-hoc tests was employed to determine if any significant differences existed between groups identified in section 1. As was employed in section 2, undertaking such an approach, would allow further analysis in determining if the independent variables had an impact on section 3 results. These will be now briefly presented.

Gender

To determine if differences exist between males and females, an independent-sample *t*-test was conducted on each of the items in section 3. Twenty-three items were statistically significant, which can be found in (Appendix E, Vol II). Some of the items that were significant included: The item regarding ‘having the capacity for enquiry and research’ was statistically significant for females ($M=4.61$, $SD=0.54$) and males ($M=4.45$, $SD=0.61$; $t(870) = -3.52$, $p=0.00$). The magnitude of the differences in the means (mean difference = $-.163$, 95% CI: $-.249$ - $-.078$) was large ($d=0.13$).

The item regarding ‘practicing preventative healthcare’ was also statistically significant for females ($M=4.18$, $SD=0.80$) and males ($M=4.03$, $SD=0.61=.85$; $t(870) = -2.20$, $p=0.00$). The magnitude of the differences in the means (mean difference = $-.145$, 95% CI: $-.274$ - $-.016$) was large ($d=0.08$).

Age groups

A one-way ANOVA with post-hoc test was conducted to investigate the relationship between the different age groups. There was a statistically significant difference at the <0.05 level in thirty items (see Appendix F, Vol II). Participants in the 30-34, 40-44, and 45-49 year age groups produced a significant effect that a ‘professional paramedic should be respectful and consider moral, ethical, social, religious aspects of healthcare’, $F(9, 862) = 2.78$, $p=0.003$, $d=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean scores for the 30-34 year age group ($M=4.76$, $SD=.43$), and the 40-44 year age group ($M=4.76$, $SD=0.43$) were both significantly different compared to the 45-49 year age group ($M=4.53$, $SD=0.50$). Although statistical significance was reached the effect size was small.

Responses from participants in the 20-24, 40-44, and 45-49 year age groups produced a significant effect that a ‘professional paramedic should be willing to be responsible for their actions’, $F(9, 862) = 2.68$, $p=0.004$, $d=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean score for 40-44 year age group ($M=4.83$, $SD=0.37$) was significantly different from the 20-24 year age group ($M=4.55$, $SD=0.50$) and the 45-49 year age group ($M=4.64$, $SD=0.57$). Again, it is important to highlight that although statistical significance was reached the effect size was in fact small.

Geographic location

A one-way ANOVA with post-hoc test was conducted to examine the relationship between the different geographic locations. There was a statistically significant difference at the <0.05 level in 29 items (see Appendix G, Vol II). Participants from Western Australia, Queensland, and New South Wales showed a significant effect to the item ‘that a professional paramedic should be literate and numerate’, $F(7, 862) = 3.95$,

$p=0.000$, $d=0.03$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants from Western Australia ($M=4.86$, $SD=0.38$) was significantly different from participants from Queensland ($M=4.58$, $SD=0.59$) and New South Wales ($M=4.61$, $SD=0.50$). Although statistical significance was reached, the effect size was small.

Participants from Victoria, South Australia, Western Australia, and New South Wales produced a significant effect that a professional paramedic should be literate and numerate, $F(7, 862) = 3.32$, $p=0.002$, $d=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants from Western Australia ($M=4.78$, $SD=0.41$), South Australia ($M=4.74$, $SD=0.49$), and New South Wales ($M=4.68$, $SD=0.47$) was significantly different from participants from Victoria ($M=4.53$, $SD=0.54$).

Current role

To determine if significant exist between paramedics and academics an independent-sample t -test was conducted on each of the items in section 3. Thirteen items were statistically significant, which can be found in (Appendix H, Vol II). The item regarding paramedics ‘demonstrating care and empathy’ was statistically significant for academics ($M=4.76$, $SD=0.43$) and paramedics ($M=4.51$, $SD=.52$; $t(827) = -2.13$, $p=0.03$). The magnitude of the differences in the means (mean difference = $-.247$, 95% CI: $-.475$ - $-.019$) was large ($d=0.25$).

The item that a ‘professional paramedic should be able to provide leadership, mentoring and supervision skills’ was statistically significant for academics ($M=4.76$, $SD=0.53$) and paramedics ($M=4.42$, $SD=.66$; $t(827) = -2.35$, $p=0.009$). The magnitude of the differences in the means (mean difference = $-.342$, 95% CI: $-.628$ - $-.057$) was large ($d=0.27$).

Length of employment

A one-way ANOVA with post-hoc test was conducted to explore the relationship between the length of employment. There was a statistically significant difference at the <0.05 level in thirty-seven items (see Appendix I, Vol II). Participants from each group

produced a significant effect regarding ‘paramedics being culturally sensitive and have an inclusive approach to differences’, $F(6, 852) = 4.13, p=0.000, d=0.02$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants employed between 1-5 years ($M=4.60, SD=0.51$) was significantly different from those employed between 6-10 years ($M=4.40, SD=0.60$), and those employed 30 years or more ($M=4.22, SD=0.51$). Although statistical significance was reached the effect size was small.

Participants from each group produced a significant effect regarding ‘paramedics having a commitment to self-development’, $F(6, 852) = 5.12, p=0.000, d=0.03$. Post-hoc comparisons using Tukey HSD indicated that the mean score for participants employed between 1-5 years ($M=4.63, SD=0.53$), was significantly different from those employed between 6-10 years ($M=4.40, SD=0.60$), 11-15 years ($M=4.44, SD=0.54$), 16-20 years ($M=4.42, SD=0.57$) and those employed between 21-25 years ($M=4.24, SD=1.24$). Again, although statistical significance was reached, the effect size was small.

Part 3: Factor Analysis Results

Factor Analysis

Exploratory Factor Analysis (EFA) was chosen to analyse the data from the National Study for three reasons. Firstly, it was used to reduce the number of latent constructs into a smaller set of variables so that a more purposeful understanding of these constructs could be achieved. Secondly since the researcher did not have any preconceptions about the variable dimension, factor structure, or which items belonged to which construct, its use allowed for analysis that is genuinely exploratory in nature, allowing provision of *generating* a theoretical model, not *testing* it. This rationale is supported by Hair et al. (1995) who stated that the “The distinctive feature of EFA is that the factors were derived from statistical results, not from theory and so they can only be named after the factor analysis is performed’ (p. 773). The testing of the resultant theory, in this case, factor structure will be validated using the Rasch Measurement Model, which will be discussed

in section 4. Thirdly, EFA provides evidence of the construct validity of an established instrument (Pett, Lackey, & Sullivan, 2003).

Suitability of the Collected Data for Factor Analysis

As outlined in the previous chapter, there are numerous rules of thumb and recommendations for adequate sample sizes in factor analysis. Given the range of suggested 'rules to follow' it is therefore important to consider multiple recommendations and options (Gorsuch, 1983; Hair et al., 1995; Hogarty et al., 2005; Kieffer, 1999; Tabachnick & Fidell, 1996). In general however there is broad agreement that a sample size of 300 is assumed to be good (Tabachnick & Fidell, 1996; Comrey & Lee, 1992).

Based on this broad guiding principle, as well as the large sample size, the sample size in the National Study is adequate to undertake factor analysis. Further, contestation exists in regards to sample size to variable ratio ($N:p$ ratio), the common strategy used to minimise the possibility of sampling error. In effect however, the suggested range is seldom outside of the 3 to 20 range (Henson & Roberts, 2006; Nunnally, 1978; Pett et al., 2003). The $N:p$ ratio for the National Study was 18.5:1, again suggesting the data were appropriate to factor analyse.

In addition to sample size and sample to variable rules of thumb, Tabachnick and Fidell (1996) recommend inspecting the correlation matrix for correlation coefficients over 0.30. Hair et al. (1995) categorise these loadings as ± 0.30 =minimal, ± 0.40 =important, and ± 0.50 =practically significant. Inspection of the correlation matrix demonstrated coefficients >0.30 , highlighting the data were suitable for factor analysis (Hair et al., 1995; Tabachnick & Fidell, 1996). Furthermore, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Kaiser, 1970, 1974) and Bartlett's Test of Sphericity (Bartlett, 1950) were both satisfied demonstrating that the National Study data were suitable for factor analysis and adequate covariance among the latent variables. The distribution of these findings is shown in Table 5.14.

Table 5.14: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.962
Bartlett's Test of Sphericity	Approx. Chi-Square	24708.809
	Df	1081
	Sig.	.000

Method of Factor Extraction

There are numerous ways to extract factors: PCA, principal axis factoring (PAF), image, maximum likelihood, alpha, and canonical (Tabachnick & Fidell, 1996; Thompson, 2004). The majority of published literature using factor analysis tends to use either PCA or PAF. Despite the ongoing scholarly debates over the pros and cons of PCA and PAF, PCA was chosen to extract the factors in the National Study, largely guided by the exploratory nature of the investigation, as suggested by Pett et al. (2003).

Hayton, Allen, and Scarpello (2004) reported that, "Despite the importance of factor retention decisions and extensive research on methods for making retention decisions, there is no consensus on the appropriate criteria to use" (p. 192). As such, no single criteria should be assumed to determine factor extraction (Hair et al., 1995). The following extraction approaches were used in the National Study: Kaiser's criteria (eigenvalue > 1 rule) (Kaiser, 1960), scree test (Cattell, 1966), cumulative percent of variance extracted, and parallel analysis (Horn, 1965).

The factor extraction results from the National Study will now be presented.

Factor Extraction Results

Analysis of the 47 items revealed seven factors with eigenvalues above 1, accounting for 59.8% of the total variance. Items with loadings greater than ± 0.40 , with the factor in question, were used to characterise the factor solutions. While the cumulative percentage of variance in disciplines from natural sciences is at least 90-95% (Hair et al., 1995; Pett

et al., 2003), in the less precise disciplines within humanities and social sciences the explained variance can be in the order of 50-60%. The explained variance of 59.8% in the National Study is within acceptable levels of ‘explained variance’.

Inspection of the scree plot and eigenvalues produced a departure from linearity coinciding with a 7-factor construct (Figure 5.1). As noted by Gorsuch, (1983), Tabachnick and Fidell, (1996), and Thompson (2004), interpreting scree plots is subjective, requiring researcher judgement. This subjectiveness is reduced when sample sizes are large, $N:p$ ratios are ($>3:1$) and communalities values are high (Gorsuch, 1983, cited in Pett et al., 2003). Each of these three requirements was met by the National Study factor analysis results.

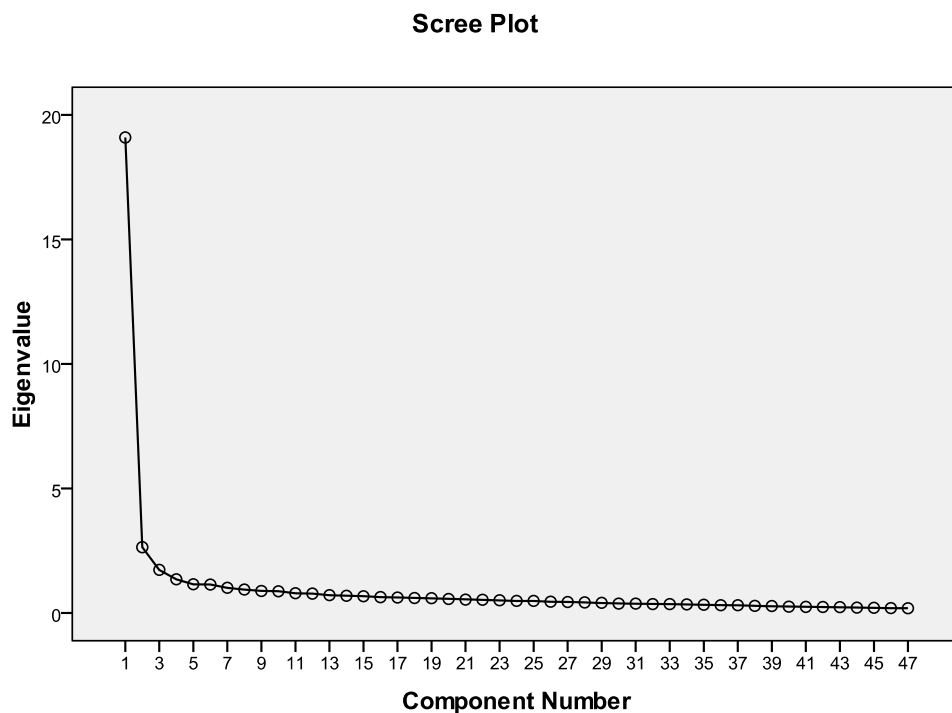


Figure 5.1: Scree test criterion

Evidence suggests parallel analysis is one of the most under utilised factor extraction techniques in factor analysis (Hayton, Allen, & Scarpello, 2004). Parallel analysis was

undertaken using MonteCarlo (PCA for Parallel Analysis) software package. In parallel analysis, actual eigenvalues are compared with random order eigenvalues. Factors are retained when actual eigenvalues surpass random ordered eigenvalues. The distribution of these results can be seen in Table 5.15.

Table 5.15: Parallel Analysis (adapted from Pallant, 2007)

Component Number	Actual eigenvalue from PCA	Random order from parallel analysis	Decision
1	19.095	1.4792	Accept
2	2.644	1.4325	Accept
3	1.733	1.3976	Accept
4	1.354	1.3659	Reject
5	1.156	1.3380	Reject
6	1.144	1.3125	Reject
7	1.014	1.2894	Reject

The results from the four different factor extraction techniques are located in Table 5.16.

While the eigenvalue > 1 rule, scree test and explained variance criteria extracted 7 factors; the parallel analysis only identified 3 factors. Despite the variation between parallel analysis and the other three techniques, the best fit from the national data was considered to be the 7-factor solution. While the parallel analysis confirmed a three-factor structure, the other three criteria all produced a seven-factor structure.

The decision to keep the seven-factor structure was based on three aspects. First, and most importantly, the seven-factor structure were interpretable and could be theoretically and conceptually justified by the researchers. Second, the study was exploratory in nature and the seven-factor structure would undergo further examination using Rasch analysis. Third, as suggested by Gorsuch (1983), if there is doubt on the number of factors, researchers should extract more, rather than too few factors.

As described by Gorsuch (1983) further evaluation of the adequacy of the number of factors was performed. This was undertaken by calculating and inspecting the correlation residual matrix for high covariances. Residuals are computed between observed and reproduced correlations. Residuals of between 0.5-1.0 are considered moderate, while values over 1.0

are considered large, suggestive that further factors may exist (Pett et al., 2003).

Examination of the matrix produced 6 non-redundant residuals (28.0%) with absolute values greater than 0.05 (Appendix J, Vol II). Further attempts at different factor structures did not significantly change the number of residuals, therefore a seven-factor structure was considered best-fit for these data.

Table 5.16: Factor identification following multiple factor extraction techniques

Factor Extraction Technique	Factors Identified
Eigenvalue > 1 rule	7
Scree Test	7
Explained variance	7
Parallel Analysis	3

Selection of Rotational Method

Principal Component Analysis was applied to identify the number of factors followed by Oblique Oblimin rotation. While Orthogonal varimax rotation was used in the pilot study for easier interpretation, in the national study the decision to use Oblique Oblimin rotation was based on the following reasons: firstly, it was assumed that the underlying factors would be correlated, and secondly, while more difficult to report, Oblique rotations offer simple solutions to interpret (Pallant, 2007; Pett et al., 2003). Pedhazur and Schmelkin (1991, cited in Pett et al., 2003) support the use of Oblique rotations compared with Orthogonal stating that “in most instances, [Orthogonal rotations offer] naïve, unrealistic portrayals of sociobehavioural phenomena” (p. 149).

As suggested by Pett et al. (2003) and Kieffer, (1999), following PCA analysis, principal axis factoring (PAF) should also be examined for comparison and assessment for best fit. The PAF rotated solution on the National Study data, while also producing 7 factors, the item load structure obtained did not provide the same theoretical meaning as produced by PCA.

Following Oblique Oblimin rotation, the items were examined and assessed for factorial suitability. Those not loading or unable to be assigned to a factor using the above guides were discarded. A total of nine items were deleted. This is summarised in Table 5.17.

Table 5.17: Reasons for item deletion

Item Deleted	Reason for Deletion
3.06 A professional paramedic should be literate and numerate.	Failed to load
3.15 A professional paramedic should be adaptable to changes in clinical practice.	Failed to load
3.22 A professional paramedic should have a good understanding of their patients' welfare.	Failed to load
3.24 A professional paramedic should value the importance of teamwork.	Failed to load
3.27 A professional paramedic should be caring and empathic.	Failed to load
3.33 A professional paramedic should have theoretical knowledge.	Failed to load
3.38 A professional paramedic should be able to respond to changes in the provision of health care due to evolving community expectations.	Failed to load
3.39 A professional paramedic should be willing to undertake ongoing education.	Failed to load
3.44 A professional paramedic should practice preventative healthcare.	Failed to load

Labelling of Factors

The labelling of factors is a subjective, theoretical, and inductive process (Pett et al., 2003). The reason for thorough and systematic factor analyses is to isolate items with high loadings in the resultant pattern matrices. In other words, it is a search to find those factors that taken together explain the majority of the responses. Examination of the pattern matrix demonstrated that the item variance on each factor ranged from fair (0.40) to excellent (0.81). Comrey and Lee (1992, cited in Pett et al., 2003) developed the following guidelines for item-to-factor loadings:

- .45 (20% shared variance): fair
- .55 (30% shared variance): good
- .63 (40% shared variance): very good

- .71 (50% shared variance): excellent

The seven resultant factors (38 items) were descriptively labelled as indicated below and shown in Table 5.18, and 5.19.

Factor 1 was given the label *Personal Behaviour and Attitudes*. There were five items that loaded on this factor, with eigenvalue loadings ranging from 0.41 to 0.70 (explained variance 40.6%). The top item within the factor was: ‘A professional paramedic should have the ability to work independently as well as a member of a team’ (loading 0.70). Factor 1 included characteristics such as demonstrating clinical reasoning skills, ability to work independently as well as a member of a team, an ability to learn including the ability to use reflection and learn from experience, recognised limitations and demonstrating effective written and oral communication skills. These components illustrated the factor labelling as *Personal Behaviour and Attitudes*.

Factor 2 was labelled *Patient Interaction and Welfare*. There were eight items that loaded on this factor, with eigenvalues ranging from 0.43 to 0.78 (explained variance 5.6%). The top item within the factor was: ‘A professional paramedic should be trustworthy’ (loading 0.78). Factor 2 included characteristics such as being trustworthy, accountable, non-judgemental and non-discriminatory, adhering to a code of ethics, operating within appropriate ethical and legal boundaries, and being respectful considering moral, ethical, social, religious aspects of healthcare. These characteristics emphasised the factor labelling as *Patient Interaction and Welfare*.

Factor 3 was given the label *Scientific approach to patient care*. There were three items that loaded on this factor, with eigenvalue loadings ranging from 0.58 to 0.75 (explained variance 3.6%). The top item within the factor was: ‘A professional paramedic should demonstrate critical thinking’ (loading 0.75). Factor 3 included characteristics such as the having capacity for enquiry and research, demonstrating critical thinking, and being able to think critically. These characteristics reinforced the factor labelling as *Scientific approach to patient care*.

Factor 4 was labelled *Paramedic and Society*. There were four items that loaded on this factor, with eigenvalue loadings ranging from 0.41 to 0.61 (explained variance 2.8%). The top item within the factor was: ‘A professional paramedic should be culturally sensitive and have an inclusive approach to differences’ (loading 0.61). Factor 4 included characteristics such as seeing things from the patients’ point of view, understanding their role in providing a primary care health service, being culturally sensitive and have an inclusive approach to differences, and understanding the role of paramedic care within the broader healthcare system. These features emphasised the factor labelling as *Paramedic and Society*.

Factor 5 was labelled *Commitment to professional and health care outcomes*. There were five items that loaded on this factor, with eigenvalues loadings ranging from 0.51 to 0.81 (explained variance 2.4%). The top item within the factor was: ‘A professional paramedic should be able to take responsibility for quality of care and health outcomes’ (loading 0.81). Factor 5 included characteristics such as following evidence-based practice, capacity to undertake self-directed approaches to learning, and being committed to self-development. These items reinforced the factor labelling as *Commitment to professional and health care outcomes*.

Factor 6 was labelled *Professional Behaviour*. There were seven items that loaded on this factor, with eigenvalues ranging from 0.47 to 0.80 (explained variance 2.4%). The top item within the factor was: ‘A professional paramedic should contribute to continuous improvement within the healthcare system’ (loading 0.80). Factor 6 included characteristics such as committed to the discipline, attaining high clinical status within the healthcare system, and contributing to continuous improvement within the healthcare system. These characteristics reinforced the factor labelling as *Professional Behaviour*.

Factor 7 was labelled *Interaction Skills*. There were six items that loaded on this factor, with loadings ranging from 0.40 to 0.79 (explained variance 2.1%). The top item within the factor was: ‘A professional paramedic should be able to provide leadership,

mentoring and supervision skills' (loading 0.79). Factor 7 included characteristics such as providing leadership, mentoring and supervision skills, being a good listener, and accepting guidance from colleagues. These characteristics reinforced the factor labelling as *Interaction Skills*.

Table 5.18: Operationalisation of factor constructs

Factor Number	Factor Construct	Items	% Variance Accounted for by each Factor
1	Personal Behaviour and Attitudes	3.40, 3.42, 3.43, 3.45, 3.47	40.6%
2	Patient Interaction and Welfare	3.01, 3.03, 3.05, 3.07, 3.11, 3.25, 3.26, 3.29	5.6%
3	Scientific approach to patient care	3.02, 3.04, 3.13	3.6%
4	Paramedic and Society	3.08, 3.09, 3.12, 3.23	2.8%
5	Commitment to professional and health care outcomes	3.10, 3.17, 3.18, 3.28, 3.41	2.4%
6	Professional Behaviour	3.30, 3.31, 3.32, 3.34, 3.35, 3.37, 3.46	2.4%
7	Interaction Skills	3.14, 3.16, 3.19, 3.20, 3.21, 3.36	2.1%
Total Variance Accounted			59.8%

Table 5.19: Pattern and Structure Matrix for PCA with Oblimin Rotation of seven factor solution of the PGAS (38 items)

Item	Pattern coefficients							Structure coefficients							h ²
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	
Independent team member (40)	.554	.230	.128	.113	.124	.104	.122	.703	.466	.144	.138	.454	.362	.420	.608
Oral and written communication (43)	.515	.126	.121	.192	.109	.194	.038	.671	.432	.557	.228	.445	.457	.337	.563
Use reflection (47)	.499	.031	.173	.046	.112	.079	.166	.663	.323	.373	.263	.461	.395	.445	.554
Clinical reasoning (42)	.480	.101	.349	.001	.050	.179	.010	.655	.412	.342	.373	.333	.427	.362	.660
Recognise limitations (45)	.412	.113	.022	.149	.201	.027	.192	.639	.446	.273	.386	.546	.388	.510	.595
Trustworthy (5)	.040	.761	.103	.195	.026	.076	.061	.329	.783	.340	.056	.293	.250	.304	.663
Non-judgemental (1)	.102	.651	.037	.085	.091	.230	.105	.223	.703	.277	.306	.287	.382	.368	.572
Respectful (3)	.165	.560	.083	.313	.005	.041	.187	.520	.693	.253	.309	.484	.217	.334	.629
Accountability (7)	.038	.549	.214	.194	.061	.021	.051	.335	.688	.429	.384	.378	.275	.270	.571
Responsible for actions (11)	.234	.530	.148	.007	.056	.044	.051	.481	.682	.377	.218	.377	.230	.333	.555
Ethical and legal boundaries (26)	.268	.527	.014	.083	.211	.099	.001	.192	.681	.301	.506	.354	.301	.439	.607
Code of ethics (25)	.206	.461	.116	.026	.347	.075	.063	.481	.635	.162	.274	.564	.251	.385	.582
Clinical competence (29)	.364	.434	.130	.279	.116	.064	.004	.323	.612	.209	.612	.368	.283	.453	.573

Critical thinking (4)	.016	.319	.637	.136	.101	.053	.026	.291	.529	.757	.086	.375	.312	.261	.696
Think critically (13)	.091	.130	.582	.104	.228	.026	.150	.392	.437	.709	.135	.484	.320	.380	.650
Enquiry and research (2)	.010	.021	.581	.139	.053	.112	.079	.269	.308	.668	.297	.345	.367	.299	.522
Broader health system (23)	.183	.110	.249	.452	.052	.106	.248	.429	.273	.410	.610	.436	.443	.513	.623
Patients point of view (8)	.171	.237	.099	.450	.212	.022	.066	.418	.479	.140	.609	.491	.299	.395	.568
Culturally sensitive (12)	.029	.435	.021	.445	.002	.008	.176	.323	.612	.209	.612	.368	.283	.453	.622
Understand their role (9)	.096	.370	.191	.412	.002	.026	.027	.371	.585	.396	.570	.368	.311	.346	.580
Self development (17)	.024	.086	.117	.105	.763	.005	.180	.364	.267	.318	.177	.817	.411	.466	.714
Interdisciplinary team (18)	.029	.028	.054	.098	.664	.046	.198	.367	.307	.182	.359	.783	.438	.510	.669
Self-directed (28)	.072	.054	.174	.100	.660	.070	.055	.375	.272	.366	.158	.740	.419	.363	.598
Evidence-based practice (10)	.195	.141	.323	.198	.623	.096	.301	.488	.382	.187	.330	.710	.489	.385	.674
Responsibility for quality care (41)	.208	.087	.085	.077	.518	.176	.003	.364	.267	.318	.177	.817	.411	.466	.597
High clinical status (30)	.079	.077	.015	.157	.067	.733	.022	.310	.245	.215	.085	.397	.750	.295	.596
Continuous improvement (34)	.158	.034	.051	.114	.046	.702	.050	.416	.297	.307	.347	.465	.802	.350	.698
Specialist knowledge (46)	.087	.048	.105	.115	.054	.662	.102	.145	.185	.262	.086	.264	.660	.310	.469
Population based care (31)	.029	.073	.054	.301	.110	.595	.024	.288	.201	.265	.479	.458	.721	.337	.623
Social	.033	.092	.064	.295	.088	.485	.195	.287	.346	.184	.517	.480	.674	.515	.632

responsibility (35)															
Committed to discipline (32)	.063	.114	.199	.016	.375	.485	.065	.366	.340	.090	.259	.629	.668	.428	.627
Basic sciences (37)	.176	.186	.255	.111	.057	.472	.156	.410	.162	.425	.321	.437	.665	.439	.593
Leadership and mentoring (20)	.080	.022	.224	.153	.064	.142	.737	.410	.174	.425	.317	.437	.665	.794	.725
Good listener (16)	.177	.177	.139	.079	.039	.006	.584	.269	.319	.375	.142	.422	.459	.714	.596
Accept guidance (21)	.171	.081	.194	.102	.079	.063	.538	.432	.422	.081	.322	.397	.318	.694	.609
Counselling skills (14)	.200	.105	.114	.145	.135	.253	.482	.461	.418	.374	.348	.451	.331	.647	.529
Learn to help others (36)	.214	.044	.103	.013	.012	.383	.421	.482	.290	.320	.261	.450	.631	.626	.639
Communication ICT (19)	.038	.059	.201	.252	.239	.089	.400	.129	.303	.077	.366	.420	.475	.611	.578

Note. Bolded loadings highlight item allocation for each factor
 h^2 = communality (The estimated correlation of item communality)

Internal Consistency and Reliability of the Data

Cronbach's α reliability coefficients were analysed for each of the seven factor solutions generated from the PCA. The Cronbach α calculation produced a high reliability ($\alpha = .87$) (Table 5.20). Each factor demonstrated very good internal consistency with Cronbach's α coefficients above 0.70, particularly for exploratory research (Hair et al., 1995; Muijs, 2004). Four of the seven factors had Cronbach's α coefficients above 0.8.

Table 5.20: Reliability of national study (Factors 1-7)

	All Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Cronbach's α	0.87	0.83	0.87	0.74	0.78	0.82	0.86	0.83

Pearson reliability coefficient for the 7 factors ranged between $r=0.51$ to $r=0.72$ (see Table 5.21). Although the size of the correlation coefficient should be analysed with care (Anthony, 1999) these findings suggested that the inter-factor correlation coefficients ranged from moderate to strong (Pett et al., 2003).

Table 5.21: Pearson's correlation coefficient (Factors 1-7)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Factor 1	1						
Factor 2	.704	1					
Factor 3	.603	.625	1				
Factor 4	.675	.724	.522	1			
Factor 5	.674	.601	.572	.618	1		
Factor 6	.640	.514	.510	.593	.677	1	
Factor 7	.694	.618	.527	.690	.675	.708	1

** Correlation is significant at the 0.01 level (2-tailed).

Replicability of Factor Loadings

It is informative to determine if the factor load patterns obtained in the initial factor analysis solution can be obtained when the sample can be divided into three distinct groups and the factor analysis is completed with each of those groups. Put another way, it is worthwhile to verify the homogeneity of the patterns. Then the replicability or factor loading consistency of the factor loading patterns can be compared. Other examples of similar cross-validation studies are reported in the psychometric literature (Lichtenberg, Ross, Millis, & Manning, 1995; Mitchell, Regan-Smith, Fisher, Knox, & Lambert 2009). To assess the degree of factor loading consistency within the data from the National Study the following subgroups (based on age, gender, and geographical location) were used to investigate the factor loading consistency using PCA with Oblimin Rotation:

- Age Group 1 (19-41 years)
- Age Group 2 (41-75 years)
- Gender Group 1 (Male)
- Gender Group 2 (Female)
- Geographical location Group 1 (VIC, TAS, ACT, QLD)
- Geographical location Group 2 (SA, WA, NSW, NT)

Tables 5.22 to 5.28 outline each of the 7 factors, comparing the eigenvalue loadings between the 6 groups, thus providing an overall assessment of the replicability between groups, items, and factors. Theoretically, the same factor structure should be reproduced when comparing the three groups when divided based on age, gender, and geographical location. Evidence of very good to high correlation existed for each of the 7 factors with one item “*A professional paramedic should have a commitment to self-development*” converging 100% across each group. The item with least consistency (0%) across the 6 groups was “*A professional paramedic should be self-aware, recognising personal responsibilities and limitations*”. Multiple items also loaded within each group that were not assigned to the proposed 7-factor structure, these are highlighted by (*). Note, all item loadings are from the pattern matrix, as suggested by Lee and Ashton (2007).

Table 5.22: Examination of– Factor 1

	Factor 1 (Personal behaviours and characteristics)	Age Group 1 (19-41 years)	Age Group 2 (41-75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item		(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)	
A professional paramedic should have the ability to work independently as well as a member of a team.	.554	.823	-	-.524	-.709	-	.467	66%
A professional paramedic should have effective written and oral communication skills.	.515	-	.550	-	-.510	.713	-	50%
A professional paramedic should have an ability to learn including the ability to use reflection and learn from experience.	.499	.690	-	-	-	.469	-	33%
A professional paramedic should demonstrate clinical reasoning skills.	.480	-	.537		-.506	.617	-	50%
A professional paramedic should be self-aware, recognising personal responsibilities and limitations	.412	-	-	-	-	-	-	0%

Table 5.23: Examination of– Factor 2

	Factor 2 (Patient Interaction and Welfare)	Age Group 1 (19-41 years)	Age Group 2 (41-75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item		(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)	
A professional paramedic should be trustworthy.	.754	.590	.651	.696	.432	.813	-	83%
A professional paramedic should be non-judgemental and non-discriminatory.	.637	.657	-	.743	-	-	.614	50%
A professional paramedic should be respectful and consider moral, ethical, social, religious aspects of healthcare.	.568	.739	-	.638	.581	-	.527	66%
A professional paramedic should be aware of, and regard for, professional issues such as; accountability and confidentiality.	.584	.571	.632	.444	-	.637	-	66%
A professional paramedic should be willing to be responsible for their actions.	.587	.487	-	.510	-	.528	-	50%
A professional paramedic should operate within appropriate ethical and legal boundaries.	.583	.610	-	.493	.566	-	-	50%
A professional paramedic should adhere to a code of ethics.	.524	.411	-	.446	.512	-	-	50%
A professional paramedic should have clinical competence.	.516	-	.492	-	-	.549	-	33%

Table 5.24: Examination of– Factor 3

	Factor 3 (Scientific approach to	Age Group 1 (19-41 years)	Age Group 2 (41-75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item	(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)		
A professional paramedic should demonstrate critical thinking.	.637	.758	-	.581	.769	-	.790	66%
A professional paramedic should be able to think critically.	.582	.766	.537	.474	.754	-	.564	83%
A professional paramedic should have the capacity for enquiry and research.	.581	.418	-	.631	.402	.634	.682	83%

Table 5.25: Examination of– Factor 4

	Factor 4 (Paramedic and Society)	Age Group 1 (19-41 years)	Age Group 2 (41-75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item	(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)		
A professional paramedic should understand the role of paramedic care within the broader healthcare system.	.452	-.521	-	-	-	.447	.502	50%
A professional paramedic should be able to see things from the patients' point of view.	.450	-.402	-	-	.577	-	.682	50%
A professional paramedic should be culturally sensitive and have an inclusive approach to differences.	.445	-	.555	*	-	-	.487	33%
A professional paramedic should understand their role in providing a primary care health service.	.412	-.481	.437	.435	.567	-	.462	83%

Table 5.26: Examination of– Factor 5

	Factor 5 (Commitment to Professional and	Age Group 1 (19-41 years)	Age Group 2 (41-75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item		(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)	
A professional paramedic should have a commitment to self-development.	.763	-.417	-.803	-.784	.573	.669	-.804	100%
A professional paramedic should be able to work in interdisciplinary teams.	.664	-	-.739	-.679	-	-	-.742	50%
A professional paramedic should have the capacity to undertake self-directed approaches to learning.	.660	-	-.650	-.693	-	.561	-.723	66%
A professional paramedic should follow evidence-based practice.	.623	-	-.735	-.749	-	-	-.563	50%
A professional paramedic should be able to take responsibility for quality of care and health outcomes.	.518	-	-.638	-.537	-	-	-.630	50%

Table 5.27: Examination of– Factor 6

	Factor 6 (Professional Behaviour)	Age Group 1 (19- 41 years)	Age Group 2 (41- 75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item	(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)		
A professional paramedic should attempt to attain high clinical status within the healthcare system.	.773	-.792	.508	.701	*	.711	.581	83%
A professional paramedic should contribute to continuous improvement within the healthcare system.	.702	*	.660	.803	-.453	-	.639	66%
A professional paramedic should have specialist knowledge (e.g. practitioner or extended scope roles).	.662	*	.753	.555	-.684	-	.773	66%
A professional paramedic should integrate population-based care into their practice	.595	-.576	.591	.631	-.567		.620	83%
A professional paramedic should embrace social responsibility.	.485	-	.492	.509	-	-	.442	50%
A professional paramedic should be committed to the discipline.	.485	-	-	.427	-.490	.423	-	50%
A professional paramedic should be able to apply knowledge of the basic sciences.	.472	-	.517	.416	-.534	-	.497	66%

Table 5.28: Examination of– Factor 7

	Factor 7 (Interaction Skills)	Age Group 1 (19-41 years)	Age Group 2 (41-75 years)	Gender Group 1 (Male)	Gender Group 2 (Female)	Location Group 1 (Vic/Tas/ACT/Qld)	Location Group 2 (SA/WA/NSW/NT)	% of groups where each item loaded
Item	(n=473)	(n=399)	(n=650)	(n=222)	(n=353)	(n=517)		
A professional paramedic should be able to provide leadership, mentoring and supervision skills.	.737		-	.754	.505	.612	-.574	66%
A professional paramedic should be a good listener.	.584	.661	.742	*	-	.502	-	50%
A professional paramedic should be able to accept guidance from colleagues.	.538	.415	-	.535	-	-	-	33%
A professional paramedic should have developed counselling skills.	.482	-	.554	.491	.557	.651	-	66%
A professional paramedic should be able to learn and to help others to learn.	.421	-	-	.451	-	-	-.525	33%
A professional paramedic should have the capacity to use communication and information technology effectively and appropriately.	.400		-	.445	-	-	-	16%

NB. (*) items loaded on unassigned factor solution

Overall assessment of item and factor loading consistency demonstrated very good to high correlation between items and overall construct validation of the proposed 7-factor solution, with almost two-thirds of items loading on the same factors in all groups. In other words, very good to high levels of factor loading consistency were obtained between the groups. This assessment indicated that scale is measuring its intended concepts and outcomes in a consistent manner.

The next section will examine the Rasch Model and Rasch Measurement Results. The section, extending the previous work of the factor analysis, will investigate the scale unidimensionality and construct validity of the PGAS, converting the previous ordinal

level data into interval level data, producing a more robust and psychometrically-sound scale.

Combining factor analysis and Rasch analysis is nowadays commonly used in the measurement literature as the combination strengthens claims for psychometric validity. For example, factor analysis still remains the most common multivariate statistical approach in item reduction, yet one of its major limitations is its use of ordinal-level and sample dependent data, meaning that while construct validity can be examined, the same data can not be reproduced given the ordinal-level data and absence of fit-statistics. Rasch analysis on the other hand, transforms this ordinal-level data into interval-level data, while also being able to test for unidimensionality, categorical ordering, and item bias (Pallant & Tennant, 2007). Another notable, but complementary difference between factor analysis and Rasch analysis is that a complete data set is needed to complete a factor analysis while Rasch analysis can accommodate missing data.

Part 4: Rasch Measurement Results

Rasch Measurement Model

There are two major methods for validating assessment scales: Classical Test Theory (CTT) and Item Response Theory (IRT) (Schumacker & Smith, 2007; McAllister, 2008). While CTT has served as the main test theory for the past 80 years, IRT has seen a surge in its use and application in recent decades in health sciences (Fan, 1998), particularly given its capacity to monitor changes in health outcomes (Hays, Morales, & Reise, 2000). This has occurred largely because its capacity to test item-levels as opposed to test-levels, by way of investigating person fit and whether items operate in a consistent way when completed by participants with differing traits (e.g., males versus females, experienced worker with inexperienced workers, individuals with a type of medical diagnosis versus individuals who are healthy) this is known as differential item functioning (DIF) (Hays et al., 2000). Most IRT models also assume unidimensionality (all items are measuring the

same construct, skill, or attribute) and local independence (items remain uncorrelated) (Hays et al., 2000).

The Rasch Model, named after Danish physicist and mathematician Georg Rasch, utilises a mathematical model in the assessment and testing of construct validity within instruments and scales (Duncan, Bode, Lai, & Perera, 2003; Tennant and Conaghan, 2007). The Rasch model has been widely used by educational researchers for the past 40 years. However, its application is gaining popularity among researchers in the health and human science disciplines; particularly over the past two decades (Andrich, 2004; Chien & Bond, 2009; Duncan et al., 2003; Tennant & Conaghan, 2007). Consequently a growing body of knowledge is emerging surrounding the use of Rasch in such health disciplines as rehabilitation, orthopaedics, neurology, geriatrics, and endocrinology (Chien & Bond, 2009; Duncan et al., 2003).

Rasch measurement is most often considered to be a form of IRT (Andrich, 2004; Bond & Fox, 2007; Chien & Bond, 2009; McAllister, 2008; Tennant & Conaghan, 2007). However some scholars argue that Rasch Measurement is fundamentally different to IRT because one of the Rasch Model's main assertions is that some error and variation is acceptable and this type of 'chance' is not tolerated in other IRT models (McAllister, 2008). Further, while other IRT models search for best fit, unidimensionality, and construct validity by adding extra measurement parameters, Rasch analysis does not (Schumacker & Smith, 2007).

The Rasch Model is based on two straightforward assertions.

1. Firstly, that each person is characterised by different abilities. Moreover, the easier the item the more likely it is for a person to obtain a higher score, and more able persons are likely to achieve better scores or responses on hard items compared with less able people (Chien & Bond, 2007; Wuang et al., 2009). Bond and Fox (2007) put it another way: "Persons who are more able or more developed have a greater likelihood of correctly answering all the items in the

observation schedule. Easier items are more likely to be answered or reached correctly by all persons” (p. 37).

2. Secondly, that each item has an inherent difficulty level.

These two assertions allow Rasch Measurement to compute a hierarchy of item difficulty, and target an item’s difficulty level to a person’s ability and rater performance (Chien & Bond, 2009; Schumacker & Smith, 2007; Wuang et al., 2009).

Rasch measurement and application of its probabilistic model is increasingly having major impacts in measuring outcomes in health and human sciences, in particular, health care assessments (Bond & Fox, 2007; Duncan et al., 2003) and satisfying scale construct validity, generalisability, and external validity requirements (Tennant & Conaghan, 2007). While Rasch’s initial work surrounded the use of dichotomous data (e.g., yes and no responses), others such as Andrich (1978) (The Rating Scale Model) and Masters (1982) (The Partial Credit Model) have extended Rasch’s earlier work into analysing polytomous data such as Likert-type rating and ordinal data (Bond & Fox, 2007; McAllister, 2008). The capacity for Rasch analysis to target item/person’s scores is reinforced by Duncan et al. (2003) who noted:

It is a probability model that converts the ordinal scores obtained by summing items scores into interval measures. While the ordinal raw scores used in traditional analyses are typically used as if they were interval in nature, the measures produced by Rasch analysis are on equal-interval scales that is common to both persons and items (p. 951).

In addition to these linear transformations, Rasch analysis has the capacity to delete misfitting data such as extreme scores without disrupting the unidimensionality of the instrument (Linacre, 1989, cited in Smith & Smith, 2004).

Researchers have a number of ways in which to apply the Rasch Model. First, the Rasch Model can be utilised in the application of scale development where items may form part

of subscale totals, or overall scale scoring. In addition to this, the Rasch Model can be used to formulate a hierarchical map of scale item's difficulty and test takers' ability to further strengthen dimensionality. This process is referred to as calculating person logit and item logit measures. Second, the model allows for psychometric testing of scale unidimensionality, DIF, construct dimensions of ordinal scale data, and conversion of ordinal data into interval-level data. Finally, the Rasch Model can also be used in the development of item bank questions for computer adaptive testing (Bond & Fox, 2007; Chien & Bond, 2009; Schumacker & Smith, 2007; Tennant & Conaghan, 2007; Wuang et al., 2009).

Rasch researchers now have the choice of several Rasch-specific statistical software packages, most commonly WINSTEPS, RUMM2020, ConQUEST and QUEST (Hays et al., 2000; Tennant & Conaghan, 2007). Despite the current interest in the Rasch Model, some of these packages are not standardised; resulting in non-universal interpretations of data (Hays et al., 2000; Tennant & Conaghan, 2007). In brief terms, Rasch statistical programs execute mathematical logs adjusting item and person data and preserving unidimensionality, converting ordinal data into linear interval data. This allows the researcher to examine person ability estimations, item difficulty estimations, and probability of item responses (Bond & Fox, 2007; Wuang, et al., 2009). Linacre (1989, cited in Smith & Smith, 2004) noted that "Rasch measurement is the only way to convert ordinal observations into linear measures" (p. 25).

By ensuring items load on one construct only, the Rasch Model allows examination of item correspondence (Wright & Linacre, 1989). Construct validity is confirmed by item fit. Because item fit is iterative, it has been described as a "quality-control mechanism" (Bond & Fox, 2007) by providing the researcher with evidence that item output can be adequately represented as interval level measurement.

Rasch Analysis Objectives

Results following the exploratory factor analysis from the national study will be further analysed using the Rasch model. A Four-Step Rasch Analysis Protocol was developed in order to improve decision pathways. The Four-Steps include:

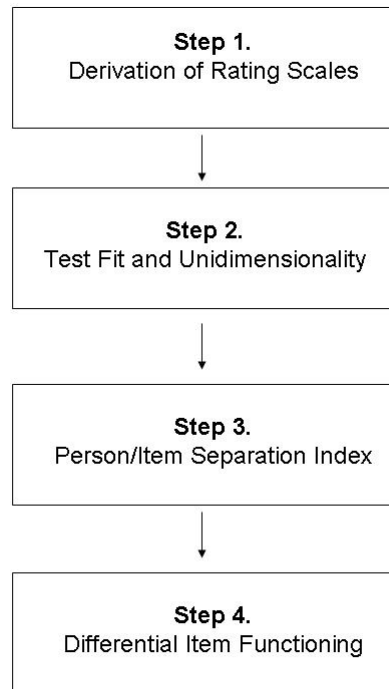


Figure 5.2: Four-step Rasch analysis protocol

The Rasch analysis has three objectives:

1. Examination of Item Fit to the Rasch Model
2. Examination of Unidimensionality
3. Examination of Differential Item Functioning

The Four-Step Rasch Analysis Protocol will be explained in more detail, and followed by the results addressing the three objectives.

Step 1: Rating Scales

Instruments yield two types of data: dichotomous - right-wrong, yes-no data, and polytomous data - when greater than three responses are generated (e.g., disagree strongly, disagree, no opinion, agree, agree strongly) (McAllister, 2008). When analysing polytomous data, researchers choose either the Andrich Rating Scale Model or Masters Partial Credit Model (Tennant & Conaghan, 2007). Wright and Mok (2004, cited in Smith & Smith, 2004) continue “The response rating scale, when it works, yields ordinal data which need to be transformed to an interval scale to be useful. This is achieved by the Rasch [Andrich] Rating Scale Model” (p.17).

The decision over which model to use is based on sample size and whether response categories are evenly spaced and applied to all items. In other words, if the scoring categories vary between items, such as part marks for partially correct responses, then the Masters Partial Credit Model is used (Bond & Fox, 2007). If rating scales do not alter and participants have a 50/50 chance of being rated in one category or another, then the Andrich Rating Scale Model is used (Bond & Fox, 2007; McAllister, 2008). Given that Likert-scales produce ordinal data using response categories that are not metrically equal distances apart, they require conversion into interval or ratio data, as Bond and Fox (2007) add:

The adding of raw scores to yield a person or item total score in Rasch measurement is justified only for those items which adhere to the model’s requirements: They must pass the quality control criteria first. These quality control criteria are the Rasch reliability and validity diagnostics (p. 106).

Based on the requirements outlined above (polytomous data, adequate sample size, and thresholds that are rated evenly across items), the data will be analysed using the Rating Scale Model. The following Rasch decision tree pathway was used in selecting the most appropriate Rasch model.

Step 2: Test Fit and Unidimensionality

Assessment of unidimensionality is one of the Rasch Model's main measurement objectives (Duncan et al., 2003). Unidimensionality is met when items under examination adequately and consistently measure components of one construct (Bond & Fox, 2007; Duncan et al., 2003). For example, if cognition is being measured then other constructs such as empathy, communication or leadership should not be measured. When unidimensionality is not met it is indicated by inadequate infit statistics (Duncan et al., 2003). In Rasch analysis unidimensionality is initially assessed by the infit mean square statistic (infit MnSq), and outfit mean square statistic (outfit MnSq), hence in practice the concept of unidimensionality and test fit are often considered together (Bond & Fox, 2007). Further evaluation of unidimensionality is assessed by Rasch factor analysis (RFA) using principal components analysis (PCA) to ensure that there are no unaccounted for factors left in the items' variance. Although recent work suggests universal criteria may not establish multidimensionality (Smith, Wright, Selby, & Velikova, 2007; Tennant & Pallant, 2006), the majority of literature still suggests using the following two criteria:

- 1) 50% of the total variance explained by the Rasch-derived measures
- 2) Eigenvalue < 3 and $< 0.50\%$ of unexplained variance in the first contrast component (Linacre, 2005, cited in Wuang et al., 2009).

A sample size of greater than 200 participants and a minimum of 10 items are considered adequate to achieve the required testing of unidimensionality, item difficulty, targeting, and separation (Duncan et al., 2003; Wright & Stone, 1999). Local independence is also assumed if fit statistics and PCA confirms that response dependency and multidimensionality does not exist and no leftover variance patterns in the item residuals can be found, indicating the data and model are in agreement with each other (Tennant & Conaghan, 2007). Hays et al. (2000) noted that "Local independence means that the items are uncorrelated with each other when the latent trait or traits have been controlled for" (p. 29).

Conceptually, infit statistics are chi-square based, given that their tests of goodness-of-fit and assessment of difference is between two or more groups (Duncan et al., 2003; Tennant & Conaghan, 2007). Infit MnSq measures the actual and expected responses for items that are close to the person's ability level, whereas the outfit MnSq statistic measures the differences in all items regardless of ability levels (Tennant & Conaghan, 2007). The testing of goodness of fit further strengthens the scale's construct and external validity (Tennant & Conaghan, 2007). Both infit and outfit statistics are never negative (e.g., > 0) (Bond & Fox, 2007), with infit and outfit statistics ranging from 0 to infinity, with the ideal value at 1.0 (Bond & Fox, 2007; Duncan et al., 2003, Wang et al., 2009). Values < 1 (mean square < 0.75) produce overfit, suggesting that items have not varied enough or are too deterministic, resulting in potentially misleading researchers into the perceived quality of item measures. Conversely, values > 1 (mean square > 1.3) produce underfit, indicating responses to items are unpredictable and erratic, leading to a loss of local dependence and unmodeled "noise" (Wang et al., 2009). One such example would be having less able participants passing hard items and conversely, higher skilled participants are unable to pass easy items (Bond & Fox, 2007).

Items that produce values which are much higher or lower suggest misfitting caused by either item overlap or haphazard responses (Bond & Fox, 2007; Wang et al., 2009). Further iterative processes finding the best fit include observations for ceilings, which occur when large numbers of participants do not report item difficulties and floor effects, which is large numbers of participants reporting item difficulties, and skew and kurtosis (Wang et al., 2009).

The interpretation of fit statistics is complex and important. Bond and Fox (2007) note, that "more than any other aspect of Rasch modeling, [interpretation of fit statistics] requires experience related to the particular measurement context" (p. 241). While rules of thumb and recommendations on mean square distributions exist (see Table 5.29) no universal rules apply (Bond & Fox, 2007). Although these recommendations offer important guidance for novice Rasch researchers, they should be used with careful judgement as sample sizes are not taken into account (Bond & Fox, 2007).

Table 5.29: Item mean square ranges (Adapted from Bond & Fox, 2007)

Type of Test	Mean Square Range
Multiple choice test (Difficulty - Hard)	0.8-1.2
Multiple choice test (Difficulty - Standard)	0.7-1.3
Rating scale (Likert/Semantic survey)	0.6-1.4
Clinical observation	0.5-1.7
Judging	0.4-1.2

Regardless of which Rasch software is used, each program reports the fit statistics as two chi-squared ratios (Bond & Fox, 2007). The common Rasch software such as WINSTEPS and RUMM2020 report the fit statistics as ZSTD and residual statistics respectively (Tennant and Conaghan, 2007). The commonly accepted range for ZSTD for rating scales is between -2.0 to 2.0 (Bond & Fox, 2007).

Step 3: Person and Item Separation Index

In Rasch measurement, reliability and internal consistency are measured using both persons and items (Bond & Fox, 2007). The Person Separation (G_p) Index is a measure of reliability in Rasch analysis that estimates and discriminates participant's responses along underlying latent variables (Bond & Fox, 2007; McAllister, 2008; Wang et al., 2009). This measure is based on traditional statistics such as Kuder-Richardson Formula 20 (KR20) and Cronbach's alpha reliability coefficient (Bond & Fox, 2007; Schumacker & Smith, 2007; Wang et al., 2009). Individual measures produce a standard error of measurement, which produces, if substituted, better reliability than is possible when KR20 or Cronbach alpha coefficients are calculated, particularly as these estimates are notable to provide any detail on a person's ability location along the hierarchical scale (Schumacker & Smith, 2007; Wright & Stone, 1999).

The G_p Index must exceed 2 to achieve the satisfactory reliability level of at least 0.80 (Wang et al., 2009), indicating that a person's performance will likely be replicated

among a similar sample group (Bond & Fox, 2007). The range of the G_p Index and the corresponding reliability coefficient are tabulated below (Wright & Stone, 1999):

Table 5.30: G_p index

Rasch Person Separation Indexes	Corresponding Reliability Coefficients (0-1)
1	0.50
2	0.80
3	0.90
4	0.94
5	0.96

An index of 2 allows the separation of three strata, such as, (high, average, low) outlining the number of specific strata of participants within each subscale (Chien, 2007; Wuang et al., 2009). In other words, the higher the G_p Index, or smaller the error, the easier the measured strata are identified, and consequently, indicates how well the items discriminate between people (Duncan et al., 2003). Reducing significant measurement error is critical in scale development and validation as McAllister (2008) states: “Quality study design will not compensate for misinformation contributed by inaccuracies introduced by assessment tools that do not measure effectively” (p. 483).

Another measure of reliability is the item separation index R_I . The R_I Index uses the same criteria and interpretation as the G_p Index and provides analysis on how well items are targeted to the sample, taking into account any misfitting data and floor and ceiling effects. This analysis provides a hierarchy of items. As noted by Bond and Fox (2007), “Item reliability and item separation refer to the ability of the test to define a distinction hierarchy of items along the measured variable” (p. 60). The R_I Index specifies how well items might replicate to another similar sample group (Bond & Fox, 2007).

Step 4: Testing for differential item functioning (DIF)

Differential item-functioning (DIF) is another measure for item invariance (item bias) comparing estimates across different dependent variables (Tennant and Conaghan, 2007) such as male/female, metropolitan/rural, healthy/not healthy, or Baby Boomers/Gen X. The DIF analysis investigates whether items have similar meaning across comparison groups (e.g., paired *t*-tests). In other words, DIF provides further support that the items are performing as they should regardless of which group undertake the test (Bond & Fox, 2007). Therefore, DIF is present when participants from different groups have variant responses, thus uncertain probabilities exist on the success on an item or particular task (Tennant & Pallant, 2007; Wuang et al., 2009). Two forms of DIF exist: uniform DIF and nonuniform DIF (Tennant & Conaghan, 2007). Uniform DIF exists when statistical differences are constant between items and all levels of a matching variable, and nonuniform DIF exists when statistical differences are not constant between ability levels and matching variables (Hanson, 1998; Tennant & Conaghan, 2007). Where items display either forms of DIF these items would normally be amended or discarded, since items are generating different success rates despite groups being at the same ability (Bond & Fox, 2007; Tennant & Pallant, 2007).

The process of manipulating data by amending or discarding items is complex, requiring investigation and careful judgement by the researcher (Tennant & Pallant, 2007). For example, while results may produce satisfactory fit statistics, they may also produce DIF, meaning the researcher must determine if items are random variations or sampling errors (Du, 1995; Tennant & Pallant, 2007). Bond and Fox (2007) point out that: “The evidence of DIF might just be the very information that is central to your investigation” (p. 232).

In determining whether to adjust for DIF, Du (1995) suggests three criteria should be addressed before adjustment i) Is the DIF statistically significant? ii) Does the DIF have serious implications? And, iii) is the DIF real or simply a chance effect? Du (1995) argues if all three criteria are evident, there is evidence that DIF exists and items and data should be re-examined. In addition to these three criteria, Bond and Fox (2007) reinforce

that researchers should have thorough knowledge of the construct under investigation and the relevant sample group. Examination of DIF generally involves two steps: first, comparing DIF contrast to ensure >0.5 logits and second, examining t -test p -value to ensure <0.05 . Since DIF procedures require item difficulties to be measured for each group separately, scatter plots can also be used in this type of investigation (Bond & Fox, 2007). Item difficulties between groups are plotted (95% CI) with items falling outside of the control plot lines indicating invariant items between groups are DIF (Wuang et al., 2009).

The four Rasch analysis steps provide a systematic and structured approach in examining dimensionality and construct validity of the PGAS. Other analyses can be performed in Rasch measurement, such as hierarchical ordering and person/item maps. However these analyses are more applicable in scales that are concerned with logit spread of person's ability and item difficulty, such as, rehabilitation developmental scales or health assessment questionnaires and therefore have not been included in the Rasch analysis of this study.

Rasch Analysis Results

Applying the Four-Step Rasch Analysis Protocol provided a structured approach in addressing the three objectives. When examining the item data, an iterative and stepwise process was undertaken until each objective satisfied the Rasch model's expectations. Factor items not fitting the Rasch model were not necessarily rejected in isolation. Rather, factor items were closely examined in context of the construct, which guided rather than forced the acceptance or rejection by strict statistical criteria alone. This ensured that factor items were not simply dismissed, while at the same time ensuring appropriate levels of psychometric rigour were maintained. Results for each objective will now be examined in closer detail.

The Rasch analysis was undertaken using WINSTEPS, version 3.64.2 (Linacre, 2006). Data from the national study where items loading on each of the seven factors obtained from the exploratory factor analysis were examined individually using Rasch analysis.

Objective 1: Examination of item fit - process

Assessment of item fit was determined by the infit mean square statistic (infit MnSq) and outfit mean square statistic (outfit MnSq). Both infit (weighted) and outfit (un-weighted) MnSq values between 0.6 and 1.4 and ZSTD values ranging from -2 to 2 were considered acceptable for this analysis (Bond & Fox, 2007; Chien & Bond, 2009). In other words, items displaying MnSq > 1.4 or ZSTD >2 or both would indicate that items are misfitting (e.g., haphazard item response). In contrast, items exhibiting MnSq <0.6 or ZSTD <-2 or both would demonstrate overfit (e.g., too perfect) (Chien & Bond, 2009).

Given the positive nature of the items in the final study, such encouragement for agreement is argued to produce overfitting scores (Bond & Fox, 2007). As such, a more detailed focus was put onto high MnSq or ZSTD Rasch output or both, since these data tend to affect the accuracy of the instrument and dimensionality in a more meaningful and sensitive manner (Bond & Fox, 2007).

Objective 2: Examination of unidimensionality - process

Following assessment for item fit, examination for unidimensionality in each of the seven factor subscales was undertaken, ensuring that relevant items only loaded on the construct under investigation (Bond & Fox, 2007; Duncan et al., 2003). While multivariate factor analyses attempts to summarise items into factors, searching for intercorrelations among variables (Pallant, 2007), principal components analysis (PCA) is used as a strategy to search for items that do not load on the construct under examination. If a large number of items do not load on the factor / dimension / subscale under investigation or large percentages of item residuals are not accounted for, the scale may be exhibiting multidimensionality instead of unidimensionality. Linacre (2009) states that this is a direct threat to a scale's validity, particularly when multidimensionality is big enough to divide dimensions.

RFA and PCA were used to test unidimensionality using the following criteria: i) 50% of the total variance explained by Rasch-derived measures, and ii) Eigenvalue < 3 and <

0.50% of unexplained variance in the first contrast component (Linacre, 2005, cited in Wuang et al., 2009; Linacre, 2006). While these criteria are well-documented in the literature, Bond and Fox (2007) suggest that final determination of additional dimensions should be guided by the researcher's judgement, based on theoretical assumptions. However, they also caution that final determination of additional dimensions ought to be based on pragmatic, non-theoretical decisions (Bond & Fox, 2007).

Further, sample size and minimum number of items are important factors in any examination for unidimensionality. The sample size of $n=872$ and the 38-item PGAS more than met the requirements for adequately testing for unidimensionality using Rasch analysis (Duncan et al., 2003; Wright & Stone, 1999).

Objective 3: Examination of differential item functioning - process

Following examination of Rasch model item fit and unidimensionality, the final objective of the Rasch analysis was the investigation for differential item functioning (DIF) across three sub-groups: age, gender, and length of employment. As noted by Cauffman and MacIntosh (2006) measurement is not simply a unidimensional exercise, but because it is complicated by a range of psychological factors, examination for DIF is an important strategy in determining if item calibrations are bias-free across dependent variables.

Assessment of DIF was undertaken across three sub-groups: i) gender, ii) age (<41 years of age / >41 years of age, iii) and length of service (<10 years of service / >10 years of service). The rationale for the age separation at 41 years of age was because this was the median age from the national study, and 10 years of service was chosen as this is often used (albeit incorrectly) in determining experience and clinical promotions within the discipline. The criteria for investigating DIF will involve 1) comparing DIF contrast >0.5 logits, and 2) examine t -test p -value <0.05. If these criteria are met, researcher judgement will be used in conjunction with item fit, unidimensionality and overall theoretical and conceptual significance.

Next the results will be discussed, focussing on the four factors that initially did not meet Rasch model expectations. The remaining three factors met the requirements for the Rasch model and their specific results can be found in (Appendix K, Vol II).

Factor 1 (Personal Behaviour and Attitudes) – Rasch results

In analysing factor 1, item 45 “*A professional paramedic should recognise their limitations*” showed misfit (MnSq=1.38, ZSTD=6.2, and age and gender DIF) and was ultimately removed. No further item misfit was identified following removal of item 45 resulting in good fit to the model (Table 5.31).

Table 5.31: Factor 1 (Personal Behaviour and Attitudes) Rasch Analysis (n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Recognise limitations (45)	-.48	<u>1.38</u>	<u>6.2</u>	1.23	4.7	√	√	
Independent team member (40)	-1.14	1.04	<u>.6</u>	1.03	.3			
Oral and written communication (43)	.39	1.02	.4	.94	-.6			
Use reflection (47)	.35	1.01	.2	.93	-.6			
Clinical reasoning (42)	-.38	.80	-3.9	.58	-3.3			
Item reliability overall scale: 0.98								
Variance explained by measures: 55.5%								

* Underlying values indicate that the MnSq or ZSTD values were beyond the misfitting criteria, e.g., MnSq > 1.4 or ZSTD > 2.0.

* DIF exists if contrast >0.50 and p <0.001

* Abbreviations: MnSq, mean square and ZSTD, standardised Z value, DIF, differential item functioning.

Potential explanations for the misfit in item 45 are not clear, although several potential reasons might exist. Firstly, the notion of recognising personal limitations has for a long time been based on egotistical hierarchy. In other words, the more ‘senior’ paramedics become, the less likely they are to admit to having limitations, and/or making clinical

errors. Secondly, admitting to limitations traditionally has led to punitive conflict such as disciplinary action or potential litigation which has ultimately led to a development of blame culture. Following the removal of item 45, item reliability for factor 1 was 0.97 and the variance was explained by the factor items were 66.8%, with a first contrast eigenvalue of 1.7, demonstrating excellent reliability and factor unidimensionality (Table 5.32).

Table 5.32: Factor 1 (Personal Behaviour and Attitudes) Rasch Analysis (Iteration 1) ($n=872$)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Independent team member (40)	.66	1.12	<u>2.2</u>	1.01	.1			
Oral and written communication (43)	-1.06	1.12	1.8	1.05	.4			
Use reflection (47)	.61	1.04	.7	.95	-.3			
Clinical reasoning (42)	-.20	.74	-5.2	.58	-3.3			
Item reliability overall scale: 0.97								
Variance explained by measures: 66.8%								

Factor 2 (Patient Interaction and Welfare) – Rasch results

One item in factor 2 was identified as misfitting in the first analysis - item 29 (clinical competence). This item also demonstrated DIF in relation to both age and length of service groups. Potential explanations for this DIF occurring are not clear, although one possible reason could be the term *competence* itself, which may have implied the former vocational roots and that *competency-based training* is most appropriate for current needs. Item reliability for factor 2 was 0.98 and the variance was explained by the factor items were 55.5%, with a first contrast eigenvalue of 1.6, demonstrating excellent reliability and factor unidimensionality (Table 5.33).

Table 5.33: Factor 2 (Patient Interaction and Welfare) Rasch Analysis (n=872)

		Infit statistics		Outfit statistics				
Item	Logit Score	MnSq	ZSTD	MnSq	ZSTD	DIF Age	DIF Gender	DIF Length of Service
Clinical competence (29)	-.85	1.16	<u>2.2</u>	1.18	1.5	√		√
Non-judgemental and non-discriminatory (1)	1.03	1.06	.9	1.16	1.9			√
Aware of professional issues such as; accountability and confidentiality (7)	.03	1.09	1.4	.94	-.6		√	
Respectful and consider moral, ethical, social, religious aspects of healthcare (3)	.46	1.01	.2	.99	-.1			
Willing to be responsible for their actions (11)	-.15	1.00	.1	.97	-.3			
Adhere to a code of ethics (25)	.58	.97	-.5	.90	-1.2			
Trustworthy (5)	-1.30	.79	-2.8	.79	-1.6		√	
Operate within appropriate ethical and legal boundaries (26)	.20	.79	-3.4	.71	<u>-3.4</u>			
Item reliability overall scale: 0.98								
Variance explained by measures: 55.5%								

Item 29 was subsequently removed for the next iteration. Following this analysis, item 7 (aware of professional issues such as; accountability and confidentiality) demonstrated DIF in both gender and length of service groups (see Table 5.34). One possible explanation for the DIF finding could be related to the conflicting terms in the item stem (e.g., accountability and confidentiality), possibly misleading participants. Item reliability remained excellent at 0.98 and the variance explained by measures improved to 56.9% with first contrast eigenvalue of 1.7.

Table 5.34: Factor 2 (Patient Interaction and Welfare) Rasch Analysis (Iteration 1)
(*n*=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Non-judgemental and non-discriminatory (1)	.95	1.02	.4	1.13	1.4			
Aware of professional issues such as; accountability and confidentiality (7)	-.09	1.12	1.7	1.01	.1		√	√
Willing to be responsible for their actions (11)	-.29	1.08	1.2	1.04	.4			
Adhere to a code of ethics (25)	.48	1.00	.1	.92	-.8			
Respectful and consider moral, ethical, social, religious aspects of healthcare (3)	.36	.97	-.5	.93	-.8			
Trustworthy (5)	-1.49	.84	-2.1	.85	-1.0		√	
Operate within appropriate ethical and legal boundaries (26)	.08	.82	-2.8	.73	<u>-3.0</u>			
Item reliability overall scale: 0.98								
Variance explained by measures: 56.9%								

A third iteration was undertaken removing item 7. In this analysis the remaining 6 items produced the best-fit according the Rasch model. DIF was demonstrated in item 5 (trustworthy), however given the importance of this item to the underlying theoretical construct, it was not removed (see Table 5.35). Overall item reliability remained excellent (0.98) and unidimensionality improved following a second iteration with 60.4% of the variance explained and first contrast eigenvalue of 1.7. Therefore, following a Rasch systematic approach, and addressing the 3 objectives, of item fit, unidimensionality and DIF, factor 2 was considered to meet the Rasch model requirements.

Table 5.35: Factor 2 (Patient Interaction and Welfare) Rasch Analysis (Iteration 2)
(n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Willing to be responsible for their actions (11)	-3.1	1.09	1.3	1.05	.5			
Non-judgemental and non-discriminatory (1)	.99	1.05	.9	1.05	.6			
Adhere to a code of ethics (25)	.49	1.00	.0	.90	-1.0			
Respectful and consider moral, ethical, social, religious aspects of healthcare (3)	.36	.99	-.2	.94	-.6			
Trustworthy (5)	-1.59	.88	-1.4	.93	-.4		√	
Operate within appropriate ethical and legal boundaries (26)	.07	.83	-2.8	.72	<u>-3.0</u>			
Item reliability overall scale: 0.98								
Variance explained by measures: 60.4%								

Factor 6 (Professional Behaviour) – Rasch results

Two items in factor 6 were identified as misfitting in the iteration - item 46 (specialist knowledge, e.g., practitioner or extended scope roles) and item 30 (high clinical status within the healthcare system) (see Table 5.36). Item 46 also demonstrated DIF in both gender and length of service groups. A possible explanation for the poor model fit of item 46 could be the ambiguous statement offering participants two options in the item stem, thus potentially confusing or misleading participants. No obvious reason for the DIF in item 46 or item 30 misfit can be suggested. Item reliability for factor 6 for this analysis was 0.99 and variance explained by items was 57.1%, with first contrast eigenvalue of 1.5 demonstrating excellent reliability and factor unidimensionality.

Table 5.36: Factor 6 (Professional Behaviour) Rasch Analysis (n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Specialist knowledge (e.g. practitioner or extended scope roles). (46)	.91	<u>1.51</u>	<u>8.5</u>	1.60	9.9		√	√
High clinical status within the healthcare system (30)	-.52	<u>1.40</u>	<u>6.6</u>	1.30	4.7			
Embrace social responsibility (35)	.06	.93	-1.2	.90	<u>-1.9</u>			
Apply knowledge of the basic sciences (37)	-.72	.88	-2.2	.83	<u>-2.9</u>			
Committed to the discipline (32)	-.36	.80	-3.9	.77	<u>-4.3</u>			
Integrate population-based care into their practice (31)	.93	.76	-5.0	.79	<u>-4.3</u>			
Contribute to continuous improvement within the healthcare system (34)	-.30	.75	-5.1	.69	<u>-6.0</u>			
Item reliability overall scale: 0.99								
Variance explained by measures: 57.1%								

Items 46 and 30 were subsequently removed from the next iteration. Following this analysis, item 37 (apply knowledge of the basic sciences) demonstrated both model misfit and DIF between age groups (see Table 5.37). One possible explanation for the DIF occurring could be related to previous paramedic education and training, particularly affecting those older than 40 years of age and who completed courses where basic sciences were not routinely taught. Item reliability was 0.99 and the variance explained by measures was 52.3% with a first contrast eigenvalue of 1.4.

Table 5.37: Factor 6 (Professional Behaviour) Rasch Analysis (Iteration 1) (n=872)

		Infit statistics		Outfit statistics				
Item	Logit Score	MnSq	ZSTD	MnSq	ZSTD	DIF Age	DIF Gender	DIF Length of Service
Apply knowledge of the basic sciences (37)	-.90	1.12	<u>2.1</u>	1.07	1.1	√		
Embrace social responsibility (35)	.19	1.04	.7	.97	-.4			
Contribute to continuous improvement within the healthcare system (34)	-.31	1.00	.1	.93	-1.2			
Committed to the discipline (32)	-.40	.99	-.2	.93	-1.2			
Integrate population-based care into their practice (31)	1.43	.92	-1.5	.97	-.5			
Item reliability overall scale: 0.99								
Variance explained by measures: 52.3%								

A second iteration was undertaken removing item 37 from the analysis. In this analysis the remaining 4 items produced a best-fit according the Rasch model criteria, and DIF was not exhibited (see Table 5.38). Overall item reliability remained excellent (0.99) and unidimensionality was established with 54.8% of the variance explained and a first contrast eigenvalue of 1.4 reported. Therefore, following a Rasch systematic approach and addressing the 3 objectives, of item fit, unidimensionality and DIF, the final version of factor 6 consisting of four items was considered to fit the Rasch model specifications.

Table 5.38: Factor 6 (Professional Behaviour) Rasch Analysis (Iteration 2) (n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Embrace social responsibility (35)	-.04	1.05	.9	.99	-.1			
Contribute to continuous improvement within the healthcare system (34)	-.59	1.03	.5	.95	-.8			
Committed to the discipline (32)	-.69	1.00	.1	.92	-1.2			
Integrate population-based care into their practice (31)	1.33	.95	-1.0	.98	-.3			
Item reliability overall scale: 0.99								
Variance explained by measures: 54.8%								

Factor 7 (Interaction Skills) – Rasch results

One item in factor 7 was identified as misfitting in the iteration - item 14 (counselling skills) (see Table 5.39). Item 14 also demonstrated DIF in the age subgroup. No obvious reason for the poor model fit and DIF in item 14 misfit can be suggested. Item reliability for factor 7 for this analysis was 0.99 and variance explained by items was 62.6%, with first contrast eigenvalue of 1.5 demonstrating excellent reliability and factor unidimensionality.

Table 5.39: Factor 7 (Interaction Skills) Rasch Analysis (n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Counselling skills (14)	2.14	1.12	<u>2.2</u>	1.35	4.9	√		
Leadership and mentorship (20)	-.13	1.04	.7	.93	-.9			
Good listener (16)	-1.18	.97	-.5	.90	-1.1			
Learn to help others (36)	-.12	.95	-.7	.95	-.7			
Communication ICT (19)	.35	.92	-1.3	.92	-1.1			
Accept guidance (21)	-1.06	.85	-2.7	.81	<u>-2.3</u>			
Item reliability overall scale: 0.99								
Variance explained by measures: 62.6%								

Item 14 was subsequently removed from the next iteration. Following this analysis, item 19 (communication using ICT) demonstrated both model misfit and DIF between age groups (see Table 5.40). One possible explanation for the DIF occurring could be related to previous paramedic education and training, particularly related to those older than 40 years of age and who completed courses where more advanced forms of communication technologies were not commonly used. Item reliability was 0.98 and the variance explained by measures was 48.5% with a first contrast eigenvalue of 1.4.

Table 5.40: Factor 7 (Interaction Skills) Rasch Analysis (Iteration 1) (n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Communication ICT (19)	-.87	1.11	<u>2.7</u>	1.19	3.2	√		
Leadership and mentorship (20)	.35	1.09	1.4	.93	-.8			
Good listener (16)	.88	.95	-0.7	1.01	.2			
Learn to help others (36)	.36	.97	-.4	.89	-1.4			
Accept guidance (21)	-.72	.83	-2.9	.75	<u>-3.3</u>			
Item reliability overall scale: 0.98								
Variance explained by measures: 48.5%								

A second iteration was undertaken removing item 19 from the analysis. In this analysis the remaining 4 items produced a best-fit according the Rasch model criteria, and DIF was not exhibited (see Table 5.41). Overall item reliability remained excellent (0.98) and unidimensionality was established with 51% of the variance explained and a first contrast eigenvalue of 1.4 reported. Therefore, following a Rasch systematic approach and addressing the 3 objectives, of item fit, unidimensionality and DIF, the final version of factor 7 consisting of four items was considered to fit the Rasch model specifications.

Table 5.41: Factor 7 (Interaction Skills) Rasch Analysis (Iteration 2) (n=872)

Item	Logit Score	Infit statistics		Outfit statistics		DIF Age	DIF Gender	DIF Length of Service
		MnSq	ZSTD	MnSq	ZSTD			
Leadership and mentoring (20)	-5.3	1.16	2.2	1.11	1.0			
Good listener (16)	.89	.97	-.4	1.04	.5			
Accept guidance (21)	-3.6	.82	-2.7	.73	-2.9			
Learn to help others (36)	-1.33	.86	-2.4	.83	-2.0			
Item reliability overall scale: 0.98								
Variance explained by measures: 51%								

Items misfitting the Reach model were not evident in the remaining three factors (12 items). Several items produced DIF; however, since item misfit was not evident and items were deemed to be important to the underlying theoretical construct, they were not removed from the analysis and subsequent iterations were not undertaken. In terms of unidimensionality, the remaining four factors all produced first contrast eigenvalues of <1.7, and produced an explained variance > 50%.

The final version of the PGAS (30-item) following the Rasch analysis can be seen in (Table 5.42).

Table 5.42: Rasch Analysis (Seven factor PGAS - 30-items)

Item	Measure	Infit MnSq	Infit ZSTD	Outfit MnSq	Outfit ZSTD	DIF Age	DIF Gender	DIF Length of Service
Factor 1								
Independent team member (40)	.66	1.12	<u>2.2</u>	1.01	.1			
Oral and written communication (43)	-1.06	1.12	1.8	1.05	.4			
Use reflection (47)	.61	1.04	.7	.95	-.3			
Clinical reasoning (42)	-.20	.74	-5.2	.58	-3.3			
Factor 2								
Responsible for actions (11)	-3.1	1.09	1.3	1.05	.5			
Non-judgemental (1)	.99	1.05	.9	1.05	.6			
Code of ethics (25)	.49	1.00	.0	.90	-1.0			
Respectful (3)	.36	.99	-.2	.94	-.6			
Trustworthy (5)	-1.59	.88	-1.4	.93	-.4		√	
Ethical and legal boundaries (26)	.07	.83	-2.8	.72	<u>-3.0</u>			
Factor 3								
Critical thinking (4)	1.75	.95	-.7	1.14	3.7			
Think critically (13)	-.63	1.00	.1	.87	-1.1			
Enquiry and research (2)	-1.12	.81	-2.3	.80	-1.7			
Factor 4								
Broader health system (23)	.08	1.07	1.2	1.01	.2			
Patients point of view (8)	.55	1.07	1.1	.93	-.9			
Culturally sensitive (12)	.41	.99	-.2	.92	-.9			
Understand their role (9)	-1.04	.80	-3.4	.75	-3.1			
Factor 5								
Evidence based practice (10)	.10	1.23	<u>4.4</u>	1.34	4.4			√
Self-directed (28)	.44	1.17	1.9	1.34	3.5			√
Responsibility for quality care (41)	-.04	1.05	.7	.95	-.5		√	
Self-development (17)	-.47	.89	-1.5	.80	<u>-2.4</u>		√	
Interdisciplinary team (18)	-0.1	.85	-2.1	.84	-1.8			
Factor 6								
Social responsibility (35)	-.04	1.05	.9	.99	-.1			
Continuous improvement (34)	-.59	1.03	.5	.95	-.8			
Committed to discipline (32)	-.69	1.00	.1	.92	-1.2			
Population based care (31)	1.33	.95	-1.0	.98	-.3			
Factor 7								
Leadership and mentoring (20)	-5.3	1.16	2.2	1.11	1.0			
Good listener (16)	.89	.97	-.4	1.04	.5			
Accept guidance (21)	-3.6	.82	-2.7	.73	-2.9			
Learn to help others (36)	-1.33	.86	-2.4	.83	-2.0			

* Underlying values indicate that the MnSq or ZSTD values were beyond the misfitting criteria, e.g., MnSq > 1.3 and ZSTD > 2.0.

* DIF exists if contrast >0.50 and p <0.001

* Items in bold met the misfitting criteria and were subsequently removed.

Summary

This chapter analysed and explored the research findings from the national study using two multivariate statistical approaches: EFA and Rasch Analysis with the purpose of providing answers to the following three questions: i) is the paramedic discipline a profession, ii) does the paramedic discipline want to be a profession, and iii) what are the desired graduate attributes of a professional paramedic? The chapter was presented in four parts. Part 1 described the study procedures, ethical implications and other study administration. Part 2 presented both descriptive and comparative data using *t*-tests and ANOVAs. Part 3 presented the EFA results, with Part 4 presenting the Rasch analyses.

The results have been examined and reported, indicating that statistically significant findings were evident in various professionalisation and graduate attribute items. Findings from both the statistical approaches used have confirmed that the PGAS is a reliable, valid, and unidimensional instrument. Given the inherent strengths of EFA in item-reduction and parsimony, and the Rasch model's goodness-of-fit, and unidimensionality expectations, overall construct validity of a 30 item scale and seven subscales were confirmed. Using both EFA and Rasch analysis has produced a psychometrically sound instrument which offers the paramedic discipline a set of empirically-based graduate attributes. The instrument is argued to provide the discipline with the underpinnings of a national curriculum based on a set of potential graduate attributes.

Chapter 6

INTERPRETATION OF RESULTS

Introduction

The national study had three objectives: to establish whether the paramedic discipline considered itself a profession, and if not, whether it desired to move through the professionalisation process, and lastly, if it sought to confirm which graduate attributes were deemed to be best suited for the Australian paramedic membership. Analyses of the descriptive results, exploratory factor analysis (EFA), and Rasch analysis (RA) highlighted four important points. First, the paramedic discipline is *not* considered to be a full profession by its membership. Second, members of the paramedic discipline *want* to become recognised as a full profession thus indicating a desire to move through the professionalisation process. Third, following EFA and RA, a 30-item Paramedic Graduate Attribute Scale (*PGAS*) including seven subscales was confirmed. Last, the *PGAS* is a psychometrically sound instrument with established unidimensionality, construct validity, and reliability.

The purpose of this chapter is to interpret and discuss the key findings from the national study. This section will provide an overview of the national study, and provide an outline of the interpretation and analysis from the descriptive statistics, EFA and RA. Each of these will be presented in three parts:

- Part 1 will include analysis and discussion of descriptive and comparative statistics.
- Part 2 will provide analysis and discussion of results following the EFA.
- Part 3 will outline the analysis and discussion of results following the RA.

The aim of these three parts is to provide a verifiable response to addressing the following questions: i) is the paramedic discipline a full profession? ii) does the

paramedic discipline want to be viewed as a full profession?; and iii) what are the desired graduate attributes of a professional paramedic? It will be argued that the answers to the questions will lead to the conclusion that the paramedic discipline requires a standardised curriculum and a defined and validated set of graduate attributes. In other words, the graduate attributes of a paramedic training course ought to reflect the desired defining characteristics of professional paramedics and vice versa given the research and developmental role of Higher Education institutions.

Part 1: Descriptive and Comparative Discussion

Informed by the pilot study, the *PGAS* used for the national study contained three sections: section 1: demographics (6 questions), section 2: professionalisation (8 questions), section 3: graduate attributes (47 questions). Each of the sections used a five point Likert-type scale in order of increasing importance (1=strongly disagree to 5=strongly agree). The discussion of each of these three sections will be based on the descriptive results and comparative findings from the independent *t*-tests and one-way ANOVAs.

Section 1: Demographics

The results from the demographic section demonstrated a good representation of the paramedic membership. The subgroups of age, geographic location, and length of employment all produced an adequate cross-section and spread of the sample group. The age of participants ranged from 18 to 75 years ($M=40.71$, $SD=9.92$) suggesting a variety of experiences and backgrounds existed, thereby adding important dimensions to the data analysis. In other words, the age range demonstrates that participants included both novice and expert paramedics, and a proportion (3%) of the > 60 years of age were likely to be retired from the ambulance sector adding an additional aspect to the data analysis.

Every state and territory was represented in the study ensuring that a broadly national range of the paramedic membership participated in the study. The distribution of geographic location was expected considering the size of memberships in each state. In

other words, Australian College of Ambulance Professionals (ACAP) membership is highest in New South Wales, Victoria, and Queensland. New Zealand and South Africa were removed from the data analysis as they represented only 0.2% of the total sample. Similarly, the gender break down was predictable given the traditionally male dominated workforce (74.5% versus 25.5%). However as the paramedic workforce continues to evolve, this gender distribution is anticipated to change in the coming years. In fact, planning data suggest the majority of students graduating from university programs are now female (Australasian Survey of Student Engagement, 2010).

While the pilot study was represented mainly by academic staff from universities and/or polytechnics, the national study balanced this with the majority of participants being employed by an ambulance service. Moreover, in both studies sufficient distribution was achieved with those associated and responsible for education and training. Importantly, various view points and therefore alternative perspectives were obtained from those not directly involved or necessarily interested in paramedic education and training. The remaining participants were employed either in a hospital, defence department, or other setting (e.g., health department, or community health care agency). Student participants totalled (2.8%) of the distribution. However, since they were not yet qualified or had not yet achieved employment as a paramedic, their data was not included in the analysis given the likelihood of data violation. Finally, an adequate distribution of participants' length of employment was also reported - $M=9.41$ years, $SD=9.92$ (range 3 months to 45 years) suggesting that participants included both novices and experts in the paramedic field. Overall it suggests that because of the variation in experience, attitudes, and perceptions, the responses were likely to provide a rich cross section of data sourced. Specific to this study, participants were likely to have been educated during several of the phases (e.g., *passive paramedic*, *reactive paramedic*, and *proactive paramedic*) outlined in Chapter 2, thereby ensuring multiple viewpoints on which graduate attributes are best suited for the membership. The next section will discuss the results from Section 2 – Professionalisation.

Section 2: Professionalisation

Results from the professionalisation section provide valuable information regarding what current (and past) members think about the present professional status of the discipline. Since the view of the paramedic membership is that the discipline is not currently a profession, these findings also provide information on which professional characteristics or governance structures the paramedic membership believes are still required in order to achieve full professional status. Key factors such as national registration and standardised curriculum (both of which are mutually inclusive and directly informed by national graduate attributes) were likely to be highly evident. Each of the eight professionalisation items from Section 2 will now be discussed.

Becoming recognised as a profession

While the results suggest the paramedic discipline views itself as not being a full profession, findings also demonstrate that being recognised as a profession by others is something the membership nonetheless wants to achieve. The item whether the ‘paramedic sector will benefit from becoming recognised as a profession’ produced a significant difference of opinion between participants employed between 1-5 years and those employed between 21-25 years. Although speculative, these findings potentially suggest that those recently employed, and therefore recent university graduates, have undertaken undergraduate units in professionalism during their undergraduate coursework. Coursework in professionalism is restricted to Bachelor-level programs, and was not studied or taught in previous Certificate or Associate Diploma courses, which suggests these participants may be more aware of the contemporary professionalism theories and challenges faced by the paramedic discipline in achieving full professional status. In other words, relatively new paramedic graduates are more likely to recognise the current shortfalls in the discipline’s quest in achieving this goal, compared to those who have been employed for longer and therefore unlikely to have undergone university-based training.

Exhibiting the characteristics of a profession / Unique body of knowledge / Clinical autonomy

Interestingly, other results suggest the paramedic discipline is currently moving towards exhibiting professional traits such as possessing a unique body of knowledge (M=3.95), and working autonomously (M=3.78). External evidence supporting both items has been demonstrated by the recent industrial campaigns and outcomes from Fair Work Australia in South Australia and Australian Capital Territory (ACT), where paramedics (intensive care level) have been recognised as health professionals and receive professional rates of pay (ACAP, 2010a; Gallagher, 2010; Industrial Relations Commission, 2007; Lennox, 2010; South Australian Industrial Relations Tribunal, 2008). In ACT's case, several pertinent points have been raised. First, intensive care paramedics have been re-classified from Technical Officers to Health Professionals; suggesting paramedics' work (at its highest clinical level) is now recognised as a profession by cognate health providers, health policymakers and bureaucrats in the ACT (ACAP, 2010a). Second, this promotion, whilst clearly a solid achievement and an important point in the paramedic professionalisation journey, does raise the issue of those not qualified at the level of an intensive care paramedic. Simply put, what range of classifications is applied to paramedics who do not qualify at the intensive care level, such as ambulance officers or students? What classification can they aspire to? Contrasting this point with other professional groups such as nursing and dentistry, two points are evident. Firstly, subordinate positions such as Division 2 Nurse and Dental Hygienist, while being subordinate to Division 1 Nurses and Dentists, are both still considered health professionals (Australian Health Practitioner Regulation Agency, 2010). Secondly, they are considered health professionals, not because of autonomous practice, or a unique body of knowledge (which could be argued they do not possess), but rather because they have national registration, self-regulatory bodies, formal education program accreditation procedures, and national standards. These latter points appear to be the next challenge for the paramedic discipline in achieving national recognition for all levels of paramedic clinical practice and provision of patient care, and the discipline as a whole.

Regarding the item ‘exhibiting characteristics of a profession’, differences occurred between the 55-59 and 25-29, 30-34, and 40-44 age groups. This result is somewhat surprising. Making the assumption that the majority of participants in the 55-59 age group had been employed as paramedics for many years (some for 30 years), it was unexpected that they did not report higher mean scores given their long association with the discipline, and the professional pride in their employment as paramedics.

The item ‘exhibiting the characteristics of a profession’ produced a statistically significant difference between participants living in Tasmania compared with those living in ACT and South Australia. The statistical differences could possibly be caused by the clinical and professional isolation that Tasmania faces in its professional paramedic practice. Moreover, given the professional isolation across all health care professions, the notion of medical dominance and “working in silos” is amplified by Tasmania’s island status, and hence there is a potential that participants from Tasmania do not clearly identify their professional characteristics along similar lines to their mainland counterparts. Given the recent changes to the re-classification of paramedics in ACT, and the professional rates of pay in South Australia, it would be reasonable to assume that paramedics from these areas would argue they exhibit the characteristics of a profession, and hence a potential reason in the differences in mean scores.

National registration

Currently, members are pessimistic about paramedics establishing national registration within the next two years ($M=2.90$, $SD=1.03$). While this negativity is perhaps well founded as it is based on years of inaction and rhetoric, the past 12 months has seen the emergence of two paramedic peak/governing bodies: ACAP, and the Council of Ambulance Authorities (CAA). As outlined in Chapter 3, ACAP is a national body representing over 4000 paramedic members involved in prehospital care. On the other hand, the CAA is a peak body and the corporate identity for the paramedic discipline and individual ambulance service organisations that employ over 18,000 paramedics in either a paid or volunteer capacity (CAA, 2008c).

The key difference between the two organisations is the governance. The board of the CAA consist mainly of the Chief Executive Officers from every ambulance service in Australia. ACAP's national board on the other hand, consists of either retired ambulance service managers or paramedic personnel currently employed by an ambulance service. Relationships between the two organisations have been strained over the past few years over one issue: national registration. The CAA do not support the notion of national registration for paramedics (CAA, 2008c), while ACAP endorses its implementation (ACAP, 2008b, 2009a, Joyce et al., 2009). The disagreement over national registration has led to several public confrontations highlighted in the Response Magazine (Hotchin, 2008) and later at a pre-conference seminar meeting held in Auckland, September 2009 and organised by the CAA. The main point of contention between ACAP and CAA rests with the perceived conflict of interest, and loss of 'organisational control' that currently exists with the CAA. In summary, CAA has taken the position that the self-regulation and credentialing provided by each ambulance service is sufficient in maintaining public safety (Joyce et al., 2009). This is illustrated by the following remarks made by both parties. CAA (CAA, 2008b) stated:

There is no demonstrable need to advance registration at the current time in the interests of patient safety as systems and procedures are in place in every jurisdiction to safeguard patient safety in what is already a highly regulated field of the health service delivery (p. 8)

In opposition, ACAP (ACAP, 2008d) noted that:

ACAP does not agree with the CAA's view that there is currently no demonstrable need to advance the cause of registration in Australia and the apparent desire to maintain the status quo for the funding and administration of out of hospital EMS [Emergency Medical Services]. The CAA position is perceived by ACAP to be contrary to the community's desire to achieve improved health care outcomes in the broad public interest ... (p. 4)

These ideological differences between ACAP and CAA, while creating tension within certain political circles, highlight the need for urgent debate and informed dialogue within the discipline, particularly given the changes and proposed reforms taking place in

Australian health care. Given the number of proposed reforms, it is likely many industrial and legislative issues will also be created. For example, prescribing rights for new practitioner roles indicate that workplace and enterprise agreements are likely to be re-negotiated. Therefore, it is no surprise that in recent times, the newly titled National Council of Ambulance Unions (NCAU) has formed a public partnership with ACAP in their committed stance on paramedic registration (ACAP, 2010b). The following statement demonstrates the positioning of both groups opposing the CAA:

ACAP and NCAU representatives noted the widespread support from practitioners and the growing endorsement by various jurisdictions for the registration of paramedics and the inclusion of EMS within national healthcare policy. ACAP and NCAU are disappointed that so far the Council of Ambulance Authorities (CAA) has not embraced the principle of national registration which we see as fundamentally important for the profession and in the interests of public safety. ACAP and NCAU believe it is time for the CAA and Ambulance Services nationally to take positive steps to work collaboratively with all stakeholders to ensure the early implementation of national registration (ACAP, 2010b)

The ACAP and NCAU appear to be at loggerheads with the CAA. What is important to note is that professional registration as mandated by the Commonwealth government is for the protection of the general public from unqualified or poorly performing health care providers, while at the same time ensuring that health care professionals remain current in their abilities, knowledge and skills. It is only an indirect benefit to the professions themselves that they will be more visibly recognised by members of the public as being ‘fully professional’. The ACAP and NCAU likely have differing vested interests to the CAA.

The issue of national registration also produced significant differences between participants employed between 1-5 years, and the rest (6-10 years, 11-15 years, and 21-25 years). While participants employed between 1-5 years were largely neutral on this item, the other groups presented less than optimistic views on achieving national registration. The likely explanation for these findings in those employed for longer periods may be caused by national paramedic registration not being prominent, and despite being mooted

for several decades having met with very little progress, minimal leadership, and a lack of political momentum. However, as highlighted earlier, the notion of paramedic registration has now acquired leadership and political momentum, ironically caused by the division between the ACAP and CAA. While it is too early to make predictions about the outcome of the contestation and controversies, the turbulence seems to have provided a cause for optimism amongst the younger members of the paramedics sector. It will be interesting to re-examine this item given the current discourse and debate between ACAP and CAA, and health reforms currently taking place in the Australian health system such as the implementation of the single national registration board.

Alignment with nursing and medicine

In response to the question of whether the discipline should align itself with nursing or medicine to improve its chances of becoming a profession, participants preferred an alliance with medicine ($M=3.31$, $SD=1.16$) over establishing one with nursing ($M=2.37$, $SD=1.17$). While the results suggested that the paramedic membership is not unified on seeking alliance with medicine, the results are clearer with regard to aligning with nursing. One plausible explanation could be the ongoing influence the nursing profession has on paramedic education, training, and curriculum development. Anecdotally, the continued reliance on nursing and nursing educators is a contentious one, particularly among paramedic academics and educators, who are concerned with the number of non-paramedic personnel either coordinating or leading paramedic university departments. For example, only three of the 12 paramedic departments within Australia currently have a paramedic as head of department. This lack of paramedic leadership is highlighted by one of the national paramedic leaders:

In order to be considered a profession in our own right, paramedics need to be the main educators of new entrants and to carry out research that develops the profession's knowledge base. While the contribution of other disciplines is valued, undue reliance on others for professional leadership limits the advancement of paramedics as a professional group (O'Meara, 2006).

Another possible explanation could be the notion of ‘occupational take-over’ (Phillips, 2007). The most likely professional group to subsume the paramedic discipline would be nursing given the historical ties (ambulance nursing education from the 1970s) and the ongoing reliance for nursing educators to teach and coordinate core paramedic curriculum in undergraduate and postgraduate programs. While this ‘take-over’ notion is perhaps alarmist, one aspect of it is not – the paramedic discipline does not have formal professional status, and until it does it will continue to be vulnerable from non-paramedic influences and as such have limited independence in areas such as paramedic education and training across Australia. Phillips (2007) sums up the concerns by stating that “the greatest risk for the paramedic is being subsumed into other professions, or the paramedic becoming the new ‘ambulance driver’ of the 21st century” (p. 12).

Statistical significance and large effect size were reached between paramedics and academics regarding the alignment with nursing issue. Participants from the industry group were less supportive of this idea when compared with their academic counterparts, albeit that some respondents operate in both sectors. One potential cause for these differences in mean scores could be attributable to the number of nursing (and also midwifery) staff members currently involved in coordinating or teaching undergraduate paramedic programs. Do these participants feel the paramedic discipline would be better served as a Department under the auspices of a School or Faculty of Nursing and Midwifery? Such arrangements are currently in place at three universities in Victoria: Australian Catholic University, University of Ballarat, and in part, at Monash University in its Nursing/Paramedic double degree.

Significant findings were also produced comparing females to males on the issue of aligning with nursing, with females producing a mean score of 2.30 (SD=1.16) compared with males 2.57 (SD=1.13). This item has perhaps some significance given a sizeable proportion of current paramedic staff were once registered nurses and since the nursing profession is dominated by females this raises some interesting questions in the different mean scores. For example, do these participants have disapproving attitudes towards the nursing profession? Or is this a simple case of ‘paramedic pride’, not wanting to be

dominated or regulated by an outside profession? Unfortunately statistics on paramedics' previous employment are not collected and thus detailed analysis is not possible on this particular item.

Higher Education

The transition of paramedic training programs to Higher Education was seen as an important step in the professionalisation process ($M=3.98$, $SD=0.96$) by the respondents. While the mean score suggests widespread support of Higher Education, there nonetheless appears to be a degree of uncertainty among the membership. Anecdotally, and supported by a growing body of evidence among paramedics, there are some concerns that the graduates from the 'newer' non-vocational system do not yet possess the life experience skills and may be too young or immature for the demands of paramedic employment (Willis, Williams, Brightwell, O'Meara, & Pointon, 2010). For example several descriptive studies examining paramedic pre-employment experiences while on clinical placements (Boyle et al., 2008; Waxman & Williams, 2006) suggest that a proportion of the paramedic membership still have reservations concerning the move from Vocational Education to Higher Education. This view is illustrated in a recent interview with an experienced paramedic who states:

That's the one thing that's changed over the years that I don't really agree with [transition to Higher Education]. Being a paramedic is a very intensive job and [the] three-year training course really equipped us well because it included a high level of practical experience. These days the graduates start a lot younger and can be on the road within 12 months and although some are more than capable, I prefer the "old school" methods of teaching (Mann, 2010, p. 9)

In other words, these individuals see the vocational system led by a skills-based apprenticeship model as the more appropriate for today's paramedic.

Depending on Higher Education produced unsurprising results comparing between age groups, where statistical significance was reached between those aged 50-54 and those aged between 25-29, 35-39, and 40-44. Again, on the assumption that the majority of

participants in the 50-54 age group have been employed for many years, the majority of these members would have undertaken paramedic training during the era of first aid certificates and bronze medallions, well before the transition of paramedic education to Higher Education. It is to be expected that perceptions are likely to exist among this group that tertiary level programs are not necessarily important simply because they have enjoyed long careers as paramedics without a formal tertiary level education. This is not to suggest, however, that this or any age group is entirely homogenous – the discussion here refers to trends.

The concept of depending on Higher Education produced significant differences between respondents from Victoria/Queensland and South Australia/Western Australia, though effect sizes were small. One plausible explanation for these regional differences might be due to the historical origins and contemporary nature of programs in Victoria and Queensland, compared with South Australia and Western Australia. For example, Victoria has five universities providing either undergraduate or postgraduate entry-level qualifications, while Queensland now has three, one specialising in remote paramedic practice. These compare with one university in South Australia and one in Western Australia that use a hybrid model of part-vocational and part-Bachelor level of education. These comparisons suggest base paramedic qualifications at the Bachelor level are generally considered the ‘standard’ in Victoria and Queensland, while in South Australia and particularly in Western Australia a Bachelor degree as the basic qualification is not yet normalised.

Perhaps not surprising, statistical differences were produced between academics ($M=4.41$, $SD=1.09$) and paramedic clinical staff ($M=3.96$, $SD=0.95$) on the issue of Higher Education. These differences produced a large effect size, and suggest that the transition to, and current education and training arrangements in, formal Higher Education settings is still not wholeheartedly supported by paramedic staff. This uncertainty could be in response to the rapidly increasing number of universities now offering paramedic programs, and the diverse standards exhibited by the newly graduated students thereof. In other words, there may be concern that because formal accreditation

processes and standardisation of curricula are non-existent, consistent clinical and pedagogical standards cannot be guaranteed to be consistent from one university course to another. There is some anecdotal evidence that the end product is a graduate who is consistently inconsistent (McCall et al., 2009), because he or she may or may not meet paramedic members' standards or standards set by the ambulance service. That is not to say that all curricula should be the same (Grantham, 2004), but rather that core attributes such as critical thinking, the ability to work in teams, and approaching patients in a focused, non-discriminatory manner should be evident at agreed-upon minimum standards of achievement in every university curricula as common and reliable paramedic graduate attributes. The next section will now discuss the results from Section 3 – Graduate Attributes.

Section 3: Graduate Attributes

What does a professional paramedic practitioner look like? Extrapolating from the responses to the PGAS, s/he displays the following seven descriptors (defining characteristics) that each have a number of sub-descriptors. While there is a notable degree of census, some demographically-based contestation exists. This section will consider some of the areas of disagreement as evidenced by the data analysis from the *PGAS*. Results from the graduate attribute section provided important information regarding which graduate attributes were considered most desirable for the Australian paramedic membership. Since formal accreditation and national curricula standards do not currently exist among the 12 university paramedic education programs, exploring which attributes are most desirable or suitable will provide important structure in achieving educational consistency (ACAP, 2009d).

Factor 1: Personal Behaviour and Attitudes (includes items: 3.40, 3.42, 3.43, 3.47)

The item 'has the ability to work independently as well as part of a team' produced a mean score of 4.69 (SD=0.47) suggesting this attribute was viewed as important by the membership. No statistical differences were noted in any of the subgroups, highlighting homogeneity of variance. While working independently is a reality of day-to-day practice for paramedics, its application is extended and is being viewed as central in the

success of establishing new models of health care, such as extended care roles and paramedic practitioners (Raven, et al., 2006). In these new roles, paramedics work largely autonomously making decisions without physician orders or direction. Therefore, regardless of the nature of patient injury or illness, decisions, management, and ongoing interventions are based on the paramedics' ability to work independently of a hospital or health care team.

While working autonomously is a core function of a paramedic, equally important is the capacity to work as part of a team. As population health changes, so too are the health burdens and complexity of health care needs. One potential solution in dealing with these changes and complexities is multidisciplinary teamwork and interprofessional collaborative practice (Lavin et al., 2001; Stone, 2006). Indeed, it is recognised that collaboration and teamwork are now a major focus of the Australian health care system, where teams aspire to optimise outcomes for patients through effective interprofessional collaboration. Interprofessional learning and practice can help deliver safe, patient-centred quality care (McNair, Brown, Stone, & Sims, 2001). The Productivity Commission (2005) and the National Institute of Health and Welfare (2003) have produced reports that have detailed Australian health workforce shortfalls. Both bodies have made recommendations for dealing with these issues that involve integrated interprofessional and multidisciplinary teamwork, leading to improved education and training for students, educators, and clinicians as well as more effective collaboration between stakeholders. Clearly, teamwork is an integral part of health care reforms in Australia, and therefore it is important that as the paramedic discipline positions itself in these reforms it promotes and exercises teamwork practices.

The item 'have an ability to use reflection and learn from experience' also produced a high mean score of 4.53 (SD=0.52), and produced statistically significant differences between those employed paramedics aged between 26-30 years compared with 1-5 years, and 11-15 years. One plausible reason for these statistical differences could be linked to the evolution and transition to university-based paramedic education and training, although this does not explain the differences for those paramedic personnel employed

between 6-10 years and 16-25 years. Only since this transition has the concept of critical reflection and clinical reasoning been included in paramedic curriculum. This might indicate that those employed between 26-30 years are less familiar with the importance of critical reflection and clinical reasoning. The best example of this is the inclusion of reflective journals/diaries. For example, at Monash University and Victoria University undergraduate paramedic students are provided with up to 20 weeks of clinical placements. For the vast majority of these fieldwork placements, paramedic students are expected to maintain a reflective journal which carries a small percentage towards their final grade. The objectives of the reflective journal are to promote an awareness of why critical thinking, clinical reasoning, and critical reflection are integral skills for paramedic practice. Students are expected to develop new insights based on what they experienced during their practical placements. Importantly, students are expected to reflect on how these experiences may impact on future practice, analysing strengths and weaknesses, and managing and learning from mistakes (Regener, 2005). McCall et al. (2009) add: “Through self reflection and critical evaluation students are expected to develop and exhibit professional behaviours to ensure that graduates are adequately prepared for current and future roles in community based emergency health care”. Reflection as a paramedic attribute is not only important for the changing roles in health care, but also because reflective clinicians are often change agents, able to determine what future practice may look like (Beckwith & Beckwith, 2008).

Factor 2: Patient Interaction and Welfare (includes items: 3.01, 3.03, 3.05, 3.07, 3.11, 3.25, 3.26, 3.29)

The attributes ‘being trustworthy’ and ‘having clinical competence’ produced the highest mean respondent scores, ($M=4.83$, $SD=0.37$) and ($M=4.80$, $SD=0.40$) respectively. It was predictable that both of these items received high mean scores, and both will be discussed in some detail as they form the basis of the public face of paramedics. Given that the prehospital environment is often unpredictable, patients, carers, and relatives are often uncertain, vulnerable, stressed, and in need of professional reassurance. This unpredictably occurs on a daily basis for every paramedic; therefore, ensuring patients and others gain confidence and establish rapport with paramedics is a critical attribute in

patient assessment and management. Undoubtedly, being trustworthy allows patients and others to feel comfortable and confident in disclosing information that is often very personal and distressing.

There are a number of factors and variables involved in this process. For example, paramedics must have the capacity to respond sympathetically and professionally to such issues as: how life-threatening is the emergency, have they called for paramedics in the past, was the ambulance delayed previously, and were they satisfied with the care given? The overall process of gaining rapport is made easier when the paramedic is seen as trustworthy and knowledgeable. This may be demonstrated by being honest, calm, and by not betraying trust. It is accepted practice nowadays for paramedics to always communicate to patients, carers, or relatives the exact patient outcome (regardless of how difficult or dire it is), even if this includes death. Evidence indicating trustworthiness as an attribute is already demonstrated by paramedics comes from an unlikely source. The Australian Reader's Digest administers the 'Most Trusted Professionals Poll' and for seven consecutive years paramedics have topped the poll (Australian Reader's Digest, 2010). Further, in a recent pilot study examining community perceptions of paramedic professionalism, community members were asked what they perceived as desirable attributes for Australian paramedics (Murcott, Williams, Morgans, & Boyle, 2010). Qualitative data analysis from the focus groups found that trustworthiness was considered an important attribute from a community perspective, again illustrating the importance of trustworthiness as a paramedic attribute. Similar findings were also found in a study that examined professional and community perceptions in rural locations in Victoria, Australia (O'Meara, 2001), and Kilner (2004a, 2004b) who investigated paramedic personnel in the United Kingdom.

It was not surprising that the attribute of 'clinical competence' also received a high mean score, predominately because of the large skill set that paramedics possess. They must obtain clinical competency in order to achieve certification to practice; evidence that they are capable of delivering safe and effective treatment to the public (Pointer, 2001; Studnek, Fernandez, & Margolis, 2009). Studnek, Fernandez, and Margolis (2009) noted

that “Ensuring the continued competency of EMS professionals is an important component of delivering safe and effective patient care” (p. 362). Given the traditional education and training that many members received (e.g., in the *Reactive Paramedic Era* and the influence Competency-Based Training (CBT) had on paramedic practice, it is therefore not surprising that clinical competence is deemed so important by the paramedic membership. The notion of clinical competence was deemed to be very desirable in both O’Meara’s (2001) and Kilner’s (2004a, 2004b) studies, where the paramedic membership, community members, and other health professionals viewed this as one of the most important attributes for paramedics.

Factor 3: Scientific Approach to Patient Care (includes items: 3.02, 3.04, 3.13)

The items ‘demonstrate critical thinking’ and ‘think critically’ both rated mean scores over 4.70 suggesting the concept of *critical thinking* was deemed as important by the paramedic membership. As well as often being unpredictable, the prehospital environment is sometimes hostile, and patient presentations and clinical manifestations are complex and usually ill-defined (Bendall & Morrison, 2009; Shaban, Smith, & Cumming, 2004; Steer, 2007). Added to this, paramedics also often have to deal with incomplete patient histories, have limited diagnostic equipment, and are under extreme time pressures to make instantaneous decisions and judgements (Jensen, 2010; Steer, 2007; Wyatt, 2003). Therefore providing paramedics with adequate critical thinking skills is an essential aspect of training them to develop their problem-solving in order to solve or manage the patient’s health problem effectively and efficiently (Bendall & Morrison, 2009; Janing, 1997; Jensen, 2010).

Developing critical thinking skills also has the capacity to reduce treatment errors through problem-solving heuristics, thereby improving patient outcomes (Bendall & Morrison, 2009; Jensen, 2010; Wyatt, 2003). In recent times, the topic of patient safety (medical errors) has received considerable interest in health care literature and government policy documentation (Jensen, 2010). This is particularly relevant for the paramedic sector as its clinical practice settings are many and varied. For example, a paramedic practitioner working autonomously in a remote rural setting and a team of

practitioners working in a large urban city are very different clinical practice contexts. Additionally, the paramedic scope of practice is growing; paramedics in Australia routinely interpret 12-lead electrocardiograms, undertake advanced airway procedures, and administer life-saving medications such as thrombolytics. Despite the evidence that critical-thinking skills are vital in ensuring patient safety (Kohn, Corrigan, & Molla, 1999), the relatively recent transition to Higher Education has meant that the inclusion of critical-thinking as a mainstream concept has yet to be formally implemented in the majority of paramedic teaching institutions. This finding is also reflected in the international paramedic literature (Jensen, Croskerry, & Travers, 2009). It is anticipated that as paramedic programs finally receive formal accreditation from the CAA, constructs such as *critical thinking* will be an integral component of the paramedic curriculum, rather than just ad hoc sessions.

The item 'be able to think critically' produced a statistically significant difference in the responses of female ($M=4.79$, $SD=0.43$) and male ($M=4.67$, $SD=0.49$) respondents. The literature investigating gender differences in critical thinking is limited, and, again, it is difficult to speculate why these differences occurred. Although empirical evidence supports the relationship between critical thinking and intellectual ability (Clifford, Boufal & Kurtz, 2004), this measure was not undertaken in this study. One study examining the disposition of critical thinking among undergraduate university students found that females were more likely to be open-minded and cognitively mature, thereby allowing the person to make clearer interpretations, evaluations, and self-regulations in order to form judgements (Giancarlo & Facione, 2001). Another study investigating the critical thinking skills in undergraduate psychology students found no statistical differences based on gender (Clifford, Boufal, & Kurtz, 2004).

The item 'enquiry and research' reached statistical significance ($p<0.001$) among age groups with post-hoc results demonstrating a statistical difference between the 50-54 year group, and 25-29, 30-34, 35-39, and 40-44 year groups. Although not possible to verify in this study, it is likely that the majority of participants in the 50-54 age group would not have undertaken a Bachelor-level or postgraduate qualification, and therefore do not have

the skills or experience of formal research or enquiry that graduates have. Consequently, this result is expected, particularly as concepts such as research are often deemed difficult, and potentially considered not important for day-to-day practice. It may be that there is a link between older practitioners' lack of experience and training and their reluctance to accept critical thinking/research skills as being of practical importance in their everyday work.

Another possible explanation for these differences in age groups could be the evolution of paramedic education and training and its paradigm shift from *stretcher-bearers* to *proactive paramedics* who are not only autonomous practitioners but also responsible for dictating practice based upon evidence-based research. Similar paradigmatic shifts occurred in the nursing discipline during its professionalisation process and as research and enquiry were integrated into their professional practice and code of ethics (Smirnoff, Ramirez, Kooplimae, Gibney, & McEvoy, 2007). The study by Smirnoff et al. (2007) replicated an earlier study by Rizzuto, Bostrom, Suter, and Chenitz (1994) who investigated nurses' involvement in research activities. Their study demonstrated that despite nurse participants agreeing that research and enquiry-based thinking was necessary, no significant change in nursing-led research activities had occurred since the study by Rizzuto et al. (1994). This serves as a challenge for paramedic leaders in Australia, highlighting that without ongoing professional development programs, research mentors and other support, collaborative research opportunities, promotion of evidence-based practice activities, and a national research agenda, paramedic involvement in research and enquiry may not be fully maximised.

The item 'should be able to demonstrate critical thinking' produced statistical significance ($p < 0.001$) between those employed between 16-20 years and >30 years and those employed between 1-5, 6-10, and 11-15 years. The likely reason for the difference is related to participants' experience, and the evolution of paramedic education and training. Those participants from the *Passive Paramedic* era or *Reactive Paramedic* era are likely to have been taught using behaviourist approaches, centred on competency achievement, rote learning, and simple passive recall. However, as the role of

paramedics has changed, along with clinical skills, procedures and educational standards now include the requirement to ‘*think how to think*’ (Janing, 1994). Higher order skills of analysis, synthesis, interpretation, and reflection are central to critical thinking and contemporary paramedic practice (Janing, 1997). Janing (1994) defines critical thinking for paramedics as the “investigation of a situation, phenomenon, or problem that involves the use of facts, principles, theories, abstractions, deductions, and interpretations to arrive at a conclusion that can be evaluated, justified, and critiqued” (p. 239).

Practitioners trained during the *Passive Paramedic* era or *Reactive Paramedic* era did not necessarily need to justify or critique their clinical decision-making process and subsequent management. In addition, clinical practice was based upon ‘fixed’ protocols whereby each process was followed systematically and in numerical order. Given that self-regulation processes are in place in all Australian ambulance services, paramedics are nowadays required (on identified cases) to justify their clinical management and ‘thinking’ processes. In other words, paramedics are now required to defend their working and final diagnosis, and what treatment regime was followed and for what reasons. This regime is more familiar to graduates because critical thinking skills and justifying one’s choices is the staple of the undergraduate paramedic curriculum.

Factor 4: Paramedic and Society (includes items: 3.08, 3.09, 3.12, 3.23)

The item being ‘culturally sensitive’ was viewed as an important attribute by the membership. The notion of cultural sensitivity or cultural competency has received greater attention in the medical and allied health care literature in recent years (Spencer, MacDonald, & Archer, 2009). This has been precipitated by a more diverse population, which has lead to an increased demand on the communication skills of health care professionals and health care educators in ensuring that graduates are capable of meeting the multicultural needs of the community. This is particularly apparent in the paramedic discipline, as no previous investigation of cultural competency in paramedic education or training has been undertaken (Spencer et al., 2009). Results from the national study produced high mean scores, demonstrating male and female participants consider cultural inclusiveness to be important for the discipline. The importance of teaching cultural

competency is supported by the National Health and Medical Research Council (2005, cited in Spencer, et al., 2009). Regarding gender differences on the item ‘culturally sensitive and have an inclusive approach to differences’, female respondents generated a mean score of 4.63 (SD=0.52) and male respondents a mean score of 4.48 (SD=0.57). In another study investigating first year medical students’ cultural attitudes, the authors found that females were more culturally aware than their male counterparts (Dogra & Karnik, 2003). Again, no clear reason for these differences in the national study can be suggested.

Factor 5: Commitment to Professional and Health Care Outcomes (includes items: 3.10, 3.17, 3.18, 3.28, 3.41)

The item ‘has the capacity to undertake self-directed approaches to learning’ produced significant effects between South Australia and New South Wales ($p=0.001$). While no conclusions ought to be drawn from this finding, one possible reason could be linked to New South Wales’ slow evolution in paramedic education and training. The New South Wales Ambulance Service is one of three organisations that still provide in-house education and training qualifications for paramedic staff (the others are Northern Territory and the Australian Capital Territory). Anecdotally, staff still expect the service to *deliver* their education, and the service is renowned for its historical military ties, with its concomitant high discipline, behaviourist, and competency-based training approaches.

Despite the obvious benefits of self-directedness, many paramedics still resist undertaking education or training in their own time (Cooper, 2005). Utilising the classical stimulus-response (didactic teaching) approach does not necessarily lend itself to the self-directed learning that is at the heart of training courses in the other states. The notion of self-directedness is generally considered an important trait because paramedics are often required to work autonomously and are expected to update their knowledge, skills, and understanding throughout their career (DeLorenzo & Abbott, 2004). Given the independent nature of paramedic practice, being self-directed provides important personal investment and professional growth (Cooper, 2005).

Factor 6: Professional Behaviour (includes items: 3.30, 3.31, 3.32, 3.34, 3.35, 3.37, 3.46)

Two items scored less than 4: ‘integrating population-based care into practice’ (M=3.87, SD=0.78), and having ‘specialist knowledge’ e.g. ‘practitioner or extended scope roles’ (M=3.88, SD=0.90). Possible explanation for these less than desirable attributes could be due to poor item construction. For example, population-based care is often used interchangeably with the terms ‘population’, ‘population-based’, ‘health care’, ‘medicine’ or ‘managed care’ (Halpern & Boulter, 2000), while Berkman and Melchior (2006) argue that population-based care is concerned with any studies addressing health determinants. Based on the number of interchangeable terms that define population-based care, this suggests participants are likely to have understood the item as being unclear, ambiguous, and confusing.

The item ‘specialist knowledge’ e.g. ‘practitioner or extended scope roles’ also demonstrated the possibility of poor item construction. The terms ‘practitioner’ and ‘extended scope’ potentially could be defined differently by participants, especially as only New South Wales, South Australia, and Queensland have formal practitioner models. For instance, the term ‘practitioner’ could be recognised as a nurse practitioner, which as Woollard (2006b) adds “... is finally moving towards a universal definition, closure of title, and recording in a discrete part on the Nursing and Midwifery Council register” (Challenges section, para 3). In terms of ‘extended scope’ this too is likely to have been blurred by unclear definitions. For example, in 2008 the CAA underwent a scoping project examining the emerging roles in Australian models of health care (CAA, 2008b). The results of this study indicated, “... a need to clearly define the new roles of these [extended scope] practices” (p. 26). It is evident with both items that they were potentially not understood and ambiguous leading to inaccurate responses.

Factor 7: Interaction Skills (includes items: 3.16, 3.19, 3.20, 3.21, 3.26)

The item ‘be able to provide leadership, mentoring and supervision skills’ produced statistical significance ($p=0.009$) between academics (M=4.79, SD=0.53) and paramedics (M=4.42, SD=0.66). With both mean scores well above 4, this suggests these skills are

considered crucial for paramedic graduates. Leadership is seen as an important paramedic attribute, particularly in remote and rural practice where extended scope roles are being developed and expanded (Stirling, et al., 2007). Stirling et al. (2007) argue that paramedic leadership is required in extended scope positions largely due to volunteer recruitment and motivation, and maintaining education and training standards.

Formal mentoring programs and apprenticeship relationships exist with the Australian ambulance industry (Best, Hajzler, Ivanov, & Limon, 2008). This mentorship is in the form of clinical instructors (CIs) based on a hierarchical model whereby the CI will be a qualified paramedic with more clinical experience than those being mentored. All ambulance jurisdictions in Australia mandate that newly graduated paramedics are 'partnered' by a CI for a length of time (Pointer, 2001). This period of time ranges from service to service, but is usually in the order of three to six months. The CI provides feedback, and submits weekly or fortnightly reports on the graduate's progress. Following the allotted time, the graduate will either be considered competent and/or independent to practice. This form of mentorship is fundamental to paramedic education and training - therefore, mentorship as an attribute is necessary for maintaining day-to-day paramedic training needs (Edwards, 2011).

While it is clear that leadership, mentoring, and supervision are regarded as important paramedic attributes, speculating on the contextual differences between academics and paramedic staff is difficult. However, one possible reason could be explained by the fact that most mentoring, training, and supervisory roles in the paramedic sector are often seen as *additional* roles, and are viewed by some as non-core duties. In reality, some paramedic staff refuse to undertake these roles unless they receive additional financial remuneration. Under industrial agreements, they are not required to do so beyond their day-to-day employment as a paramedic performing clinical duties.

The attribute of being a 'good listener' produced statistical significance ($p<0.001$) between those who have been employed for between 1-5 years ($M=4.66$, $SD=0.49$) and those employed for between 6-10 years ($M=4.43$, $SD=0.59$), and 21-25 years ($M=4.34$,

SD=0.67). No obvious conclusions can be drawn why this result was obtained, though *listening* as a skill was viewed by participants as an important paramedic attribute given the overall mean score of 4.58 (SD=0.53). Effective listening is vital both in human relations, in establishing patient-practitioner rapport, and in patient management. In the medical and allied health literature, poor communication and listening has been argued to be a potential cause of medical errors for some time (Denham et al., 2008). Examples of malpractice and issues surrounding patient safety have been directly linked to communication failures (Fiesta, 1994).

An emerging body of knowledge suggests that empathetic listening can impact positively on a patient's sense of well-being – which in turn acts positively on their physical health. For example, in a study that examined paramedic-conducted counselling sessions with victims of intimate partner violence (formerly known as domestic violence), victims felt comfortable and self-assured when paramedics had displayed effective listening skills (Naved, Rimi, Jahan, & Lindmark, 2009). In another study examining physiotherapists in a palliative care setting, positive feedback and satisfaction was obtained from patients and family members where active listening techniques had been utilised by physiotherapy staff (Martlew, 1996). Both studies emphasised that although effective listening is difficult, when sensitive and effective techniques are used purposively, it can lead to both better understanding of patients' crises, and improved patient management and outcomes (Martlew, 1996; Naved et al., 2009).

Failure to listen does not occur only at the health professional and patient interface. Studies have identified that poor listening skills occur in the hospital environment, particularly in emergency department settings. Several studies have reported results highlighting that poor listening skills by nursing and medical staff have led to ineffective patient handover by paramedic staff (Evans et al., 2010; Jenkin, Abelson-Mitchell, & Cooper, 2007; Talbot & Bleetman, 2007). Consequently, listening as an attribute for the paramedic membership is important as it allows paramedics to provide additional perspectives. This develops better communication and listening strategies between health

care professionals, thereby minimising information loss and the potential for procedural errors (Evans et al., 2010).

Although effective listening in general is considered an important paramedic attribute by the paramedic membership (Willis et al., 2010), hypothesising on why statistical difference occurred between the different lengths of employment groups is difficult. One possible reason may be related to the progression of graduates from that of a novice to that of an expert on the knowledge and expertise continuum, although this concept could be true for all skills. In other words, as paramedics gain more exposure and experience, they often rely on clinical cues and are able to confirm a diagnosis much quicker than novices (Benner, 2001). In terms of listening, it suggests that they are able to cognitively arrange relevant information more rapidly and rely less on listening for lengthy periods, particularly when the situation is not life threatening.

While statistical significance was reached in many items in Section 3 – Graduate Attributes, effect sizes were largely small to moderate. Searching for casual relationships or associations in each of the findings was largely speculative, and little supporting literature exists. Thus, external validity and generalisability should be treated with caution. Therefore, finding answers and possible solutions to these questions will require further and ongoing research. The next section (Part 2) will explore specific findings from the EFA.

Part 2: Exploratory Factor Analysis Discussion

Informed by the initial work following the pilot study, the *PGAS* used in the national study contained 47 items and 10 factor subscales and underwent further analysis of its underlying theoretical construct using EFA. As previously outlined in Chapter 4, a factor analysis flow-chart approach was developed allowing a systematic and step-wise method in analyses: i) is the data suitable for factor analysis? ii) how will the factors be extracted?; iii) what criteria will assist in determining factor extraction?; iv) what

rotational method will be used?; and v) interpretation and labelling. This approach ensured the following pathway was taken in analysing the national data set.

The data was considered suitable for factor analysis following the multiple ‘rules of thumb’ that included the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett’s Test of Sphericity, the sample size to variable ratio, and inspection of the correlation matrix for loadings >0.30 . Each of these was adequately met, indicating that the data was suitable to undertake factor analysis. Potential factors were extracted by principle components analysis (PCA) using four criteria: i) Kaiser’s criteria (eigenvalue > 1 rule) (Kaiser, 1960); ii) scree test (Cattell, 1966); iii) cumulative percent of variance extracted; and iv) parallel analysis (Horn, 1965). While the parallel analysis confirmed a three-factor structure, the other three criteria all produced a seven-factor structure. The decision to keep the seven-factor structure was based on three aspects. First and most important, the seven-factor structure could be theoretically and conceptually justified. Second, the study was exploratory in nature, and third, the data set would undergo further construct scrutiny and refinement using the Rasch measurement model. In other words, the data would be subjected to a second and more robust psychometric analysis.

Following the initial extraction using PCA, the data was then examined using Oblique Oblimin rotation providing further clarity on the number of factors and evidence that the best-fit model was seven factors. A total of nine items failed to load on a viable factor subscale, and therefore they were deleted from the *PGAS*. Notably, no item cross-loading occurred. While one of EFA’s main objectives is to reduce the number of latent variables, three nevertheless surprising omissions occurred: item 3.27 *a professional paramedic should be caring and empathic*, item 3.06 *a professional paramedic should be literate and numerate*, and item 3.33 *a professional paramedic should have theoretical knowledge*. Each of these items could be considered core paramedic attributes, and their omission was not expected. The only explanation for items 3.06 and 3.33 could be the assumption that all graduates now complete undergraduate degrees, and therefore they must possess theoretical knowledge, and demonstrate competence in literacy and numeracy before graduation. No explanation can be given for item 3.27 since one would

assume that caring and empathy would be considered a core personal or professional attribute. This notion may change with a small body of work being undertaken, where investigators are examining undergraduate students' levels of empathy across a range of health conditions and clinical situations (Boyle et al., 2010).

Least surprising was item 3.44 *a professional paramedic should practice preventative healthcare*, since the term is often associated with social models of care, general health models and more specifically primary health care (e.g., health promotion and prevention or promotion of healthy lifestyle habits), areas in which paramedics have had little involvement in the past. This may change as alternative models such as paramedic practitioners are considered. For example, a growing basis on extended scope of practice roles is being considered and trialled in some parts of Australia. Foremost amongst these are the Isolated Practice Paramedic (Queensland Ambulance Service), and the Extended Care Paramedic (New South Wales and South Australian Ambulance Services) (Walker & Pearson, 2010).

The final aspect of the step-wise approach was to interpret and label each of the resulting seven factors. While this approach is argued to be subjective (Pett, Lackey, & Sullivan, 2003) relying on researcher judgement, it nevertheless must be theoretically and conceptually objective enough to withstand empirical scrutiny. The seven factors demonstrated good to excellent factor loadings, which was assisted by increasing the loading cut-off from the traditional 0.3 (Fisher, King, & Tague, 2001) to 0.4 in an attempt to improve the item variance. The seven factors were labelled as described below:

1. *Personal Behaviour and Attitudes*
2. *Patient Interaction and Welfare*
3. *Scientific Approach to Patient Care*
4. *Paramedic and Society*
5. *Commitment to Professional and Health Care Outcomes*
6. *Professional Behaviour*
7. *Interaction Skills*

Following the labelling of the factors, examination of the scale's reliability (internal consistency) and item-to-factor correlation was undertaken. Overall, the seven factors produced a high Cronbach α coefficient (0.87); additionally, each factor was also examined individually, again generating high Cronbach α coefficients (ranging between 0.87-0.74). A Pearson reliability coefficient was used to investigate the correlation between items-factors. Correlations ranged between $r=0.51$ to $r=0.72$ demonstrating moderate to strong correlations. Both of these reliability checks indicated that the seven factors and associated items were reliable.

While the step-wise approach to EFA and reliability checks provided evidence that the *PGAS* was valid and reliable, an additional 'replicability analysis' was undertaken. This additional investigation was undertaken to provide secondary results based on three subgroups from the demographic variables, namely, age, gender, and geographical location. This investigation demonstrated that the majority of items consistently loaded on the same seven factors derived from the initial EFA, again indicating the *PGAS* was a valid scale with a relatively stable factor structure.

The EFA demonstrated the *PGAS* was a reliable and valid instrument reducing the total items to 38 that loaded on seven subscales (or factors). It was then decided to further check the construct validity of the *PGAS* by evaluating its unidimensionality using the Rasch Model. This would also allow the ordinal level item scores of the *PGAS* to be converted to interval level logit scores. A brief discussion of the Rasch results will now be undertaken.

Part 3: Rasch Model Analysis Discussion

Following the EFA of the national study survey data, which produced a best-fit model of 38 items and seven subscales, its data was further analysed using the Rasch Model. As previously described, a four-step Rasch analysis protocol was developed in order to improve decision pathways that assisted in addressing three areas of data analysis and

measurement: i) examination of item fit to the Rasch Model; ii) examination of the unidimensionality of the overall scale and its seven subscales; and iii) examination of differential item functioning (DIF) of the overall scale and its seven subscales. A total of eight items did not fit the Rasch Model requirements (one in Factor 1, two in Factor 2, three in Factor 6, and two in Factor 7), reducing the total items in the *PGAS* to 30, while also retaining the seven subscale constructs generated by the earlier EFA. By completing a second construct validity analysis using the Rasch Model, this ensured that the *PGAS*'s factor structure was robust and rigorously developed.

Factor 1 (Personal Behaviour and Attitudes)

Item 45 (recognise limitations) did not fit the Rasch Model and also produced DIF in the gender and age groups, and was ultimately removed. Potential explanations for the misfit in item 45 are not clear, although this might be caused by a long-standing blame culture within the discipline. Possible explanation for the poor model fit of item 45 could be the ambiguous statement offering participants two options (limitations and responsibilities) in the item stem, thus potentially confusing or misleading them.

Factor 2 (Patient Interaction and Welfare)

Item 29 (clinical competence) did not fit the Rasch Model and also produced DIF in the age and length of service groups, while item 7 (aware of professional issues such as accountability and confidentiality) produced DIF in both gender and length of service groups. Potential explanations for this DIF occurring are not clear, although one possible explanation could be the term 'competence' itself, which may have connotations with the former vocational roots and links with competency-based training. Participants may have felt this terminology did not reflect the current educational state of play or future paramedic education and training needs.

Regarding item 7 one possible explanation for the DIF finding could be connected to the alternate terms in the item stem (e.g., accountability and confidentiality), possibly misleading participants. Both of these terms have different meanings and clinical implications that are likely to have caused item misfit. One potential cause for the DIF in

the length of service group could be related to when participants completed their training programs. Items such as ‘accountability’ and ‘confidentiality’ were not routinely included in paramedic programs prior to the transition to university-based education. This may suggest that participants do not see these items as being important graduate attributes. No clear explanation can be given for the DIF based on gender.

Factor 6 (Professional Behaviour)

Item 46 (‘specialist knowledge’ e.g. ‘practitioner or extended scope roles’), item 30 (high clinical status within the healthcare system), and item 37 (apply knowledge of the basic sciences) each demonstrated Rasch Model misfit. In addition, item 46 also exhibited DIF in gender and length of service groups, and item 37 exhibited DIF in the age group. Possible explanation for the poor model fit of item 46 could be the ambiguous statement offering participants two options in the item stem, thus potentially confusing or misleading them. Given the current discourse surrounding alternative models of service delivery in the health sector, terms such as paramedic practitioner, generic worker, interprofessional collaborative practitioner, and physician assistant are more frequently used. Therefore, it is likely that many participants do not understand what their core roles and functions are.

Regarding item 37 one possible explanation for the DIF occurring could be due to the previous approaches used in paramedic education and training, particularly related to those older than 40 years of age who completed courses where basic sciences were not routinely taught as part of the paramedic curriculum. It was not until the 1990s-2000s that basic sciences were included in all paramedic programs during the transition to university-based education. This suggests that those participants older than 40, those who were likely to have undertaken their formative education prior to 1990, do not see the importance or need to learn the basic sciences in order to improve or provide quality paramedic clinical service. Many of these participants are likely to hold senior management positions in clinical areas or education, again suggesting the view that basic sciences is not a desirable attribute for the paramedic discipline.

Factor 7 (Interaction Skills)

Item 14 (counselling skills), and item 19 (communication using information, communication and technology) each misfit the Rasch Model requirements. In addition, both items exhibited DIF in the age sub-groups. No obvious reason for the poor model fit and DIF in item 14 can be suggested. Similarly, no clear reason for the poor model fit in item 19 is evident; however, one possible explanation for the DIF occurring could be related to previous paramedic education and training, particularly related to those older than 40 years of age and who completed courses where contemporary forms of communication technologies were not commonly used.

As demonstrated in the Rasch analysis addressing the three objectives of item fit, unidimensionality, and DIF, eight *PGAS* items were deleted from the data set leaving 30 items fitting the Rasch Model. The cause of the six items being deleted originated from two areas: i) poor item construction, where items were potentially ambiguous or had more than one meaning in the item stem; and ii) participants' length of service and the likely correlation that their formative training programs were before the transition to university-based education. In addition, item reliability and the variance explained by measures both demonstrated good reliability and factor dimensionality in each of the seven factor subscales. Only Factor 7 produced a $< 50\%$ explained variance result (48.9%) which was likely to be a result of the small number of items in that factor.

Based on these results, several possibilities exist for future investigation and interpretation. Firstly, further examination of the *PGAS* and additional graduate attributes should be considered. Particular emphasis should be placed on item construction. In other words, items such as 'accountability', 'confidentiality', and 'extended scope roles' are potentially important to professional paramedic practice, and may require further examination. Secondly, additional sociological research opportunities exist to examine the attitudes and perceptions of participants who have been employed for substantial periods of time in the paramedic discipline. This will be important research, particularly as many of these people have senior positions in the ambulance sector, and perhaps even more importantly, they often mentor and train novice paramedics soon after graduation

from university. Thirdly, the convergent and divergent validity of the *PGAS* could be explored by comparing the association between the *PGAS*'s factors and other related and unrelated theoretical constructs.

Interpretations and Implications from the Pilot and National Studies

The objectives of these two studies were to develop contemporary knowledge regarding the professionalisation of the paramedic discipline and establish which graduate attributes were seen to be most desirable for professional paramedics in Australia. The studies also generated the *PGAS*, which is a tool that operationalised a number of graduate attributes that can now be measured, evaluated, monitored, and tracked. This section will discuss how the questions raised in Chapters 2-5 were investigated in the pilot and national studies. These discussions will briefly address the key interpretations from the pilot and national studies, illustrating that professionalising the discipline requires a standardised curriculum and a defined and validated set of graduate attributes. In other words, the graduate attributes of a training course ought to reflect the desired defining characteristics of professional paramedics.

As outlined in Chapters 1-3 the Australian paramedic discipline has undergone important transformations over the past 30 years in its education, training, and health care identity, moving from a 'stretcher-bearer' to a proposed 'transdisciplinary autonomous practitioner'. Significantly, these transformations have and are currently taking place when the health care system is searching for alternative service delivery models as it continues to be placed under growing pressures. Additionally, given the changes in paramedic education and training and health care reforms, this will likely change future clinical practice and health care identity, indicating that current models of paramedic service delivery must change, adapt, and evolve (O'Meara et al., 2006). Therefore establishing which graduate attributes best define tomorrow's paramedic is crucial in creating an agenda for the future of paramedic health care. Current health care reforms

such as increased workforce mobility, greater emphasis on interprofessional collaboration, and a single national registration and accreditation governance structure, highlight that the paramedic discipline is ‘professionally’ vulnerable given its current ‘semi-professional’ status. Given the potential for paramedics to offer extended health care, especially in rural and remote locations, the potential for occupational encroachment is now a reality (O’Meara et al., 2006). Without formal professional recognition and current exclusion from the Australian national registration and accreditation scheme, this places the paramedic discipline in a tenuous position with occupational take-over a real possibility.

Chapter 3 discussed professional theories and examined the professionalisation process of two similar health care professions: nursing and physiotherapy. Examining these two professions provided a historical comparative ‘roadmap’ of what they undertook to achieve their current professional status. Historical and contemporary theories of what characterises a *profession* generally agree on the following traits: a unique body of knowledge, professional regulation/authority, autonomy, a code of ethics, and service to the public. It is argued that two professional traits are not yet demonstrated by the Australian paramedic discipline are: a unique body of knowledge and professional regulation/authority. As demonstrated by the nursing and physiotherapy professions, both disciplines became legitimate professions following their transition to the Higher Education sector, where a unique body of knowledge was developed, through research and a standardised curriculum. These aspects served as key catalysts in achieving full professional status for both nursing and physiotherapy. While the transition to Higher Education for the Australian paramedic discipline has occurred for some time, the fact remains clear that a national standardised curriculum and defined graduate attributes do not currently exist, and are two of the key reasons why it retains its current semi-professional status.

Three clear questions arose from Chapters 3:

- 1) Was the Australian paramedic discipline considered a profession?

- 2) Did the Australian paramedic membership want be a profession?
- 3) What were the most desirable graduate attributes for Australian paramedics?

These three questions led to devising, testing, and validating a questionnaire that could provide the necessary answers. This process was undertaken in four stages: i) questionnaire development; ii) pre-pilot validation; iii) pilot study; and iv) national study.

Having examined the literature on paramedic graduate attributes and theories of professionalism, a pre-pilot questionnaire was developed. A modified Delphi technique was also used in the pre-pilot validation process, gaining opinions and checking for face and content validity from a small number of content experts from the health care sector. Following this pre-pilot validation process, a 64-item pilot *Paramedic Graduate Attribute Scale (PGAS)* was generated. During the pilot study phase, the *PGAS* was administered to a small sample of paramedic educators and paramedic managers, but a large representative population of paramedic academics. The findings from the pilot study demonstrated two points in relation to the professional status of the paramedic discipline. First, the paramedic discipline is *not* a profession. Second, the paramedic discipline *wants* to become recognised as a profession. Additional results suggested that the paramedic sector believes that being accepted as a profession is some way off. This was especially evident in the rather pessimistic responses that national registration would not be achieved in the near future.

In examining the construct validity and dimensionality of the *PGAS*, Exploratory Factor Analysis was employed in reducing the number of dependent variables. Following Principal Components Analysis, the reduced set of graduate attribute items produced a 10-factor best-fit solution. Results from the pilot study demonstrated that undertaking a larger national study was feasible. This revised *PGAS* was then administered to a larger sample of Australian paramedics, paramedic managers, and paramedic and health care academics around Australia.

Almost 900 ($n=872$) ACAP members participated in the national study. Results from the national study found the paramedic discipline was not considered a full profession by its members; however, achieving the title of a *profession* was viewed as important to the paramedic membership. Aligning with other professions such as nursing or medicine was not supported, and obtaining national registration within two years was viewed unenthusiastically by respondents. However, the transition and reliance on the Higher Education sector was perceived as an important factor towards achieving professional status. Interestingly, many items from the professionalisation section of the *PGAS* produced statistically significant findings between subgroups, and while it was difficult to draw direct causal relationships, it identified additional gaps in the research, and signified that more research in these areas is required. Also, numerous graduate attributes were viewed as being desirable for professional paramedics. Principal Components Analysis was again employed to achieve parsimony, reducing the dependant variables to 38 items that generated a seven factor solution. Rasch Analysis was also used to further test the *PGAS*'s reliability and validity, and confirmed that seven subscales existed. A further eight items were discarded, confirming the 30-item *PGAS* was psychometrically sound, offering the Australian paramedic discipline with its first set of empirically-based graduate attributes.

Findings from both the pilot study and national study addressed the three questions from the earlier chapters. First, the Australian paramedic discipline was not considered a profession. Second, the Australian paramedic membership wants to be judged as a fully fledged profession. Lastly, a reliable and valid graduate attribute scale was developed, including 30 graduate attributes that loaded on seven viable factors.

In Chapter 3 it was argued that the Australian paramedic sector did not demonstrate professional authority or possess a distinct body of knowledge using Greenwood's (1957) theory of professionalism. Results from both studies endorse a lack of professional authority through the negative views held by the Australian paramedic membership that national registration would not occur within two years. To some extent, results were more positive in terms of possessing a distinct body of knowledge, but questions still

remain regarding how a discipline can lay claim to having esoteric knowledge when no national curriculum consistency presently exists at any Higher Education institution or clinical practice certification level. Consequently, these findings present the paramedic discipline with clarity in its professionalisation process, and provide them with an opportunity to achieve these objectives. However, one element in this process that is perhaps unclear is how to best strategise and achieve these objectives, and in what sequence. In other words, should submissions for inclusion on the national registration and accreditation scheme be undertaken when curriculum inconsistencies between university paramedic education programs still persist? Or, alternatively, should the discipline focus on standardising its curriculum in order to produce a united and national body of knowledge, before submissions to the national registration scheme are made? It is the latter which will be argued to provide greater support and sustainability in the long term, and produce greater collegiality between universities, industry, peak bodies, and governments departments.

So will developing a nationally consistent curriculum, as a priority, assist in its quest of achieving national registration? Examination of established and emerging professions would suggest this to be true. Developing a distinct body of knowledge and obtaining national registration appear mutually exclusive, particularly in established professions. In semi or emerging professions, such as the Australian paramedic sector, this exclusivity is clearly evident; however in reality, demonstrating a distinct body of knowledge is established prior to national registration being obtained. This point is illustrated by the Services for Australian Rural and Remote Allied Health (SARRAH) and their promotion of interprofessional education and interprofessional learning to be included on the national registration and accreditation scheme (Services for Australian Rural and Remote Allied Health, 2009). SARRAH recognised that obtaining admission to the national registration scheme would not occur without developing a distinct body of knowledge and a national curriculum (SARRAH, 2009). In establishing a distinct body of knowledge they noted: “This will be made easier once national IPP [interprofessional practice] health professional graduate attributes and health professional practice capabilities have been accepted and a model of IPE/IPL [interprofessional

education/interprofessional learning] curriculum has been developed” (2009, p. 7). Additional evidence supporting the notion that developing a distinct body of knowledge should be established prior to national registration was apparent in the professionalisation process the nursing and physiotherapy fields undertook. In both professions, national registration was obtained following the relocation of education and training to universities, and the advances towards possessing a unique body of knowledge being established through standardised curriculum and research.

Developing a unique body of knowledge is a strategic priority, particularly given the current political hostilities regarding national registration between ACAP, NCAU, and CAA. As outlined previously, the ACAP and NCAU openly support and endorse national registration for paramedics, while CAA considers the quality assurance obtained by the self-regulation provided by individual ambulance services as sufficient. These obvious ideological differences have been points of disagreement for many years, and it seems they are unlikely to subside (ACAP, 2008b; 2009b; CAA, 2008c). Based on this relationship and the ongoing differences of opinion, it would be in the best interests of the paramedic discipline to focus its resources and energies on establishing a distinct body of knowledge. The difference in opinion on the issue of national registration does not exist when it comes to developing a specific body of paramedic knowledge through the establishment of a national standardised curriculum. Both groups are working collaboratively and support this venture through the development of guidelines for the assessment and accreditation of entry-level paramedic education programs (CAA, 2009b). The accreditation project is ongoing thus providing evidence that the relationship between the CAA, ACAP, and the NCAU is both collegial and sustainable, although ACAP holds the view that the accreditation standards should be independent, and not employer-centric (CAA) as they are proposed to be (ACAP, 2009b; 2009c).

Taking a pragmatic stance, would the Australian Federal Government offer national registration to the paramedic discipline when the key peak bodies are in stark opposition to each other regarding the value of national registration? Additionally, no national education standards, accreditation of Higher Education programs, or graduate attributes

currently exist. This fact is confirmed by the Federal Government neglecting to include the paramedic discipline in the national registration scheme being launched in July 2012. Developing a distinct body of knowledge is likely to influence and place the paramedic discipline in a better position for inclusion in the July 2014 round of the national registration and accreditation scheme. It should also be noted that other health care disciplines were not included in the first round of the national registration scheme such as speech/language pathologists.

Graduate attributes are crucial in Australian paramedic education and training, and the promotion of curriculum standardisation (which are likely to improve the chances of gaining national registration). This point is supported by the composition of a current single registration and accreditation scheme implemented in July 2010. Each of the ten professions included in the single registration scheme all have accredited and standardised curriculum, along with defined graduate attributes (referred to as core competencies or capabilities). Another four health care professions (Torres Strait Islander health practitioners, Chinese medical practitioners, medical radiation practitioners, and occupational therapists) will be included under this single registration board in July 2012 (Australian Health Practitioner Regulation Agency, 2010). Again, one feature they all possess is standardised curriculum and defined graduate attributes. It is hoped that the graduate attributes defined by this study can offer the Australian paramedic discipline the capacity to accredit and standardise its national curriculum, and be considered for the national registration and accreditation scheme in July 2014.

Summary

Achieving a distinct paramedic body of knowledge is more likely to occur when a national curriculum is established. A central component in establishing a national curriculum is graduate attributes. Underpinning all education in universities is curricula and their associated graduate attributes (either specific or generic). Graduate attributes play an important role in establishing and maintaining academic standards. They also ensure that curriculum and learning outcomes are reflective of employability needs, or in

other words, help guide educational practices with professional and community expectations (Crosthwaite, Cameron, Lant, & Litster, 2006). Graduate attributes inform student selection and admission processes, and shape the success of individual professions educating new graduates and universities more broadly. Graduate attributes are central in quality assurance, standardisation, registration and regulation requirements, and additionally allow curriculum mapping, thereby identifying if gaps or overlaps exist. They also play an important part in graduate employability, providing relevant skills, knowledge, and attitudes, while also engendering students to life-long learning. Graduate attributes provide the basis for national curriculum standards (McCurry, 1996). The next chapter will discuss curriculum theory and design, and how the acquisition of the *PGAS* and its graduate attributes can be implemented in national paramedic curriculum to produce national education standards thereby strengthening its case to be recognised fully as a health care profession.

SECTION 3: Curriculum Requirements

Chapter 7

GRADUATE ATTRIBUTES AND CURRICULUM REFORM IN PARAMEDIC EDUCATION AND TRAINING

Introduction

The preceding chapter presented and interpreted data from a national survey that demonstrated that the paramedic membership in Australia wanted to be viewed as a full profession. The study also identified a set of underpinnings of professional paramedic practice requiring further investigation; including national registration, professional autonomy, national standardisation for paramedic education programs, and the development of a unique body of empirically-based knowledge. Statistical analyses consequently assisted in developing a reliable and valid version of the *Paramedic Graduate Attribute Scale (PGAS)*, the instrument which was used in the National Study. Results from the study produced seven graduate attributes that the Australian membership considered to be the desirable characteristics for a professional paramedic. These are: Personal Behaviour and Attitudes, Patient Interaction and Welfare, Scientific Approach to Patient Care, Paramedic and Society, Commitment to Professional and Health Care Outcomes, Professional Behaviour, and Interaction Skills.

The purpose of this chapter is to outline how these graduate attributes can serve as the basis for Higher Education curriculum renewal and reform for the Australian paramedic sector. The chapter will provide an overview of how the paramedic graduate attributes might be integrated and translated into a curriculum design framework that allows national educational consistency as well as offering institutional autonomy across the Australian paramedic university programs. The chapter will also include an overview of graduate attributes in the Higher Education sector outlining how the professional paramedic characteristics can be utilised as the graduate attributes as a key component in a national paramedic curriculum. As there are limited conceptual frameworks to refer to and little in the way of published theoretically-based guidance outlining the practicalities

and barriers of mapping and embedding graduate attributes, a systematic curriculum re-design approach will be proposed. This will illustrate how these paramedic graduate attributes may be adopted and integrated by the paramedic discipline. A curriculum re-design approach is critical in implementing the *PGAS* because no professional accreditation body or individual university has formally undertaken this process as yet. In other words, this approach is designed to provide an explicit strategy for graduate attribute and curriculum reform for the Australian paramedic sector. In addition, employing the framework approach will not only provide the necessary guidance for key stakeholders but importantly avoid the likelihood of a directive ‘top-down’ approach from senior management to teaching staff, which is shown to be ineffective compared with a consultative and consensus ‘bottom-up’ approach (Bennett, Dunne, & Carre, 1999). Further, it may potentially overcome some of the issues that are associated with graduate attribute integration and reform such as staff resentment and lack of organisational commitment. How this might be achieved will be described in four phases:

1. Development of Graduate Attributes (*PGAS*)
2. Curriculum Alignment
3. Curriculum Delivery
4. Assessment.

An appropriate framework approach is significant because no conceptual basis or evidence of successful graduate attribute integration has been sustained by any university or discipline within Australia to date, regardless of institutional assertions and rhetoric to the contrary (Barrie, 2005; Barrie, Hughes, & Smith, 2009b; Bennett et al., 1999; Cathcart, Kerr, Fletcher, & Mack, 2008; Clancy & Ballard, 1995). Barrie (2004a) notes that “The lack of any rigorous or scholarly basis for the concept of graduate attributes is something that has long been recognised in the literature” (p. 1). This raises important questions regarding the successful implementation of the *PGAS* and its professional descriptors into a Higher Education setting. There is little in the way of evidence in the literature in regard to the successful implementation of graduate attribute initiatives in

other disciplines, suggesting that multiple variables and complexities are involved in graduate attribute and curriculum reform (Clancy & Ballard, 1995). In fact the literature in general indicates that graduate attribute initiatives and curriculum renewal strategies have been inconsistent for well over 10 years (Barrie, 2004c; Cummings, Ho, & Bunic, 1997) with a tendency for graduate attribute reform to be superficial at best (Carroll, 2004; Cathcart et al., 2008; Smith & Bath, 2006). In summary, attempts at curriculum reform have been cursory at best. Cathcart et al. (2008) wrote that:

... when it comes to the operationalisation of graduate outcomes as a focus for activity and performance measure within curricula as taught, the extent of implementation and the modes used to integrate graduate attributes is variable, and generally more indicative of an immature state (p. 2).

This chapter will provide examples of how the *PGAS* can be operationalised following the four phases outlining common ground for the respective paramedic authorities, accreditation bodies, and individual universities. The outcomes of adopting this approach will be a structured curriculum design and a graduate attribute reform process. This will be crucial in determining whether the Australian paramedic discipline can continue gaining momentum towards achieving a national unique body of knowledge through standardised curriculum and the nexus between teaching and research and subsequent title and recognition as a health care profession.

A rationale for graduate attributes will be outlined by describing how they influence Higher Education curriculum reform, aid in facilitating academic and curriculum standards, create curriculum uniformity, and allow for international benchmarking to take place. The use of graduate attributes to design curriculum objectives and outcomes into a coherent whole draws upon the *Constructive Alignment Theory* developed by Biggs (1999a). A theoretical basis is crucial, as Barrie (2005) explains:

Moreover, if academics, we are unclear as to what exactly we are aiming at, then it seems reasonable to expect that students will be even less clear as to what they should be learning and employers and society

at large will be unsure of what they are getting in the way of graduates (p. 3).

The graduate attribute and curriculum initiative outlined in this chapter will describe how the graduate attributes are embedded and ‘locked’ into the curriculum; this will be illustrated by context-based and outcome-based learning principles such as problem-based learning and case-based learning. The final step involves assessment. How graduate attributes are enacted and their transferability measured will then be described.

At the conclusion of these four phases, it will be argued that the derived professional paramedic characteristics will form the basis of Australia’s new paramedic graduate attributes. These graduate attributes will guide and inform curriculum change and reform in paramedic education and training. Not only will the graduate attributes provide the proposed professional accreditation body and participating universities with a potential curriculum blueprint, but also attempt to match the industry requirements with the outcomes of a graduate’s university education. This better alignment between the industry and university education sectors will also serve as a vital part of creating a unique body of paramedic-unique knowledge, or ‘knowledge capability’ (Nunan, 1999). There will be greater alignment of students’ knowledge acquisition and thus the basis for making stronger claims for being a legitimate health care profession.

The intention of this chapter is not to develop individual curricula for university programs, but to suggest a workable template of how graduate attributes can be utilised as the drivers of a theoretical and sustainable curriculum blueprint and curriculum renewal. In addition, a range of cross-sectional influences and barriers surrounding graduate attribute reform will be discussed, including academic involvement, employability, curriculum design, and types of assessments. The purpose of these discussions is to examine the reasons why previous attempts at graduate attribute implementation have been ineffective in other cognate and non-cognate disciplines. This examination will provide the Australian paramedic discipline, peak bodies, professional accreditation groups, and universities with paramedic education programs with potential solutions for ensuring the *PGAS* is successfully integrated into paramedic curriculum. Furthermore,

the seven graduate attributes will allow individual Higher Education institutions to have significant degrees of distinctiveness, while at the same time contributing to a consistent national education and academic standard. The seven graduate attributes can also play a role in focusing research that will build a body of paramedic knowledge within Australia. The chapter will also be informed by the earlier chapters, as these defining characteristics and descriptors tie directly to the professional development phases, distinctive learning periods, and professional positioning described in the first three chapters in the thesis. Integrating graduate attributes into paramedic curriculum nationally will address current (*Proactive* Paramedic) and proposed future learning needs (*Transdisciplinary* Paramedic stage), health care reforms and attend to the current shortfalls in the discipline's professional status.

At present, there are no empirically-based consistent or agreed upon graduate attributes for paramedics within Australia. The *PGAS* and its associated professional paramedic descriptors clearly communicate the attributes to the relevant stakeholders and student audiences, thereby providing individual teaching institutions and the professional accreditation body with an opportunity to consider integrating the *PGAS* into the paramedic curriculum nationally. Furthermore, it offers the proposed professional accreditation body with a set of empirically-based graduate attributes that reflect contemporary paramedic practice and workforce performance, thus providing an opportunity to develop a unique body of knowledge that is shaped by national educational standards. This body of knowledge will not only assist in paramedic work-readiness, but also play an influential part in asserting the need for national registration and ultimately being accepted as a legitimate health care profession. The *PGAS* will assist in '*creating a standard in developing standards*'.

The Rationale for Graduate Attributes

Akin to some elements of a mission statement, graduate attributes describe the skills, abilities, knowledge, and attitudes students develop during their coursework studies at university (Barrie, 2006; Barrie, 2007b; Bowden, Hart, King, Trigwell, & Watts, 2000;

Hager, Holland, & Beckett, 2002; Higher Education Council, 1992; Sharp & Sparrow, 2002). As emphasised in Chapter 1, this description is often shared interchangeably with other terms such as generic skills, competencies, qualities, and capabilities (Barrie, 2005; Barrie & Prosser, 2004b; Clancy & Ballard, 1995; Jones, 2001). Despite the inconsistent and varying terminology, graduate attributes are argued to better describe the skills, knowledge, and attitudes which make up the generic skills and competencies of all disciplines (Hager, Holland, & Beckett, 2002; Scanlon, 2006).

Currently, universities around the world are undergoing significant challenges as they position themselves in competitive knowledge-based economies (Barrie & Ginns, 2007a; Barrie, Hughes, & Smith, 2009b; Jones, 2001). The traditional roles of universities are being challenged by reduced funding, globalisation, internationalisation, changing student demographics, rapid growth in student enrolments, and the requirements set by industry, governments and accreditation bodies (Bretag, 2003; Onsman, 2010; Star & Hammer, 2008). This view is supported by Field (cited in Scanlon, 2006) who noted that: “Government interest in graduate attributes and the resurgence of interest in lifelong learning can be located in the economic challenges resulting from globalisation and rapid technological change” (p. 128).

On a national scale, these challenges, possible solutions, and potential roadmaps have been outlined in the *Building University Diversity Report* (Department of Education, Science, and Training, 2005) and the *Bradley Report* (Bradley et al., 2008) which examined the approval, registration, and flexibility issues relating to the Australian Higher Education sector. Internationally, reforms have been reflected in the *Dearing Report* (1997), and the *Bologna Process* (1999) which have attempted to deal with the same challenges (i.e. standardisation, articulation, and benchmarking of programs) faced by universities in Europe (European Ministers of Education, 1999; National Committee of Inquiry into Higher Education, 1997). Other global issues such as changing workforce and industry contexts and increased multidisciplinary approaches have resulted in trying to instil students with new graduate attributes and lifelong learning¹⁰ skills. The Higher

¹⁰ Sometimes referred to as ‘self-managed learning’.

Education Council (1992) also noted that “... it makes little sense for higher education only to teach to the needs of today; it must prepare graduates for the needs of tomorrow” (p.22). Employers want skills, knowledge, and attitudes that are generic and lifelong (James, Lefoe, & Hadi, 2004). At a national level, evidence that universities are preparing graduates for future employment with graduate attribute initiatives is well documented in a number of institutions, in particular the University of Wollongong, the University of Sydney, and the University of South Australia (Hager et al., 2002). Another example, illustrating the graduate attribute and curriculum reforms taking place in Australian Higher Education; is the recent introduction of the ‘Melbourne Model’ at the University of Melbourne. The model offers undergraduate students a general degree initially, followed by a postgraduate specialisation degree (Davies & Devlin, 2007). This is modelled in part after the Higher Education trends that have taken place in the United States.

While perhaps an extreme in terms of graduate attribute and curriculum reform, it does nonetheless highlight some of the transformations taking place in the Australian Higher Education landscape. Another example is the ‘two plus two model’ being adopted by the Faculty of Health Sciences at La Trobe University. All students enrolling in a health-related professional program at La Trobe University (such as physiotherapy, podiatry, occupational therapy, orthotics and prosthetics, orthoptics, or speech/language pathology) will complete a generic common Bachelor of Health Science that will take *two* years to complete. Then upon successful completion of the common undergraduate degree, students will enrol in a graduate-entry Masters program specialising in their chosen health-related field that will take another *two* years to complete.

Lifelong skills are intended to offer graduates a skill-set that equips them to be better able to adapt to today’s knowledge-based society and the uncertainties and changing professional contexts (Kember, 2009). It is therefore no surprise that the prominence of graduate attributes in Higher Education has emerged in the literature to counter these challenges. Barrie, Hughes, and Smith (2009b) support these views: “Graduate attributes have been widely taken up by universities in many parts of the world including Australia”

(para, 1). Yet the integration of graduate attributes into Higher Education curriculum has not been without some controversy or reservations. For example, for some individuals and organisations, "... the concept of graduate attributes has been taken on reluctantly and suspiciously as the unwanted child of a union among business, government, and education sectors" (James et al., 2004, adopting Graduate Attributes Section, para, 1). Other controversies and reservations include those based on an economic rationalist model, that demands from industry are distorting university curriculum and that there is too much uniformity and standardisation with a general lack of encouragement for curriculum diversity (Armerego, 2009; Bowden & Masters, 1993; Star & Hammer, 2008). Others regard the graduate attribute agenda mainly without a theoretical basis, seeing it largely as a bureaucratic and quality assurance process (Barrie et al., 2009b; 2009c).

Despite these reservations, graduate attributes offer many advantages including: 1) assisting in the articulation of academic curriculum standards and course outcomes; 2) providing national and international benchmarking opportunities; 3) allowing curriculum mapping to take place, thereby identifying if gaps or overlaps exist; and 4) aiding in defining the educational needs for a discipline (Bowden & Masters, 1993; Sumsion & Goodfellow, 2004). This last point is particularly germane for the paramedic discipline as it searches for national curriculum standards and recognition as a full health care profession.

Bath, Smith, Stein, and Swann (2004) assert that the increased importance nowadays being placed on Higher Education graduate attributes has been shaped by three factors: 1) the ideology that learning in universities should engender lifelong learning; 2) the increasing association between Higher Education and employability of graduates; and 3) an increased focus on matching graduate attributes to student outcome satisfaction measures through national auditing and quality assurance procedures. Graduate attributes are central in quality assurance, standardisation, registration and regulation requirements (Barrie, 2005; International Engineering Alliance, 2009; SARRAH, 2009). One example of collecting quality assurance data is through the Course Experience Questionnaire

(CEQ), which has been the main measure of student satisfaction used by Australian universities since 1993. While regularly criticised over poor item construction, the CEQ has undergone widespread psychometric testing with demonstrated validity and reliability (Barrie & Ginns, 2007a). The CEQ, which purports to measure graduate attributes and students' learning motivation, as well as overall student satisfaction, is used by a broad range of stakeholders (Barrie, 2005; Ginns, Prosser, & Barrie, 2007; Hager et al., 2002; Harvey & Kamvounias, 2008; Jones, 2001).

In Australia, graduate attributes are matched to quality outcome measures that are directly linked to Federal government funding,¹¹ a process which is monitored by the Australian University Quality Agency (AUQA) (Barrie & Ginns, 2007a; Harvey & Kamvounias, 2008; Hughes & Barrie, 2010; Smith & Bath, 2006). This auditing and linkage to funding has striking similarities to the competency-based training movement of the 1980s that sought to address and match the outcomes of vocational education and training to the requirements of industry (Bowden & Masters, 1993). The provision of graduate attributes, either generic or discipline-specific, provides the capacity for universities to identify which outcomes are best suited for industry, societal, and professional needs. In recent times, AUQA has shifted its attentions from the descriptions of quality assurance processes and policies to actual student outcomes based on graduate attributes and employability expectations (Barrie, 2005; Bath et al., 2004; Oliver, Jones, Ferns, & Tucker, 2007). One of the reasons for this shift is the emerging body of literature (Bowden et al, 2000; Goldsworthy, 2003; Hager et al., 2002) that suggests that more extensive graduate attribute reform is still necessary in the Higher Education sector (Barrie, 2005; 2006). The shift in the purpose of the auditing process illustrates the impact of graduate attributes have had and are continuing to have on curriculum reform (Barrie & Ginns, 2007a). It has clear significance and relevance for the development of paramedics as an academic discipline in its own right and its subsequent role as a voice in the formation and administration of any future professional accreditation body.

¹¹ In order to receive Federal government funding, all Australian universities have been required to acknowledge and publically display graduate attribute policy statements since 1992 (Barrie et al., 2009b; 2009c).

Employability

Graduate attributes play an important part in students' employability by, as Hager et al. (2002) put it, closing the 'employability gap'. Meaningful graduate attributes provide information to potential employers about relevant skills, knowledge, and attitudes, while also engendering students to be life-long learners who are able to respond efficiently to change and demands placed on them (Cummings et al., 1997; Sumsion & Goodfellow, 2004).

This point is supported by Treleaven and Voola (2008) who add, "There is strong evidence that such employability requires the development of graduate attributes" (p. 160). Since the education and training reforms of the 1990s, expectations have continually been raised by government, professional associations and business sectors that universities should produce graduates who are better prepared for professional employment (Bennett et al., 1999; Litchfield, Frawley, & Nettleton, 2010; Nettleton, Litchfield, & Taylor, 2008). Moreover, graduate attributes and employability remain high on political and business agendas and continue to receive increasing international attention in both Higher Education and political settings; particularly in countries experiencing rapid economic growth, technological advancements, and the shifting of employment goal-posts (Armerego, 2009; Barrie, 2006; Green, Hammer, & Star, 2009; Hager et al., 2002; Hager & Holland, 2006; Jones, 2001; Leggett, Kinnear, Boyce, & Bennett, 2004; Sumsion & Goodfellow, 2004).

Aligning graduate attributes to core educational curricula therefore seems vital for universities in their governance procedures, particularly in the age of globalisation, cross-border benchmarking of educational programs, and ever-changing international demands. The influence of both globalisation and internationalisation on Australian Higher Education curricula is significant. For example, approximately one quarter of all students studying at Australian universities are from overseas, contributing to making international education Australia's third-highest earner of export dollars (Larkins, 2009). Therefore, Higher Education has major responsibilities in Australia's economy, and educating the

new generation of innovators and leaders. Larkins (2009) illustrated the importance of creating a competitive and industry-focused Higher Education sector by noting that, “Higher education underpins all economic growth. Universities are at the centre of a competitive knowledge-based economy” (para, 2).

While graduate attributes are viewed differently by teachers, students, employers, policymakers, and bureaucrats, it is often not recognised why these *differences* occur (Barrie, 2009a). Though there is substantial variation in the way graduate attributes are defined by Higher Education, by state and Commonwealth governments, and by industry, there seems to be some commonality across the tertiary sector in graduate attribute policy statements. Common university graduate attributes include critical thinking, problem solving, becoming effective global citizens, lifelong learning, scholarship, communication skills and information literacy (Hager, 2006; Higher Education Council, 1992; Nettleton et al., 2008). They are all frequently cited as desirable graduate attributes by all parties that advocate for them. However, it is how, and by whom, graduate attributes are mapped and integrated into respective curriculum that appears to be one of the major challenges. For example, who is responsible for the implementation, monitoring, and evaluation of graduate attributes? Is it faculty supported teaching and learning (T&L) units or academic development units? Is it the responsibility of individual departments, of centralised learning support departments, or of individual academics? Will the students be receptive to the changes? Is it the responsibility of an outside agency such as AUQA? The governance and monitoring of graduate attribute implementation are crucial elements in the curriculum reform.

Academics and Graduate Attributes

It is important to note that even when graduate attribute initiatives have received funding support, their success is limited, and the inability to implement and transfer these initiatives across systems is quite remarkable (Barrie, 2006). Evidence indicates that graduate attribute integration into curriculum will be largely unsuccessful if it is left to individual academics (Australian Psychology Accreditation Council, 2008; Sumsion & Goodfellow; 2004, Star & Hammer, 2008) who see the process largely as a bureaucratic

exercise and managerial fad (Barrie, 2009a, 2009b; Bowden et al., 2000). Clancy and Ballard (1995) state that “Perhaps a great deal of this is merely display for political purposes and is not intended to be taken too literally or too seriously” (p. 157). Also, examples have been cited in the literature where graduate attributes have simply been ‘built-on’ to the curriculum, which is further compounded by the contrasting views academics have on how graduate attributes are interpreted (Barrie, 2006; Barrie, 2007b; Bowden et al., 2000). Extending this point further Barrie (2006) presents a rather pessimistic view:

It would appear that typically, graduate attributes initiatives are only instituted where they are supported by an individual or group of people who believe such attributes to represent valuable graduate outcomes, and sometimes in the face of reported apathy and even resistance from colleagues who feel otherwise. Moreover, such initiatives often do not last after the individual leaves or the funding support is withdrawn (p. 218).

In effect, academic teaching staff often do not view graduate attribute development and integration as their responsibility (Barrie, 2007b; Sumsion & Goodfellow, 2004), and a number take the view that the vocational training sector (TAFE) is better suited to deal with graduate attribute and curriculum integration than universities (Star & Hammer, 2008; Sumsion & Goodfellow, 2004). In some ways, this point mirrors the transition and ongoing concerns by some members of the paramedic discipline regarding whether paramedic education and training is best placed in TAFE or universities (Willis et al., 2009a) as outlined in Chapters 1 and 2.

Additionally, the *generalists* believe that graduate attributes are best taught in ‘ad hoc’ or ‘one-shot inoculation’ subjects (de la Harpe et al., 2000; Green et al., 2009; Star & Hammer, 2008) while the *specifists* believe (and most evidence suggests) that graduate attributes need to be inextricably linked with discipline-based content, and integrated contextually into the curriculum (Biggs, 1996a; 1996b; Bath et al., 2004; Bowden et al., 2000; Hager et al., 2002; Jones et al., 2007; Leggett et al., 2004; Phillips & Bond, 2004; Scoufis, 2000). Decontextualising graduate attributes in an ad hoc fashion is viewed

pedagogically as hazardous, carrying with it the risk of encouraging surface learning and promoting an unbalanced generalist approach (Clancy & Ballard, 1995; Kamvounias & Thompson, 2008; Star & Hammer, 2008). Bath et al. (2004) also supports this view: "... a checklist approach to graduate attributes is considered extremely dangerous as it encourages a fragmented curriculum, as do mechanistic approaches to teaching and learning, such as the 'bolt-on' approach" (p. 316). Biggs and Tang (2007) also raise many provocative questions surrounding the notion of whether graduate attributes should be taught in stand alone, or as embedded coursework, subjects. While they acknowledge that some attributes such as critical thinking and problem solving can be taught either way, for the most part, they contend that graduate attributes should be embedded into discipline-specific coursework. "Should there be a course [subject] in Creativity 101 that all students must pass? We hope not, because you can't teach creativity that way, not in any significant sense, because genuine creativity requires significant substantive knowledge in a given area" (Biggs & Tang, 2007, p. 66).

Simon Barrie (2005; 2006) contends that the widespread implementation of graduate attributes in the Higher Education sector will only be successful if the confusion in academics' understanding of what graduate attributes mean can be addressed. He notes that "... it seems unlikely that such curriculum reform will be successful unless it first takes into account and addresses the variation in academics' understandings of the very nature of these graduate attributes" (2006, p. 235). In addition to this conceptual understanding, Sumsion and Goodfellow (2004) claim that for graduate attribute integration to be successful and sustainable, it must be adequately resourced and academic teaching staff provided with the necessary professional development skills. These views appear central in dealing with graduate attribute reform particularly as academic staff are the gatekeepers of day-to-day teaching, learning, and assessment content (Clancy & Ballard, 1995; Litchfield et al., 2010).

Examining other examples cited in the literature, the reality is that political agendas drive curriculum change, that often occurs without the appropriate levels of resourcing and professional support to ensure curriculum change and integration of graduate attributes is

sustainable long term (Bowden et al., 2000; Clancy & Ballard, 1995; Sumsion & Goodfellow, 2004). Crucially, this provides the paramedic discipline with a roadmap in dealing with the political agendas and an important theoretical basis in the quest of standardising and integrating graduate attributes into the curriculum. Therefore a key recommendation in the implementation of graduate attributes and accreditation of paramedic curricula nationally, should include significant investments in staff development, academic familiarisation, support, and resources of graduate attribute reform (Bowden et al., 2000; Green et al., 2009; Hager et al., 2002). These supporting structures have the potential to engender some commonality in understanding and interpretation of graduate attributes amongst academics that ultimately may lead to educators being less sceptical about, and more receptive to, implementing graduate attributes into their respective university programs.

Generic versus Discipline-Specific Graduate Attributes

Graduate attributes take two forms: generic and discipline-specific (Barrie, 2004c). Both forms are intended to shape students' understanding, skills, and knowledge during their university studies. This in turn contributes to both their chosen profession and life as a respected citizen (Bowden et al., 2000). The Higher Education Council (1992) pointed out that "These are skills, personal attributes, and values which should be acquired by all graduates regardless of their discipline or field of study. In other words, they should represent the central achievements of higher education as a process" (p. 20). However, as demonstrated in the Higher Education literature, graduate attributes cannot be learned *in vacuo* and have little meaning without some element of discipline context (Bowden et al., 2000; Clancy & Ballard, 1995; Cummings et al., 1997). The Higher Education Council (1992, cited in Bath et al., 2004) noted, "it is only through the study of a body of knowledge that they (generic skills, attributes and values) can be acquired" (p. 316).

Closer examination of why generic attributes were developed in the first instance has important ramifications for the paramedic discipline in its implementation of graduate attributes and attempts at standardising and accrediting its programs nationally. For example, what impact (if any) do generic attributes have on paramedic-specific graduate

attributes? How are they combined in curriculum alignment and re-designing processes? Should generic attributes guide discipline-specific graduate attributes or vice versa? Can generic and discipline-specific attributes be assessed together or as separate entities? These enquiries lead to the fundamental question of whether the development of graduate attributes should be integrated as generic attributes or embedded in discipline-specific curriculum? (Hager et al., 2002). Before these questions can be addressed, a brief overview of the continuing debate between generic versus discipline-specific graduate attributes will be discussed. This overview will provide the paramedic discipline with pertinent information and a potential roadmap in the likelihood of its forthcoming attempt at national accreditation and integration of graduate attributes, both generic and discipline-specific.

Generic graduate attribute initiatives first arose from the education and training reforms and skills agenda throughout the 1990s (Litchfield, et al., 2010; Sharp & Sparrow, 2002). The importance of having graduate attributes ‘generic in nature’ was first outlined in the Finn Report (1991), which was followed a short time later by the Mayer Report (1992) which recommended seven key generic attributes. These included: 1) collecting, analysing and organising information; 2) communicating ideas and information; 3) planning and organising activities; 4) working with others and in teams; 5) using mathematical ideas and techniques; 6) solving problems; and 7) using technology. In more recent times, the Department of Education, Science, and Training (2004) have re-examined these generic attributes, ensuring each skill is embedded in nationally recognised vocational qualifications (Litchfield et al., 2010; Oliver et al., 2007). However, for the most part they have remained quite similar to those developed in the 1990s. The broad objectives of these generic attributes was to strengthen Australia’s international trading position by providing students with key skills, knowledge, and qualities that were embedded and transferable (flexible and multiskilled) across employment and life contexts in general (Oliver et al., 2007; Scanlon, 2006). While history suggests these educational reforms played an important part in Australia’s economic recovery, there is nevertheless one aspect that is still creating tension some 20 years later (Carroll, 2004). This tension is based on the fact that the generic attributes

were created for the vocational and post-compulsory education sector – not Higher Education (Jones, 2001). According to Cummings et al. (1997) the “higher education sector in Australia has had some difficulty with the notion of competency [generic attributes] as it has been developed and promoted through the training reform agenda” (p. 221). Others suggest that the traditional focus and therefore outcome of universities’ education is not sufficient for today’s industry needs and expectations (Litchfield et al., 2010).

It has been argued (Bennett et al., 1999; de la Harpe et al., 2000; Jones, 2006) that if generic attributes are under-theorised their use as curriculum guides will be problematic; at best a superficial attempt to hide a cost-saving managerialist agenda. Moreover, others take the view that it is simply government surveillance under the guise of quality assurance (Lowe & Marshall, 2004). Clancy and Ballard (1995) cynically “regard the whole issue as just another externally driven piece of policy interference by Government, requiring only defensive exercises in ‘packaging’ by way of response” (p. 165). Generic attributes have been developed in the belief that these attributes can be applied by graduates beyond university settings in a variety of contexts transferring education and training beyond technical expertise, which are considered ‘too difficult’ to be taught by employers (Bowden et al., 2000; Gilbert, Balatti, Turner, & Whitehouse, 2004; Litchfield et al., 2010). In other words, the transferability of graduate attributes occurs with students applying these skills after they have graduated during their careers.

It is also suggested that attributes that are simply added to the traditional curriculum are identified as ‘generic’. This is purported to be one of the reasons why reservations and resentments continue to exist among academic teaching staff who have been handed the job of instilling them into students (Jones, 2009). Carroll (2004) emphasises a different perspective noting that “Australian universities are experimenting with using generic attributes as a marketing tool for gaining competitive edge” (p. 3). Some other reservations are highlighted by Cummings (1998) who stated that there “is considerably more uncertainty in the higher education sector due both to a less enthusiastic endorsement of generic attributes by university staff and a broader range of skills,

attitudes and values incorporated in generic attributes identified by universities” (Can Graduate Attributes be Measured Section, para, 1). While university staff are increasingly less enthusiastic about directing their course outcomes to include generic attributes, university administrators are adding more and more to their institutional graduate attributes. Barrie (2009a) claims that universities should ensure that students’ T&L experience of Higher Education should focus on fostering explicit graduate attributes, rather than simply applying generic skills to courses in an ‘add-on’ fashion.

The whole notion of generic attributes is extremely complex, since they manifest themselves in completely different ways based on how they are taught, examined, and interpreted in specific disciplinary contexts (Clancy & Ballard, 1995; Hughes & Barrie, 2010). An initial question, for example, is how ‘generic’ attributes are transferable? Some argue such attributes cannot be transferred without some impact in terms of discipline context. Without it, they simply reduce the curriculum to reductionist and superficial learning approaches (Gilbert et al., 2004). Cummings et al. (1997) add “is further assumed that the greater variety in the contexts in which they are developed, the greater the opportunity there will be for articulating and transferring these qualities” (p. 224).

Bowden and Marton (1998, cited in Bowden et al., 2000) argue “that the curriculum for any university program needs to be developed around the idea that students are being prepared for a future that is largely unknown” (Arguments for Adopting Generic Capabilities Section, para, 3). This stance is taken since students, when employed, are likely to be undertaking skills and roles in activities separate from their specific university course. While this is true (particularly when graduates move between different professional fields or work-related contexts), at a micro level what a paramedic undertakes on a daily basis does not significantly alter from state to state, or country to country. Supporting the notion of preparing students for an unknown future is best evidenced by the changing extended scoping roles. These roles and what they entail is largely unknown. Therefore it is important that elements of being ‘generic’ would be built on, with, or around the discipline-specific graduate attributes.

Another way of viewing generic graduate attributes is through the lens of employers. Evidence suggests they want graduates to have a set of generic skills, in addition to the skills relating to their specific discipline (Bowden et al., 2000; Litchfield et al., 2010; Oliver et al., 2007). Why would an ambulance service want to employ a paramedic graduate who displays clinical dexterity and competence, but is unable to demonstrate generic skills such as communication or problem-solving? Work by Willis et al. (2010) cites reports of up to 50% of paramedic graduate applicants falling short in psychometric and behavioural interviews which are based principally on generic or soft skills, such as communication skills, human understanding, and teamwork. The study examined the supporting sciences (interpersonal skills, and counselling) in Australian paramedic curriculum, and indirectly provides some important insights to curriculum and graduate attribute reform. The following quotes from focus group participants illustrates that the supporting sciences or generic attributes were missing skill sets in some graduates attempting to gain paramedic employment. “We handle 300 new recruits a year ... when people don’t succeed it’s ... rarely academically or clinically ... it’s the interpersonal areas that lets them down and for some, it leads to termination”. Another quote reflecting similar issues surrounding generic attributes goes on to say, “A lot of people we would not progress in the recruitment process because of their lack of team work, lack of communication skills, because we think ... they wouldn’t fit into an environment where there is pressure ...” (Willis et al., 2010, p. 6).

Currently, ambulance services around Australia do not employ university graduates based on specific paramedic graduate attributes, since none have been agreed upon or integrated into respective curriculum. Instead, given the inconsistency between each university and the likelihood that each university will produce differently-skilled graduate paramedics, ambulance services in theory recruit new graduates either according to their own individual set of attributes or with reference to the graduating university’s generic attributes. In reality, they base prospective employment on their own specific supply and demand forecasting requirements (Willis et al., 2008). Currently the demand for qualified personnel outstrips supply but what will happen when the situation is reversed;

a situation that could arise as a consequence of professionalisation? Against which criteria will ambulance services select their staff? Will they simply as Bowden et al. (2000) suggest be, "... forced to fall back on what they know of individual universities" (What is the Significance Section, para, 5), or base their judgements on whether the university is a sandstone one or not, or whether the student entered university with a high ENTER score (also known as an Australian Tertiary Admission Result [ATAR])? Supporting this point, it is unlikely they recruit prospective graduates based on university generic graduate attributes since there is evidence that only one Australian paramedic university department (Edith Cowan University) has actively integrated university generic graduate attributes into its courses.

As highlighted earlier in the thesis, it is little wonder that ambulance services have to provide lengthy graduate paramedic internships and replicate education and training to counter the inconsistencies generated by the universities. If the *PGAS* can be successfully integrated and curriculum alignment is embraced by the respective universities, it not only signals the intention and commitment by universities to produce *recognisably* professional paramedic graduates, but it provides ambulance services with a national rubric to compare graduates who are applying for positions which will make the selection process much smoother by ensuring that graduates receive standardised education and common training reflecting professional paramedic practice in the first instance. Bowden et al. (2000) add, "By fostering assessing and recording judgement or generic capabilities, the university demonstrates its commitment to producing potential employees who actually possess the characteristics the university says it values and employers have argued they need" (What is the Significance, para, 4).

While the debate and lack of clarity over the issue of generic versus discipline-specific attributes continues, the fact remains that as long as Federal government funding is linked to university generic attributes and student outcomes, generic attributes will continue to co-exist with the discipline-specific needs. Once again, this provides the Australian paramedic sector with important background information and outlines the requirements they face in curriculum and graduate attribute reform, while also raising important

questions that will need to be addressed. For example, what is the best curriculum design strategy that allows the integration of both generic and paramedic-specific graduate attributes? How are certain generic attributes such as critical thinking or creativity actually assessed? Can these attributes be formally assessed during university studies, or are they best examined in the professional workplace? An inspection of whether generic attributes are currently integrated into the 12 paramedic course programs suggests that there is much work still to be undertaken. This is evidenced by the fact that only one university acknowledges the integration of university generic attributes into their paramedic course structure. At this point in time, only Edith Cowan University (ECU) in Western Australia makes mention of linking the ECU generic attributes (that include: Enterprise, Initiative and Creativity, Professional Knowledge, Service, Workplace Experience or Applied Competencies, Awareness of Political, Social and Ethical Issues, Communication, Internationalisation / Cross Cultural Awareness, Problem Solving / Decision Making, Teamwork, Use of Technology / Information Literacy) to their individual course syllabus and overall curriculum.

Thus, one of the challenges for the paramedic sector is to establish governance structures and partnerships, thereby clarifying what are required between key stakeholders and the teaching institutions. In the example of integrating the *PGAS*, participating institutions would also need to model the university graduate attributes, providing clear articulation where these overlay with each other, and with the *PGAS*. It would be expected that participating paramedic departments would need to re-interpret and align the attributes outlined by the *PGAS* against their respective university graduate attribute policy documents and mission statements (outlined in Phase 2: Curriculum Alignment). The next section will now outline Phase 1: Development of Graduate Attributes.

Phase 1: Development of Graduate Attributes

Paramedic Graduate Attribute Scale (PGAS)

In any university course, the central framework for guiding knowledge is the course curriculum. The curriculum describes both the content and the graduate attributes –

usually as intended learning outcomes. As such, the curriculum has purposes beyond mere roadmaps of topics to be covered; they should also describe the learning that the student has acquired and how that learning is expected to be evidenced. It is these outcomes that are indicative of what the paramedic discipline considers important in terms of the qualities of a paramedic.

In the first instance then, it should be clear that the graduate attributes actually do reflect contemporary practice. Do the attributes translate into appropriate knowledge, skills and attitudes that the industry will see as desirable and employable? Such a question is difficult to answer if having institutions – both Higher Education providers and registered training organisations – offer widely varying courses with graduate attributes that are problematic in terms of comparison.

In the Australian context, at least, the PGAS results offer the accrediting bodies, the paramedic discipline with a tested instrument for standardising and modernising paramedic course curricula. The curricula can then also be used to profile the fitness to practice or work-readiness of the graduates. Further, it provides a solid basis for international benchmarking. Secondly, a well constructed and defined curriculum also provides a framework for decision-making in terms of enrolment. Both the student and the institution can gauge whether or not an applicant should be admitted to the course. Other professions rely upon such mechanisms as a tertiary entry scores. Such scores need to reconcile to the demands inherent in the curriculum. Without a national curriculum that becomes impossible to calculate.

Morgan, Orr, and Mah (2010) highlight the key features of graduate attributes and add that the, “use of the term ‘attributes’ also helps to serve as a reminder that all components of training programs – from admissions through curriculum, practicum and evaluation – can be affected by defining them” (p. 68). The first step in successfully embedding graduate attributes into university curriculum is the actual identification of which attributes are most suited to the paramedic discipline (Kember, 2009). The integration of graduate attributes and subsequent curriculum alignment, ensuring that sufficient

preparation and practice is provided for graduate attribute acquisition, will now be discussed. Specific attention will be given to constructive alignment and course mapping processes.

Phase 2: Curriculum Alignment

What appears to be absent from policy documentation, university and funding reports and other related literature is a strong conceptual basis to graduate attribute and curriculum reform. While many universities have developed graduate attribute resource guides (for example Edith Cowan University, the University of South Australia, the University of New England, and the University of Sydney), including course review processing and mapping, application of effective teaching strategies and some suggestions at assessment options, no explicit endorsement of any curriculum design theory is evident. In the absence of any other endorsed curriculum design theory cited in the literature, and influenced by an emerging body of literature supporting the use of constructive alignment in graduate attribute reform, an overview of how the *PGAS* might be integrated into paramedic curriculum using constructive alignment will now be briefly explored. To reiterate, the intention here is not to prescribe curricula for individual paramedic programs. Rather, the aim is to provide the relevant stakeholders with an appropriate and theoretically sound basis from which to incorporate graduate attributes into the respective paramedic curriculum across Australia. The use of a theoretically-based curriculum design framework supported by a ‘whole-system’ approach offers the relevant stakeholders the potential to bypass some of the issues that have plagued many disciplines in Higher Education previously.

Many universities claim their specific graduate attributes are embedded in relevant curriculum through the public display of graduate attribute policy statements and curriculum mapping processes. However, the reality outlined by quality auditing bodies such as AUQA report there is little in the way of evidence that graduate attributes have been demonstrated during students’ learning while attending university (Barrie, Hughes, & Smith, 2009b). Barrie (2006) states, “Despite reports of many individual curriculum initiatives, the overall picture in higher education systems around the world is one of

patchy implementation and uptake of such graduate attribute initiatives” (p. 218). More specific to Australia, Jones (2001) also highlights, “To date, there appears to be no convincing evidence that there has been a significant change in the graduate outcomes or curriculum practices of university education in Australia” (p. 6). In other words, strategies and intentions are often mismatched with the necessary requirements needed for curriculum reform. Thus the question arises, why is this so? As outlined previously, graduate attributes are influenced by many cross-sectional influences, reinforcing the notion that their integration into Higher Education curriculum is often a difficult and complex process (Jones, 2001).

One possible cause for the inconsistent achievement of graduate attributes across the Higher Education sector is their relationship to curriculum design issues. Carroll (2004) conjectured that it “is axiomatic from a simple review of typical lists of graduate attributes that relying only on curricula to ensure student uptake of graduate attributes is not sufficient” (p. 4). Additionally, Barrie (2004a) revealed in his phenomenographic study that academics and others have different conceptions of graduate attributes (Biggs & Tang, 2007). For example, are they generic or discipline-specific or both, how are they assessed, and so on? Barrie (2007) highlighted these points further:

This variation in what academics understand generic attributes to be helps in part to explain the reasons for the limited implementation of graduate attributes within university courses. For instance, if academics do not understand their institution’s espoused generic attributes of graduates to represent relevant, important university learning outcomes, they are unlikely to incorporate them in their courses or teaching (p. 441).

From a curriculum design perspective, as long as the ambiguity and confusion about the role and nature of graduate attributes remains, their use as the ultimate outcome of a course of study will be problematic. Jones (2009) points out: “There is a need for a careful examination of where and how the skills or attributes exist, and how they are taught and assessed” (p. 98).

Another possible cause for the patchy implementation is the fact that the transferability or contextualisation of graduate attributes is very complex (Harvey & Kamvounias, 2008; Jones et al., 2007), often requiring a ‘whole-degree’ or systems approach which is viewed as complicated and difficult to coordinate. A systems approach is supported by Biggs (1996a) who remarks that “Attempts to enhance teaching need to address the system as a whole, not simply add ‘good’ components, such as a new curriculum or methods” (p. 350). Barrie (2009a) believes that effective graduate attribute implementation requires multi-level leadership coordination and adequate resourcing, while Biggs (2003) also suggests a coordinated approach is needed including at all levels of the teaching institution. The challenging aspects of governing and implementing graduate attributes is also noted by the Barrie, Hughes, Smith, and Thomson (2009c) who observe the “way a university coordinates and approaches the implementation of its graduate attributes policy is often neglected” (para, 1). Graduate attributes are demonstrated qualities the student has shown that s/he has the required knowledge, skills and attitudes that characterise them. To a large extent and especially in the education environment the demonstration is an aspect of assessment. Therefore any strategy for curriculum reform focussed on graduate attribute that does not have assessment of outcomes as one of its keystones is likely to be disjointed and ultimately unoperational.

The paramedic programs at Flinders University have turned to the curriculum design theory created by John Biggs (1999a) called *constructive alignment* to better coordinate its approach to curriculum coherence and graduate attribute achievement (Parry & Reynolds, 2010).

Constructive alignment theory is a curriculum design theory that aligns graduate attributes, intended and observed learning outcomes, T&L activities and standards-based assessment. Simon Barrie and Beverly Oliver are two scholars who have studied graduate attributes in Australia; both support the use of *constructive alignment* in graduate attribute implementation (Barrie, 2009a; Oliver et al., 2007). Evidence that *constructive alignment* is an effective curriculum design in graduate attribute integration is growing (Cathcart et al., 2008; Lowe & Marshall, 2004). For example, Treleaven and

Voola (2008) demonstrated the use of *constructive alignment* for the integration of graduate attributes in the discipline of marketing. They remarked that “Engaging in [the] processes of constructive alignment (Biggs, 2003) provides a basis for designing in the integration of graduate attributes across the university’s programs at all levels” (Treleaven & Voola, 2008, p. 163). Its use has also been employed in business and economics (Thompson, Treleaven, Kamvounias, Beem, & Hill, 2008), teacher education (Mimirinis, 2007; Navarro, 2002), engineering (Wee, 2004), chiropractics (Ballantyne, Lowe, & Marshall, 2004), software engineering (Armerego, 2009), philosophy (Jones, 2006), law (Kamvounias & Thompson, 2008; Kift, 2002), mathematics (Shepherd, 2005), work-based learning (Reaburn, Muldoon, & Bookallil, 2009), and in online teaching in Higher Education (Oliver, 2003; Talay-Ongan, 2002), thus indicating it is becoming a well-established curriculum design theory.

Fundamentally, *constructive alignment* combines two elements: *constructivism* and *alignment*. According to the theory of constructivism the student constructs her/her own meaning based on previous life experiences, attitudes, and beliefs that are specifically relevant to the T&L activity (Biggs, 2003; Biggs & Tang, 1997). A significant paradigmatic shift occurs, whereby the learning and new knowledge is something formed by individual students, not teachers. Biggs (2003) points out that “Teaching is simply a catalyst for learning”. The *alignment* aspect refers to the teaching, learning, and assessment involvement. This involves and demands direct alignment of T&L activities and assessment tasks to the intended learning outcomes (ILOs) (Biggs, 1999a; 2003). Biggs (2003) describes the learner as being ‘ambushed’ and notes, “The learner is in a sense ‘trapped’, and finds it difficult to escape without learning what he or she is intended to learn”. In short, *constructive alignment* emphasises both learning as a focus of teaching and the importance of aligning aims and objectives to teaching as well as to the assessment tasks.

While for both of these elements clear benefits exist, in the area of alignment potentially significant alterations to previous practice are likely to be required. For example, it would include course and subject reviewing and mapping; activities that often end up

indicating that changes in course structure are required. In most cases, that requires faculty or academic approval (Carroll, 2004; Kift, 2002). Reaburn et al. (2009) outlines the challenges faced in implementing a new model:

... constructive alignment cannot be achieved or maintained in an institution that does not allow frequent and easy modification of courses. As a result, a course coordinator is discouraged to responsively modify course design and delivery, thus making constructive alignment difficult to attain (p. 829).

Any activity in the Higher Education sector that requires additional resourcing and ongoing commitment, support and resilience (Biggs, 1996a; Green et al., 2009; Reaburn et al., 2009; Sumsion & Goodfellow, 2004) tends to be seen as significant administration burdens and as such will often encounter opposition from both management and the teaching staff.

In Biggs' early models (1999a; 2003), he described *constructive alignment* broadly requiring three steps (Figure 7.2). Firstly, defining the types of knowledge that guide the intended learning outcomes (ILOs), secondly, developing T&L tasks and activities that would lead to the ILOs being met, and lastly, assessing students' outcomes based on activities matching what was intended. One of the key pedagogical outcomes proposed by this alignment is that the learning is transformed from surface to deep learning (Biggs, 1999a; Harvey & Kamvounias, 2008; Reaburn et al., 2009; Walsh, 2007) by engaging students in authentic outcomes-based learning activities, such as problem-based or portfolio-based learning. Reaburn et al. (2009) notes that "Constructive alignment therefore is a teaching system aimed at supporting learning, where the emphasis is on process rather than content" (p. 821). While it is arguable that learning involves both process and content, the observation refers to the concern that a didactic delivery of content tends to lead to only surface learning (Beattie, Collins, & McInnes, 1997; Biggs, 2003; Bowden & Marton, 2004; Rowland, 2001). Most courses are intending to generate a mix of both surface and deep learning – encouraging the students to be strategic learners (Biggs, 2003, Reaburn et al., 2009; Walsh, 2007). This of course raises interesting questions in today's Higher Education landscape of mass instruction, stream

lining of assessment, and university competitiveness (Armstrong, 2009; Biggs, 1996a; Clancy & Ballard, 1995; Jones, 2001; Newby, 2005). Houghton (2004) also highlights the potential benefits of constructive alignment in this regard:

Constructive alignment encourages clarity in the design of the curriculum, and transparency in the links between learning and assessment. In a truly Constructively Aligned curriculum it facilitates deep learning as the activities are designed for that purpose. This should improve the quality of learning... (p. 30).

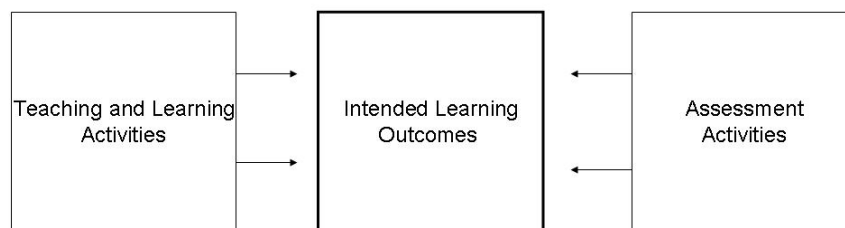


Figure 7.1: Aligning intended learning outcomes, teaching, and learning activities, and assessment activities (Adapted from Biggs, 1999a).

Guiding Biggs' model is the aim of extending declarative knowledge to functioning knowledge: using declarative knowledge to solve situated problems (Biggs, 2003).

Walsh (2007) advocating Biggs' work on this point, notes:

He argues that, traditionally, universities have taught much declarative knowledge and some procedural knowledge, but that the students have had to develop the conditional knowledge which is necessary to achieve fully functioning knowledge on their own after graduation. Constructive alignment can help address this issue, and ensure that students are more fully prepared for their professional role (p. 81).

Biggs notes that the majority of students do not have the capacity to transfer declarative knowledge into functioning knowledge without being guided by teachers or the curriculum (Biggs 1999a; 2003). In his view, transferring this knowledge into discipline-specific problem-solving contexts should be supported by appropriate T&L environments. This point is particularly important for paramedicine. Walsh (2007) notes

that "... traditional teaching methods such as the lecture, tutorial and private individual study do not provide much support for the development of the skills required for higher level learning processes" (p. 80). Both issues relating to the transference of knowledge and teaching spaces is ongoing for all Australian universities, and add to the complexities and difficulties faced in curriculum and graduate attribute reform.

In the most recent edition of *Teaching for Quality Learning at University*, Biggs and Tang (2007) devote a chapter exclusively to designing ILO's that integrate graduate attributes. The model now encompasses four steps (Biggs & Tang, 2007). The additional fourth step includes the opportunity to align graduate attributes to ILOs, T&L and assessment tasks (Figure 7.3). The alignment of graduate attributes takes place following the completion of the ILO's (with agreed levels of knowledge). Put another way, an alignment or mapping process takes place ensuring that graduate attributes are aligned to the ILOs, which indicates the graduate attributes are 'locked' into the alignment process. As discussed earlier, it is important to note that not all graduate attributes need to be aligned within each unit of study, although some attributes may indeed overlap. Equally as important, graduate attributes should not be forced to match ILOs. This point is emphasised by Biggs and Tang (2007) who state "It is not necessary that every program should address all graduate attributes because some graduate attributes may not be relevant to the program" (p. 85).

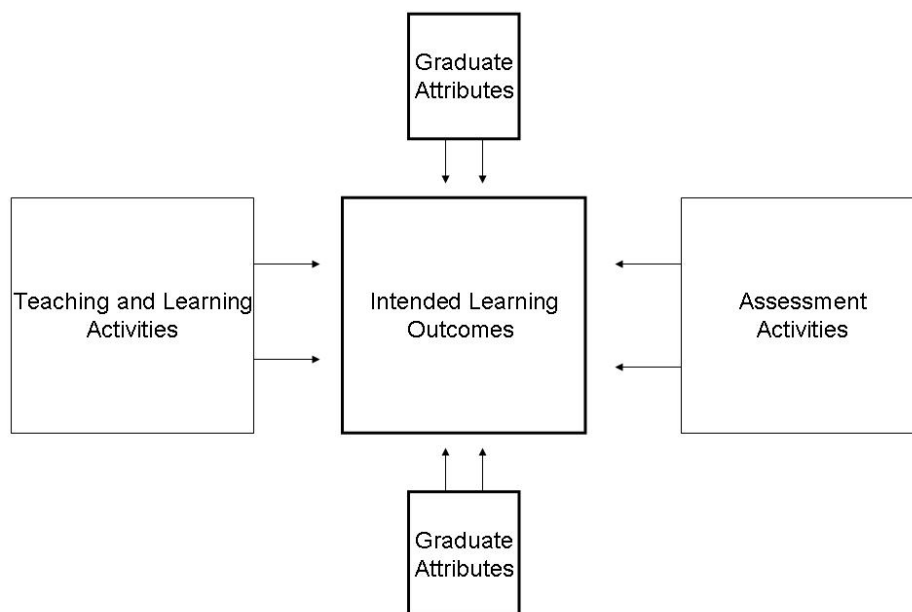


Figure 7.2: Aligning intended learning outcomes, graduate attributes, teaching and learning activities, and assessment activities (Adapted from Biggs, 1999a).

This new model now provides the teacher, policy maker, or curriculum designer with, in essence, a blueprint in which to embed and integrate graduate attributes following the constructive alignment process. Biggs and Tang (2007) outline the co-existence and importance of graduate attributes and curriculum, “Intended learning outcomes (ILOs) apply at the institutional level as graduate attributes, and at the program and course levels. Graduate attributes can provide useful guidelines for designing program outcomes, which in turn, are addressed by the outcomes of specific courses” (p. 64).

Constructive alignment offers an important theoretical basis in graduate attribute reform in paramedics (APAC, 2008; Barrie, 2009a; Barrie & Prosser, 2003; Hughes & Barrie, 2010; Litchfield et al., 2010; Oliver et al., 2007) and supports the notion that for graduate attributes to be successfully embedded and demonstrated as student outcomes they must be contextualised and based in authentic learning situations. For example, one of the core graduate attributes of the *PGAS* is ‘Patient Interaction and Welfare’, and one of its descriptors is ‘A professional paramedic should be non-judgemental and non-discriminatory’. How would this descriptor (and hence graduate attribute) stated as a

learning objective (or a series of LOs); taught by the teacher and how would the student be given the opportunity to show that s/he had learnt it? Without explicitly aligning specific graduate attributes to each facet of the T&L process, the possibility exists that this type of descriptor would simply be taught via a lecture, followed by a tutorial, with the faint possibility that it may be examined more closely during a role-play or simulation context. Again, it is one thing to espouse that specific graduate attributes will be embedded in a learning environment but another to gather evidence that they have been learnt by the students. Hager et al. (2002) highlight this point, "... developing a statement of graduate attributes is the easy part. Ensuring that the curriculum, teaching and assessment in the university does indeed promote development of the attributes is a much larger undertaking" (p 10). This is one of the central arguments in the graduate attribute reform debate, and one of the reasons why a curriculum theory such as *constructive alignment* is central in offering a potential solution. Biggs (2003) succinctly outlines the discordance currently being played out in the majority of Australian universities today:

So often the rhetoric in courses and programs is all that it should be, stating for example that students will graduate with a deep understanding of the discipline and the ability to solve problems creatively. Then they are told about creative problem-solving in packed lecture halls and tested with multiple choice tests. It's all out of kilter, but such a situation is not, I strongly suspect, all that uncommon (p. 2).

Including a theoretical framework such as constructive alignment goes beyond previous attempts at embedding graduate attributes, and perhaps offers reasons why they have been, thus far, largely unsuccessful. Barrie and Prosser (2003) observe that "In order to achieve alignment within a research-intensive university environment, a clear theoretical underpinning of the policies and processes is required" (para, 2). Additional factors such as total commitment are required for graduate attribute and curriculum reform. Bath et al. (2004) highlight the notion of a lived curriculum which is a process in avoiding superficial attempts at graduate attribute integration. Bowden et al. (2000) also draw attention to a total commitment adding the "development of generic capabilities is a spiral rather than linear process. It requires reflection and structured opportunities to compare

variety in experience in the whole program” (The Commitment of the Teaching Team Section, para, 2).

The following example (Figure 7.4) illustrates how *constructive alignment* is undertaken using an existing learning outcome taken from a unit in the Bachelor of Emergency Health course at Monash University and the *PGAS*. In this example, the model proposed by Biggs (1999a; 2003) and Biggs and Tang (2007) is followed. The intended learning outcomes focus on critical thinking and problem solving in the application of clinical skills, which corresponds with the graduate attribute ‘Scientific Approach to Patient Care’. The next phase is aligning teaching and activities that can reproduce what is required by the ILO; in this case, activities such as lectures, problem-based learning (PBL) tutorials, simulations, and online quizzes. The final phase is developing assessment tasks that directly mirror the ILO, for example PBL tutorial participation, contributions to debates, worksheets, and assignments. While on the surface, this approach appears to be straightforward; in reality ensuring all elements are aligned with each other is a complicated process. For instance, in the example provided the ILO poses a dilemma. The verb ‘demonstrate’ is quite ambiguous, does this mean demonstrate a deep understanding of critical thinking and problem solving theories and models, or alternatively, does it simply mean demonstrate critical thinking and problem solving during a role-play simulation? Clearly the development of ILOs must reflect clear and assessable items; otherwise it is unlikely that they can be aligned with graduate attributes, T&L tasks, and assessment activities. Moreover, establishing what type of knowledge is required (i.e. functioning or declarative knowledge) is also important in guiding students’ learning expectations. As Biggs (1999a; 2003) and Biggs and Tang (2007) emphasises, choosing the most appropriate verb is critical in developing ILOs. This point further highlights the demanding nature of graduate attribute and curriculum renewal initiatives. Biggs and Tang (2007) note that verbs such as ‘understand’, ‘comprehend’, and ‘demonstrate’, despite being ubiquitous throughout most university unit guides, are particularly unhelpful as they do not adequately portray outcomes. Again, this offers a potential reason why graduate attribute and curriculum renewal has been largely

unsuccessful and further highlights the need for the implementation of a theoretically-driven curriculum design that, at present, appears to be missing.

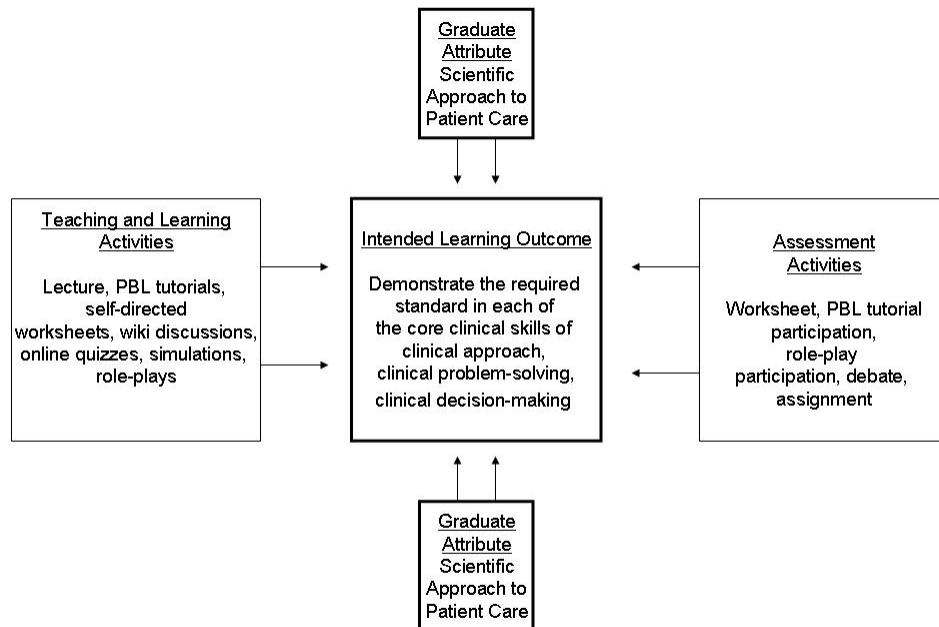


Figure 7.3: Example of constructively aligning the paramedic graduate attribute ‘Scientific Approach to Patient Care’.

The process outlined in Figure 7.4 would be undertaken with the remaining ILOs and graduate attributes in individual units of study across the whole program. As advocated by Bath et al. (2004) and Kift (2002), a ‘whole-systems’ approach would be encouraged under the guise of a formal course review or curriculum renewal process, involving University, Faculty, School, Department, and Program endorsement and involvement. Again, it is important to emphasise the point raised by APAC (2008), Biggs and Tang (2007), and Morgan et al. (2010) that graduate attributes should not be enforced onto each ILO, nor should each unit of study be expected to encompass all graduate attributes, whether they be generic or discipline-specific. The intent is that the prescribed graduate attributes are linked to the whole teaching, learning, and assessment process as proposed

by the *constructive alignment* theoretical framework both vertically and horizontally (Kift, 2002).

As outlined in the graduate attribute and curriculum reform literature, the integration and provision of a theoretically-sound curriculum design appears to be a key element that is often absent in the reform process. The *constructive alignment* theory provides relevant stakeholders responsible for paramedic education and training standards and accreditation with a conceptual framework and curriculum blueprint to work from. This blueprint can be used for future accreditation or registration requirements, or the integration of more contemporary graduate attributes in the future, such as those required in the proposed *Paramedic Transdisciplinary Phase*, thereby strengthening the case for recognition as a full health care profession.

Following the process of constructively aligning the graduate attributes to curriculum ILOs, a commonly used curriculum identification process known as curriculum or course mapping should also be undertaken to determine the distribution of graduate attributes, T&L activities, and assessment activities. How and when this will be undertaken will be guided by how well graduate attributes are recognised in the university undertaking the course mapping and curriculum renewal process (Carroll, 2004). However, in the case of the participating paramedic departments that currently do not embed any discipline-specific graduate attributes, it would be prudent and strategic to undertake the curriculum mapping process subsequent to the initial constructive alignment procedure. There is a logical sequence beginning to appear. First, a consensus is reached amongst industry personnel about what is required from training courses to ensure the discipline is regarded as professional. Second, the characteristics of professional behaviour are translated into graduate attributes. Third, courses are constructively aligned to ensure that they produce graduates with the desired graduate attributes. Fourth, course curricula are mapped to ensure all attributes are achievable throughout the entirety of the program. Fifth, the industry will monitor and document on the success of the programs. The risk of not following this approach is in a sense ‘putting the cart before the horse’ by implementing teaching, learning, and assessment activities out of sequence (Green et al., 2009). Barrie

(2007) highlights the importance of sequencing, “While such a clarification of the nature of the intended outcomes is a necessary starting point, it is not sufficient in the context of universities’ intentions to develop teaching strategies to effectively promote the development of generic attributes” (p. 441). Further discussion of course and graduate attribute mapping will be outlined in the next section.

Curriculum Mapping Process

As outlined by Oliver, Ferns, Whelan, and Lilly (2010) the nexus between curriculum renewal and graduate attribute implementation usually includes a curriculum mapping exercise. Its functions as a quality assurance mechanism is beyond doubt, and its use is widely advocated in the graduate attribute literature (Oliver, et al., 2007; Oliver et al., 2010; Sumsion & Goodfellow 2004).

A recent survey by Oliver and Whelan (2010) found that the vast majority of Australian universities (36 out of 42) either have detailed curriculum mapping matrices, or are in the process of developing such approaches. In terms of graduate attribute reform, however this represents a potential dilemma, as noted by Barrie et al. (2009c, cited in Oliver et al., 2010) who affirm that “... curriculum mapping exercises often simply note that learning outcomes reference graduate attributes” (p. 14). The problem, also noted by Barrie et al (2009c), is implicitly seen in a large portion of the curriculum mapping cases provided by Australian universities, and is illustrated in an example of a web-based graduate attribute mapping tool from Murdoch University (Lowe & Marshall, 2004). The development and implementation of an online graduate attribute mapping program “was originally designed to map only graduate attributes but it quickly became clear that the features provided made it easy to map alignment to unit objectives also” (p. 553). This description amplifies Barrie et al’s. (2009c) earlier concerns regarding a ‘tick and flick’ approach to curriculum mapping, and further strengthens the claims made by Barrie (2004c), Bath et al. (2004), Kamvounias and Thompson (2008), and Thompson (2007) that a theoretical basis to curriculum design is urgently required (Barrie, 2005; Bennett et al., 1999). Indeed this point is central in the widely cited paper by Bath et al. (2004) who suggest that:

However, while this mapping of graduate attributes plays an important role in curriculum development and quality monitoring, is it enough to ‘validate’ the curriculum and the opportunities therein for graduate attribute development? Is there alignment between what is espoused, what is enacted and what students experience and learn? And how would we know when that alignment exists? (p. 314).

In isolation, curriculum mapping has the potential to promote superficial and unproductive approaches, and appears unsuitable for graduate attribute reform (Bath et al., 2004; Green et al., 2009; Hughes & Barrie, 2010). However, with the inclusion of a conceptual framework such as *constructive alignment*, its potential for effectiveness can be greatly enhanced (Oliver et al., 2007).

Curriculum mapping is a method for collecting and identifying information regarding what is taught in a curriculum. The mapping process helps articulate how and where learning expectations and graduate attributes have been taught, linked, and assessed (Crisp, 2003; Currie, Carew, & Zaballa, 2003). Specifically, the mapping procedure includes reviewing and identifying ILOs, T&L activities, assessment tasks, and how the prescribed graduate attributes are aligned, taught, practised, and assessed (Sumsion & Goodfellow, 2004). Currie et al. (2003) describe curriculum mapping as “... a process of identifying, characterizing and depicting the way that desired learning is incorporated into and developed over the course of a degree program” (About Curriculum Mapping Section, para, 1). The mapping process essentially undertakes a ‘stocktaking process’ attempting to identify areas of improvement in course design, thus ensuring the learning, program, and graduate attribute expectations are both congruent and explicit (Bath et al., 2004; Currie et al., 2003; Sumsion & Goodfellow, 2004). The mapping process also identifies if gaps, inconsistencies, or over-concentrations exist within the curriculum. It also provides the potential for cross-curriculum integration, team-teaching opportunities, and, importantly, time for teaching staff to reflect (Jones et al., 2007; Sumsion & Goodfellow, 2004). Thus, this approach provides many benefits to a range of stakeholders such as students, academic teaching staff, industry groups, professional

registration organisations, and accreditation bodies (APAC, 2008; Bath et al., 2004; University of New South Wales, 2008). Other benefits of curriculum mapping include:

- Provides better communication of curriculum requirements between teaching staff
- Exposes students to a range of different learning experiences
- Ensures curriculum remains contemporary
- Provides the capacity to integrate teaching-research nexus
- Encourages students and teaching staff to reflect on teaching, learning, and assessment tasks
- Helps to distinguish between generic and discipline-specific graduate attributes
- Promotes alternative teaching and assessment strategies (Sumsion & Goodfellow, 2004; University of New South Wales, 2008).

A specific benefit of curriculum mapping is the clarity and relevancy it provides students with in their studies. In other words, it clarifies what the student is expected to learn and by what means, which as previously discussed, is one of the core aims of the *constructive alignment theory*. In short, graduate attributes should be made explicit to students (Bath et al., 2004; Jones et al., 2007; Scoufis, 2000; Snoke, 2004). The inclusion of such explicit references, in a sense, provides student ownership and empowerment. This point is affirmed by Scoufis (2000) who notes that “By this means students are alerted to the expectation that they too must take responsibility for the development of these attributes” (para, 9). Therefore, it is recommended that the relevant stakeholder responsible for providing formal accreditation of paramedic programs ensures the *PGAS* and its graduate attributes descriptors are made explicit in university handbooks, program advertising material, and individual unit study guides.

An example of curriculum and graduate attribute mapping is illustrated in Table 7.2. In this example, the graduate attribute ‘Professional Behaviour’ and its seven *PGAS* descriptors are mapped onto a hypothetical unit referred to as PAR1011. To reflect reality, a number of graduate attributes are not embedded in this unit, replicating that not every graduate attribute is likely to be mapped against every unit of study. This process

would be repeated across all units and year levels of the academic program being mapped, either in an arranged large group, or smaller heterogeneous groups, and, as argued previously, would follow the constructive alignment theory first. Clear leadership and delegate roles are required during curriculum mapping and course reviews, ensuring transparent reporting is consistent at all levels of the process. This is particularly important given the likelihood that changes will be made in the curriculum that are likely to lead to subsequent flow-on effects to other courses, such as double degrees or off-campus programs for example (Oliver et al., 2007). Similarly, Lowe and Marshall (2004) confirm that few academics in fact actually talk with colleagues about their teaching practices; further emphasising the need to maintain clear reporting mechanisms.

How graduate attributes are mapped across the curriculum is a matter of choice. This can be undertaken using simple matrices such as illustrated in Table 7.2. Alternatively, a range of sophisticated graduate attribute web-based tools are available for purchase, and are currently being used by individual institutions, some of which automatically link graduate attributes to assessment tasks. Hughes and Barrie (2010) outline some of the limitations of such approaches: “While automation offers a potentially valuable implementation support, and approach that disguises the extent of the assessment effort also risks creating the misleading impression that the assessment of graduate attributes requires little or no change to current practice” (p. 329). For example, Murdoch University has developed the Graduate Attribute Mapping Program (GAMP) (Jones et al., 2007), the Curtin University of Technology has created Curtin’s Mapping Tool (referred to as CCMaP) (Oliver et al., 2010), while the University of Wollongong, the University of Sydney, the University of Technology of Sydney, and Griffith University have purpose-built graduate attribute websites (Griffith University, 2009; Hoban et al., 2004; James et al., 2004; University of Technology of Sydney, 2009; University of Sydney, 2010). The number of published works examining the use of mapping graduate attribute tools in Higher Education is steadily growing (Ballantyne et al., 2004; Lowe & Marshall, 2004; Oliver et al., 2007; Parry & Reynolds, 2010; Scoufis, 2000). This body of work importantly offers the respective stakeholders involved in the paramedic curriculum renewal process a range of options in mapping the defined graduate attributes.

Table 7.1: Example of curriculum and graduate attribute mapping (unit of study only)

Paramedic Graduate Attribute	Unit of Study: PAR1011									
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Graduate Attribute: Professional Behaviour										
A professional paramedic should attempt to attain high clinical status within the health care system			*							
A professional paramedic should integrate population-based care into their practice				*	*					
A professional paramedic should be committed to the discipline										
Be capable of contributing to continuous improvement within the health care system							*	*		
A professional paramedic should embrace social responsibility										
A professional paramedic should be able to apply knowledge of the basic sciences	*	*								
A professional paramedic should have specialist knowledge										

NB: * denotes where graduate attribute is integrated using constructive alignment.

While curriculum mapping offers a range of clear benefits, it is important to also recognise the challenges and limitations associated with undertaking such an exercise. For example, as Oliver et al. (2010) point out, “Curriculum mapping can also be a fearful exercise for academics, particularly if they do not understand, are resistant to change or have a sense of exclusive ownership of content” (p. 2). While undertaking a curriculum or course mapping process is widely supported in the graduate attribute literature (Litchfield et al., 2010), Sumsion and Goodfellow (2004) acknowledge that course mapping is demanding, dynamic, and complex, despite being described otherwise in the graduate attribute literature (Sumsion & Goodfellow, 2004; Uchiyama & Radlin, 2009). Sumsion and Goodfellow (2004) state that, “Our experience with the project to date has convinced us that curriculum mapping is not the straightforward, unproblematic task so often portrayed...” (p. 341). Moreover, the literature reporting the scholarship regarding curriculum mapping of graduate attributes in the Higher Education sector is surprisingly limited, with little guidance concerning the practicalities involved (Lowe & Marshall, 2004; Oliver et al., 2010; Sumsion & Goodfellow, 2004). This point is particularly important and significant for the paramedic discipline as it attempts to address the national shortcomings in standardising its curriculum and overall graduate attribute reform.

In addition to the lack of guidance, a body of knowledge has emerged indicating that curriculum mapping is a complex process that is complicated by factors such as time constraints, staff resistance, cultural change, perceived inadequacy among staff to undertake the process, concerns of an apparent ‘top-down’ approach, and a lack of appropriate staff support (de la Harpe et al., 2000; Jones et al., 2007; Lowe & Marshall, 2004; Oliver et al., 2010; Scoufis, 2000; Sumsion & Goodfellow, 2004). Scoufis (2000) concurs that “Academics face time constraints, large student numbers and reward systems that value research, not teaching. Significantly, many academics may feel uncertain about their own competence” (para, 10). Sumsion and Goodfellow (2004) in a curriculum and graduate attribute mapping exercise involving a Bachelor of Education (Early Childhood) program discovered a range of issues involving staff participation levels. Common problems that were encountered during the process included apathy,

scepticism, lack of commitment, and resentment regarding the extra demands placed on staff (Reynolds & Parry, 2010; Sumsion & Goodfellow, 2004). Another factor involved in the active and passive resistance towards graduate attribute and curriculum renewal efforts might be the casualisation of Australian academic staff (i.e. the move towards many more casual or contract positions instead of permanent tenured staff positions within Higher Education). For example, it is argued that casualisation leads to high levels of staff turn over, which in turn creates reduced morale, and lack of teaching ownership of programs (Kift, 2003). Green et al. (2009) notes, “Ironically, the relatively downtrodden status of casual staff diminishes the power of permanent staff to affect change. Thus, the dilemmas inherent in casualisation fall back on permanent academic staff themselves” (p. 24).

A study by de la Harpe et al. (2000) found similar issues in their curriculum mapping example of a Bachelor of Commerce program. A key finding in this study was the perceived lack of support by teaching staff for the mapping process, which the authors speculated was due to a lack of ‘ownership’ of the process or outcomes. On this point, Oliver et al. (2010) note that the “empowerment of academic teaching staff is vital in curriculum review as they are the principal source of curriculum development” (p. 2). Several approaches have been suggested to assist in overcoming some of these issues: such as academic ‘buy-in’ and the provision of support and opportunities to participate in effective professional development activities for teaching staff (de la Harpe et al., 2000; Litchfield et al., 2010; Oliver et al., 2007; Sumsion & Goodfellow, 2004). Jones et al. (2007) adds that “There is strong evidence that such initiatives [curriculum and graduate attribute renewal] are most successful when implemented by a group who believe that such attributes represent valuable learning outcomes for their graduates” (p. 42). Other suggestions have included maintaining an inclusive and collaborative approach to staff at all times, ensuring that staff are not threatened by the process, or do not perceive the whole process simply as another additional administrative load requirement (de la Harpe et al., 2000; Hoban et al., 2004; Jones et al., 2007; Lowe & Marshall, 2004; Litchfield et al., 2010; Oliver et al., 2010; Reynolds & Parry, 2010; Scoufis, 2000; Sumsion & Goodfellow, 2004). Maintaining an inclusive approach is supported by Sumsion and

Goodfellow (2004) who remark that “Our experience also suggests that for curriculum mapping to be undertaken effectively, recognition of the time demands on all those involved and a commitment to a collegial approach will be required” (p. 342).

This brief overview of curriculum mapping provides some background information for the relevant stakeholder(s) responsible for the curriculum and graduate attribute renewal process for Australian paramedic programs. Surprisingly, the graduate attribute literature presents little evidence or guidance on how to best undertake curriculum mapping processes that lead to integrated graduate attributes. However, to counter the lack of evidence, the implementation of a theoretical framework such as *constructive alignment*, provides the necessary conceptual context (Oliver et al., 2007). As others have argued that without some form of curriculum design theory, curriculum mapping can be isolated and frequently produces non-intended outcomes. Power (1994, cited in Sumsion & Goodfellow, 2004) makes this point: “the very technologies [and processes] of audit may paradoxically achieve the opposite of their intended effect” (p. 342). An area that has received considerable attention in the literature is the notion of staff support, collaboration, and collegiality, without which mapping approaches are likely to be unsuccessful (Sumsion & Goodfellow, 2004). Therefore, careful consideration of how best to support staff through the curriculum mapping processes, and ‘cultural change’ may assist in minimising resentment and scepticism amongst participating staff. Oliver et al. (2010) offer some prudent advice, “Attitudes towards curriculum mapping and pedagogical vocabulary need to be addressed through the mapping process to ensure that staff understand the value and become engaged in the process” (p. 2). Addressing these challenges will be an important element in the overall success of the Australian paramedic curriculum and graduate attribute renewal process.

In review, the second phase of the process is argued that constructively aligning the curricula of the paramedic courses on offer in Australia, combined with a curriculum mapping exercise is likely to benefit the achievement of the desired graduate attributes in our discipline. From here we need to consider whether a nationally agreed upon approach to the delivery of the curriculum will ensure that we not only ‘talk the talk’ but

also ‘walk the walk’. The next section will discuss Phase 3: Curriculum Delivery, outlining the most appropriate and effective T&L methods in articulating the requirements determined by the *constructive alignment theory*.

Phase 3: Curriculum Delivery

According to Green et al. (2009), the majority of Australian universities have yet to devise and implement appropriate T&L approaches for the development of discipline-specific graduate attributes. Green et al. (2009) also note that “Australian universities have yet to ensure an alignment between what is espoused, what is enacted (through curriculum) and what students experience and learn” (p. 18). With this in mind, this section will provide an overview of the *curriculum delivery* phase which is an integral part of the *constructive alignment* process (Kift, 2002), providing the key paramedic stakeholders with potential T&L strategies in the curriculum standardisation and graduate attribute renewal process. As demonstrated by the findings from the national study, the Australian paramedic membership wants graduate attributes to reflect the desired characteristics of contemporary, high quality paramedic practice. Based on these findings this section will argue the following two points. First, to ensure that the graduate attributes are the outcome of paramedic training programs, they have to be embedded as ILOs and assessed as observed learning outcomes (OLOs). Second, to ensure that the graduate attributes are taught in a practical way (i.e. beneficial to the paramedic industry); adopting a problem-based learning (PBL) or case-based learning (CBL) is likely to be the best approach.

The third phase concerns *curriculum delivery*: that is the development and implementation of T&L activities that appropriately address each ILO and graduate attribute. Particularly outcomes are likely to be best served by particular T&L approaches and therefore a range of approaches will be considered because successful graduate attribute reform and initiatives should accept and accommodate curriculum delivery variations and diversity between universities located in different Australian states (Cathcart et al., 2008). With the likelihood of such curricula variations, a key

question that will need to be addressed is how teaching, learning, and curriculum design theory will be relevant to teaching in the paramedic health care discipline. Houghton (2004) remarks:

There is a genuine scholarship behind teaching and learning ... Teaching isn't just a bag of tricks; it helps to know what to do when and why. Some knowledge of this research might help you to help your students learn more effectively, possibly with less effort from you in the long run (p. 3).

In the context of T&L, graduate attributes are complex phenomena that should not be considered as single assessable items that are simply scattered throughout a curriculum (Barrie, 2005; Deakin University, 2010). Hager et al. (2002) advocated that, “such [teaching and learning] strategies should be embedded in the substantive course which leads to the very practice of the capabilities as these find expression through employment” (p. 10). Therefore, developing and employing the most applicable T&L strategies for the paramedic curriculum is critical for the sustainability, employability, and professional needs of the Australian paramedic membership.

Biggs and Tang (2007) propose that the most effective T&L activities tend to have similar core pedagogical characteristics in attempting to address the ILOs such as:

- Authentic learning activities
- Appropriate student motivation contexts
- Provision of timely formative feedback, and
- Opportunities for self-reflection.

Biggs and Tang (2007) further emphasise, “There is no ‘best’ all-purpose teaching method: what is ‘best’ depends on what ILO is being addressed and, at the practical level, on what are the available resources” (p. 91). To facilitate the acquisition of graduate attributes, teaching practices are required to negotiate the inherent complexities of the curriculum renewal process that meet the requirements of each specific institution (Green et al., 2009).

Bowden et al. (2000) outlined a range of challenges to T&L, and integrating graduate attributes. Some of these challenges are similar to those outlined in the curriculum mapping and curriculum renewal process described earlier. These included ensuring the graduate attributes were codified in an explicit and meaningful way to students and academic staff, and the provision of ongoing communication between all those involved in the curriculum renewal process (Bowden et al., 2000). Ensuring academic involvement, collaboration, and agreement in developing T&L activities is crucial when integrating graduate attributes into the curriculum, particularly when there is ‘academic ownership’ of curriculum content, and the potential for ‘academic resistance’ (Lichfield et al., 2010). Teaching and learning approaches that are outcomes-based are considered appropriate teaching methodologies for the paramedic graduate attribute and curriculum renewal process since they offer authentic learning opportunities (Barrie et al., 2009b). This point is supported by Bowden et al. (2000) who note that, “Graduate attributes are most readily developed within authentic learning environments” (The Challenge to Teaching and Learning, para, 1). The notion of authentic learning environments in paramedics will be explored next in more detail.

Teaching and Learning Approaches for the Paramedic Discipline

Biggs and Tang (2007) contend there are two broad methods of educating students in Higher Education. First, and by far the most common, is the development and ‘build-up’ of declarative knowledge through the traditional format of lectures and tutorials, followed by formal examinations such as norm-referenced multiple-choice tests and exams requiring written answers. The second, less common model that is steadily gaining momentum across many cognate and non-cognate disciplines is referred to as ‘just-in-time learning’ (Biggs & Tang, 2007). In this model, declarative knowledge is not delivered via the traditional lecture and tutorial format, but instead is developed through problems to be solved by students where knowledge to be acquired is defined by the nature of the problem, scenario, or case students are required to work through (Walsh, 2007). In other words, declarative knowledge is developed as the need arises, not simply delivered in a one-way knowledge transmission from the expert to the novice learner

(Biggs & Tang, 2007). Called variously problem-based learning, case-based learning, scenario-based learning, the acronym PBL will be used to refer to generic outcomes-based situational learning.

Prima facie, PBL appears best suited to the paramedic discipline, and seems to be the most efficacious for integration in the *constructive alignment process* across all paramedic programs for three primary reasons. Firstly, evidence indicates that graduate attributes should be embedded into T&L activities that are based on active and authentic approaches such as PBL (Hager et al., 2002). Secondly, paramedic practice (as other health care disciplines) is context-based, requiring professional knowledge that can be translated immediately as professional practice. Therefore, ensuring learning is as authentic as possible (which are central pillars of PBL and rooted in paramedic practice) is crucial in the promotion of learning. This is particularly important as responsibilities and interdisciplinary and interprofessional roles are evolving and changing. This aligns with the proposed *Transdisciplinary Paramedic Stage* described in Chapters 1 and 2. PBL encourages independent learning which is argued to provide students with the necessary skills as work-related conditions and contexts rapidly change (Walsh, 2007). Walsh (2007, citing Biggs, 2003) remarks that “PBL reflects the way people learn in real life; they simply get on with solving the problems life puts before them with whatever resources are to hand” (p. 84). Thirdly, the use of PBL offers inherent alignment qualities from the outset, particularly as ILOs are linked and outcomes-focused with each problem or case. Biggs (1999b) comments further that:

Problem-based learning is alignment itself. The objectives are to get students to solve problems they will meet in their professional careers – the teaching method is to present them with problems to solve; the assessment is based on how well they solve them (p. 71).

With these qualities PBL has the potential to make the curriculum and graduate attribute renewal process less complex and more efficient, while simultaneously ensuring maximum consistency throughout the T&L process. Strong empirical evidence also supports the use of PBL in medical and health care related professional education

(Albanese & Mitchell, 1993; Colliver, 2000; Dochy, Van den Bossche, & Gijbels, 2003). Dolmans, Wolfhagen, and van der Vleuten (2001) also note that the “studies conducted so far provide empirical evidence that PBL enhances intrinsic motivation in subject matter and is more enjoyable” (p. 886). For these reasons, the main focus of the Phase 3: Curriculum Delivery section will be on PBL, bearing in mind that it is important to draw attention to other T&L approaches such as peer-teaching, jigsaw groups, and learning cells as other available options for teaching staff to utilise (Biggs & Tang, 2007).

As explained earlier, constructive alignment provides a framework for students to internalise knowledge and skills in a self-directed and motivated fashion (Biggs & Tang, 2007; Reaburn et al., 2009). Referring specifically to adult learning principles Reaburn et al. (2009) add that the “approach facilitates active student engagement in authentic learning activities that are designed to achieve desired learning outcomes and assessed in terms of what students can do, rather than the ‘declarative knowledge’ or knowing about something they can recite or write” (p. 821). An important element in motivating students’ learning is the assumption that students must first understand the task, and second, must view the task as worthwhile and achievable (Biggs & Tang, 2007). Therefore, incorporating problems that are based on authentic cases that reflect contemporary professional practice are likely to be seen as ‘worthy’ of learning by students, and thus are likely to engage and motivate students’ learning. Moreover, it is argued that if student-centred approaches such as PBL are implemented, students are more likely to be able to identify their own learning needs and deficiencies, and able to make better use of learning resources (Spronken-Smith, 2005). It is also suggested that the use of PBL approaches facilitates a deeper type of integrated learning rather than a superficial grasp of knowledge (Biggs & Tang, 2007).

As noted by Hinchliffe (2006) graduate attribute acquisition is developmental in nature Hinchliffe suggests that a “more realistic concept of employability would involve the recognition that graduates cannot possibly have all the knowledge, skills and abilities that are required of them” (p. 100). Therefore, it is important that the T&L activities are appropriately matched with student capacity levels. For example, can (or should) the

attribute of critical thinking be achieved by first year undergraduates or by second year students? This point is also considered by the Australian Psychology Accreditation Council (2008) in the development of six graduate attributes for Australian undergraduate psychology programs, who affirm that the “comprehensiveness of the attributes and learning outcomes is not intended to imply that individual courses, should, or even could, support the full development of all six attributes” (p. 6). If the point is correct, it raises further questions regarding the importance of clinical placement education (or work-integrated learning) and training both in terms of *constructive alignment* and graduate attribute acquisition. Moreover, this further supports the need to include teaching and approaches of learning into the *constructive alignment* design and not just added as a ‘bolt-on’ to the curriculum, or left entirely to the individual teacher – given that it is a base line strategy rather than appropriate obligation on practice. The importance of clinical placement education is also noted by Morgan, Orr, and Mah (2010) who claim that:

As training programs strive to help students develop these attributes, it will be important to recall that not every attribute requires a course to attain it. Indeed, some of the most important competencies [attributes] delineated are ones that can be developed only through interactions with the system and work experience (p. 81).

According to Barrie (2007) there is a direct association between learning-centred approaches and producing high-quality student learning outcomes. If this is so, implementing T&L approaches and developing appropriate associated activities is argued to produce learning outcomes that are transformative as graduate attributes (Barrie, 2007b; Biggs & Tang, 2007). Graduate attributes can be developed through T&L activities where students are engaged in learning that is only context-based and depend on a range of activities including activities such as group tutorials, structured discussions, peer-assisted learning and student-based projects. Jones (2009) in her doctoral studies found that graduate attributes are highly dependent on context and are directly informed by a discipline’s epistemology. Students acquire skills such as problem-solving and team work in situations that are authentic and diverse (Bowden et al., 2000).

Kember (2008) observes that although it is “a very common model of university teaching – a professor lecturing to students who sit listening does not provide practise in the generic capabilities [attributes]” (p. 53). Evidence suggests that graduate attribute uptake is better when students are placed in learning environments that require them to actively participate in T&L activities, such as PBL (Kember, 2008). Bowden et al. (2000) also endorse this point noting that “Authentic learning environments foster a personal responsibility for learning. They link experience, previous understanding and new knowledge in a way that is readily apparent to the learner. They also simulate situations in which students may ultimately be employed” (The Commitment of the Teaching Team Section, para, 5). These types of learning settings are intrinsically more effective than the passive transfer of knowledge from expert to novice (didactic lecturing). Biggs and Tang (2007) who claim that “Knowledge is constructed through learner activity and interaction” (p. 102). The next section will explore the process of PBL in more detail and how it can be applied in the *constructive alignment* process and integrated across paramedic programs nationally.

Teaching and Learning Approaches: PBL

Problem-based learning is a T&L approach commonly used by paramedic programs across Australia. In recent times, there has been a paradigm shift in curriculum reform about how best to teach students in Higher Education contexts. This has been caused in part by increased competitiveness between institutions, by changing student demographics (i.e. digital generations and technology savvy students), rapidly changing educational technologies, and also the widening knowledge base gap among professional disciplines (Savin-Baden, 2000). Research by Kift (2002) suggests learning that takes place in small group settings is more effective at developing graduate attributes than traditional approaches to education, such as lectures (Green et al., 2009). Since the development of the landmark PBL program at McMaster University in 1969, there has been a widespread move towards constructively-driven and student-centred learning approaches such as PBL which are widely cited in the Higher Education and health care education literature (Dochy et al., 2003; Donner & Bickley, 1990; Gijbels, Dochy, Van

den Bossche, & Segers, 2005; Nandi, Chan, Chan, Chan, & Chan, 2000; Spronken-Smith, 2005; Savin-Baden, 2000; Vernon & Blake, 1993).

Spronken-Smith (2005) highlighted additional reasons for PBL implementation: “Another pedagogical reason for adopting a PBL approach is the suggestion that collaborative inquiry approaches such as PBL serve to strengthen the links between teaching and research – something that is often sought in the university environment” (p. 206). Another important reason for its use is the capacity for sharing knowledge, skills, and attitudes with students from other professions in the form of interprofessional learning and collaborative practice. The PBL approach is ideal for developing students’ understanding of how other professions undertake similar tasks (Savin-Baden, 2000). Other authors emphasise the importance that PBL plays in the establishment, development, and assessment of graduate attributes, such as critical thinking, problem-solving, teamwork, and communication skills (Major & Palmer, 2001; Savin-Baden, 2000). The applicability of PBL for graduate attribute development is also noted by Savin-Baden (2000) who asserts that “the advantage which problem-based learning offers is the development of such skills [attributes] in a learning environment where they are part of a wider learning community” (p. 13).

Although PBL is the most commonly used T&L approach in Australian paramedic programs (Williams, 2009), very few Australian universities promote a standardised approach to T&L (Carroll, 2004). To some extent this can be seen to highlight a gap in the Higher Education sector. Hughes and Barrie (2010) state, “Though outcomes-based approaches to curriculum have been responsible for a shift of focus to the assessment of student learning as a more valid demonstration of graduate attribute achievement, these data are still rarely included in institutional quality assurance processes” (p. 331). This is in part because the PBL approach has resulted in a wide array of T&L environments. Spronken-Smith (2005, citing Macdonald, 2001) adds, “PBL, despite its large number of sometimes over-zealous and even evangelical converts, has almost as many forms as places where it is used” (p. 204).

The PBL approach is based on the theory of constructivism (Savin-Baden, 2004; Tang, Lai, Arthur, & Leung, 1999). Walsh (2007) notes that “In using the term ‘constructive’ Biggs emphasizes that any learning/meaning is constructed by the student in the course of their learning experience; learning is a product of the student’s activities and experiences, rather than the tutor’s” (p. 80). While constructivism comprises various forms (Spronken-Smith, 2005, citing Macdonald, 2001), the common feature is the way the learner’s activity informs and creates new knowledge (Biggs, 1996a; 1996b). “Constructivism has a long history in cognitive psychology, and is rapidly becoming the dominant espoused theory in education; it remains, however, to see it as a common theory-in-use in higher education” (Biggs, 1996b, p. 348). The outcome of constructivism is that the learner acquires knowledge and actively constructs this knowledge through active high-level learning approaches, thereby constructing new knowledge based on previous understandings and experiences both individually and socially (Biggs, 1999b; Tang et al., 1999). Biggs (1996a) also makes it clear that the “learner brings an accumulation of assumptions, motives, intentions, and previous knowledge that envelopes every teaching/learning situation” (p. 348). These points are especially relevant to the paramedic discipline, particularly given the number of conversion-degrees (i.e. Double-Degree (Nursing/Paramedics), Graduate Diploma, and Graduate Entry Masters) for other health care professionals who bring varied and diverse backgrounds into the paramedic discipline (Sheather, 2009).

The basis of the PBL conceptual frameworks allows the students to discover learning that is meaningful to them whilst constructing and then integrating new information based on new structures and resources provided by the teacher. The learning environment promotes independent learning for students and allows teachers to encourage students to take responsibility for the learning (Williams, 2009). It also shifts direct responsibility onto the teachers, who now should take an active role in listening, not interrupting, and providing sound advice with learning resources. The teacher/lecturer/tutor is required to shed the role of director, instructor, controller, and content expert, but instead assumes the role of guide, demonstrator, facilitator, and promoter.

In a clinical sense, the objectives of PBL introduce students to patients via a narrative designed to encourage small group discussion. This process allows consolidation and integration of learning activities both within each week and between weeks/semesters/year levels. Finally, PBL encourages the application of acquired knowledge, active learning attitudes, and skills to clinical situations. Bowen (1998) adds that “Case-based learning (CBL) also is student-centred and interactive; however, students use previously acquired knowledge to solve problems that are designed to mimic future professional practice” (p. 253). The PBL process is designed to encourage an increased search for independent knowledge, active learning, self-motivation, self-directedness, self-discovery, and student-centred enquiry processes (Spronken-Smith, 2005; Tang et al., 1999). This material should be meaningful to their learning needs while allowing them to construct new information and establishing social learning interactions with fellow students and teaching staff (Major & Palmer, 2001).

The pedagogic processes of PBL rely on student-to-student and student-to-staff interactions. This enables them to listen to each others’ views, think analytically and provide constructive criticism based upon their own experiences in order to develop answers or solutions to the problem. The trait of self-directedness is seen as a critical component in the PBL process. Tang et al. (1999) remark that it “is through this self-directed learning that students in a PBL curriculum construct their own understanding and meaning, and generate new knowledge in the subject content” (p. 207).

Despite the variations in PBL, the approaches fundamentally require students to recall previously acquired knowledge to solve problems that are rooted in contemporary professional practice, plus identify knowledge gaps. Walsh (2007, citing Biggs, 2003) notes that “PBL-taught students think differently from traditionally taught students; they have less declarative knowledge, but use what they have with richer reasoning chains; they have great self-awareness and self-direction” (p. 85). The various manifestations of PBL form the basis to curriculum by the careful selection of problems or cases, ensuring the appropriate breadth of learning content is achieved within the constructive alignment framework (Juwah, 2002). Other benefits of these approaches is the development of

generic and discipline-specific graduate attributes, such as self-directed learning, lifelong learning, focus on communication, interpersonal and teamwork skills, integrated professional learning, and movement towards self- and peer-based assessment (Savin-Baden, 2000; Spronken-Smith, 2005; Juwah, 2002).

Traditionally, Higher Education teaching practices focused on teacher-centred approaches where academic expert teachers were transmitters of knowledge to novice or neophyte learners (Walsh, 2007). These teaching approaches usually included didactic lectures or elements of Socratic teaching principles, whereby the common student activity is passively *receiving* information in isolation instead of actively engaging with the learning process. Biggs (1996a) identified that the “real problem with lecturing is that it is normally low on student activity; the student is passive, precisely in the sense that a narrow range of learning related activities is usually elicited” (p. 353). The challenge currently facing many disciplines in Higher Education is the notion of passive learning, in part, due to the traditional use of the didactic-style lecture formats which are often defined and imposed by rigid contact hours and large class sizes (Biggs, 1996a, 1996b). However, the large class sizes now evident across many disciplines, does not automatically imply that teachers revert to didactic approaches, or simply see no other option but to lecture to students. Biggs (1999b) points out that a “lecture can easily be turned into a session in which the student is also an active participant” (p. 67). Therefore, selecting the most appropriate T&L activity regardless of class size, such as self-directed, student-centred, or inquiry-based, has the potential to narrow the gap between deep and passive learning while simultaneously promoting interaction, formative feedback, and high-level learning amongst students (Biggs & Tang, 2007). Biggs (1999b) claims that “Class size, although constraining, is no reason to abandon the principle of alignment” (p. 67).

However, in more recent times, the concept of student-driven or student-centred approaches has developed and emerged in the Higher Education, medical and health care literature, in part due to the application of educational theories such as cognitive and social constructivism (Biggs, 1996a, 1996b). In student-centred approaches, the focal

point is on students' learning based on previous life experiences and social learning interactions through small group-based settings, and less on the traditional didactic styles of teaching whereby teachers are simply knowledge dispensers. Biggs (1999b) also observes that "Student-focused strategies see the focus as being on bringing about conceptual change in students' understanding of the world, and it is what students do to achieve understanding that is important, not what teachers do" (p. 61). A student-focused perspective is one way of accommodating a range of learning approaches. For example, collaborative and situated learning, constructivism, and learning communities of practice (Barrie & Prosser, 2003) can replace the traditional didactic lecture format, reinforcing the content being taught and assessed specific to the profession and its body of knowledge. Interestingly, the benefits are not just for students as Biggs (1999b) argues that the educational theory of constructivism is most useful for teachers, as it provides a theoretical framework that best represents and easily translates into professional practice. The literature suggests that as a T&L approach, PBL blends constructive alignment with the achievement of graduate attributes in a purposeful and transparent manner. However, there are challenges in its implementation that require consideration. Some of these challenges will be briefly discussed.

PBL: What are the challenges?

Despite the widespread implementation and support for PBL throughout the Higher Education sector, like most pedagogical applications when first introduced, a range of issues and challenges become apparent that require consideration. These challenges and resistance were illustrated in the recent unsuccessful attempts at changing the curriculum to PBL at the Otago Medical School in New Zealand (Maudsley, 1999). Albanese and Mitchell (1993) pose the question that should be dealt with by the relevant paramedic stakeholders if approaches such as PBL are implemented: "Stated bluntly, if problem-based learning is simply another route to achieving the same product, why bother with the expense and effort of undertaking a painful curriculum revision" (p. 56). Largely, the main challenges stem around specific student learning interactions, the costs associated with PBL, changes to the positioning of teaching roles, and the debate comparing PBL

with conventional lecture-based methods. Each of these will be briefly discussed in an attempt to illustrate the potential challenges in the implementation of PBL.

It is important to note that small group learning activities, such as those used in PBL, can produce environments that are associated with disruptive and ineffective learning amongst students (Nandi et al., 2000). A range of issues causing ineffective learning opportunities have been cited in the literature; including free-loading, social loafing, argumentative, personality clashes, and attempts at taking over or dominating group learning (Dolmans, De Grave, Wolfhagen, & van der Vleuten, 2005; Dolmans et al., 2001). In a study examining Australian paramedic students' attitudes towards PBL over a three-year period, findings suggested elements of free-loading and take-over were also evident in PBL small groups, which were viewed by students as counteractive in the learning process (Williams, 2009). In another study involving medical students in Hong Kong using PBL and conventional teaching modes, the authors found conventional curriculum students were more positive compared with PBL students regarding student interactions in class. Additional results also indicated that PBL students tended to develop factions within their respective PBL groups (Nandi et al., 2000); suggesting small group learning has inherent risks which require close attention. It is the role of the PBL group facilitator or tutor to deal with these situations before they get out of hand or to the level where they are disruptive to the learning process. As part of the PBL group process, peers should also be prepared to provide constructive suggestions (also referred to as 'establishing group rules') that will help minimise group disruption. However, it is also relevant to note that the potential challenges students face in PBL groups also mirror the reality of many employment contexts where individuals from similar and different disciplines are expected to collaborate on joint tasks and projects.

The various manifestations of PBL are resource intensive and more expensive to run than traditional lecture-tutorial formats, particularly when cohort sizes are larger than 100 (Albanese & Mitchell, 1993). Spronken-Smith (2005) also notes that the "use of a PBL approach brings with it a cost in terms of extra resources" (p. 213). One solution in reducing financial expenditure is the allocation of one tutor for every two or three groups

(Spronken-Smith, 2005). While this has obvious financial benefits, there are associated and additional T&L benefits; for example, because tutors have to manage multiple groups they are less likely to take-over groups, since they have to move between groups, thus providing minimal expert advice and allowing students to manage the PBL processes themselves. Albanese (2000) argues that the financial cost involved with PBL is worth the investment in achieving a more harmonious and enjoyable learning environment for students and teaching staff. Interestingly, a feasibility and costing study completed by Donner and Bickley (1990) comparing PBL with conventional curriculum found that hidden costs associated with conventional lecture-based curriculum are not necessarily as cost-effective as first thought. They concluded that PBL programs with less than 100 students are financially feasible (Donner & Bickley, 1990).

The positioning of teaching roles and identity in PBL-based curriculum delivery appears to be one of the biggest challenges given the ideological change and transformation that are likely to be required of traditional teachers, tutors, and instructors. By using student-centred approaches, it is suggested that teachers should re-define their roles from experts or authorities to facilitators, guides, critical friends, or co-learners (Maudsley, 1999; Walsh, 2007). Although this does raise questions surrounding the notion of threatening academic identities. Walsh (2007) states that this “provides something of a contrast to what has been a dominant view of teaching in higher education: that the ‘expert’ lecturer delivers knowledge to the ‘novice’ student” (p. 79). The ideal of tutor take-over and adoption of ‘expert’ status by teachers has a large body of literature (Gilkison, 2003; Hendry, Phan, Lyon, & Gordon, 2002; Maudsley, 1999), reflecting its complexity and importance in PBL. The changing role of teacher from expert to non-expert facilitator is succinctly noted by Scoufis (2000) who asserts that such “a shift in the role of the academic from that of content expert to facilitator of learning requires significant changes to other curricula to support the development of these attributes at a time when academics are under considerable pressure” (para, 10). Maudsley (1999) argues that a range of specific teacher or tutor traits are required for PBL settings, such as the ability to provide thoughtful comments without imparting facts, and the promotion of active listening, self-

directed learning, collaboration, and respect for other learners. Again, these appear to be consistent with the T&L values of *constructive alignment*.

Another challenge in implementing and integrating PBL across units of study is the longstanding argument that PBL approaches do not cover the same content and have different learning effects compared with conventional modes of teaching (Gijbels et al., 2005; Savin-Baden, 2000). To counter this argument, Biggs (1999b) made the following remarks:

In PBL, the problems are carefully selected so that, by the end of the program, the learner is expected to cover much of the same content as is covered in a traditional program, but the nature of the knowledge so gained is different (p. 67).

Many authors also echo Biggs' view about the quality of learning being the most important element in PBL (Savin-Baden, 2000), which is reflected in a large body of knowledge examining this question more closely. Multiple meta-analyses and systematic reviews have investigated the effects of PBL compared to conventional modes of teaching (Gijbels et al., 2005), although some have raised the issue of difficulty in comparing the two modes (Albanese, 2000; Donner & Bickley, 1990). Overall the literature suggests that the PBL process is more motivating, enjoyable, and challenging for both students and teaching staff alike (Albanese, 2000; Colliver, 2000; Gijbels et al., 2005; Kaufman & Mann, 1999; Savin-Baden, 2000). In addition, PBL students perform equally, and sometimes better on clinical examinations and have less knowledge and skill decay post graduation (Nandi et al., 2000). Kaufman and Mann (1999) claim that "it appears generally that PBL students may acquire less factual knowledge; however, the retention rate of knowledge is higher, and rate of decay lower than among conventional curriculum students" (p. 247). However, the literature suggests that PBL students tend to score less on the basic science examinations, and there have been arguments that strong convincing evidence does not exist that PBL improves clinical foundation knowledge (Colliver, 2000; Gijbels et al., 2005). On this point Albanese (2000) counters that "Even if knowledge acquisition and clinical skills are not improved by PBL, the enhanced work

environment for students and faculty that has been consistently found with PBL is a worthwhile goal” (p. 729). It is also suggested that PBL students place less emphasis on rote learning and memorisation and employ learning characteristics such as self-directedness and greater attention when seeking out new information, using a ‘backward-directed’ hypothetico-deductive approach to learning (Nandi et al., 2000). As outlined earlier, according to Biggs (2003) these characteristics are key elements in the constructive alignment model, further supporting the natural alignment between PBL and *constructive alignment*. Nandi et al. (2000) remarked that “Students in problem-based learning programs place more emphasis on meaning (understanding) than reproduction (rote learning and memory); the opposite pattern prevails among students in traditional programs” (p. 302).

This section has described Phase 3: Curriculum Delivery in the constructive alignment process, endorsing the pedagogical T&L approach of PBL. While many T&L approaches are available, it is suggested that approaches such as PBL are best suited to the *constructive alignment* model since they are inherently linked, and routinely develop graduate attributes such as teamwork, communication, and problem-solving skills. In addition to these advantages, PBL approaches also appear to be the most applicable for the needs of the paramedic discipline in developing, facilitating, and generalising knowledge, skills, and attributes to the clinical environment. If PBL is the T&L approach embraced by the paramedic discipline, careful consideration needs to be given to the type or variation of PBL, particularly as a range of challenges have been raised in the literature including student interactions, cost and feasibility, comparisons with traditional modes of curriculum, and changing roles of teaching staff. Adequately addressing each of these challenges will be an important part in the overall success of Australian paramedic curriculum and graduate attribute renewal and the *constructive alignment* process. The next section will now describe Phase 4: Assessment and the final element in the *constructive alignment* process.

Phase 4: Assessment

The final phase in the proposed four-phase framework is *Assessment*. As outlined previously, each element of the *constructive alignment* process is equally important and reliant on each other to ensure alignment is maintained and individual graduate attributes are embedded in the curriculum. However, the most difficult and challenging element in the *constructive alignment* process is assessment (Biggs & Tang, 2007). Despite the associated complexities of assessment, Treleaven and Voola (2008) nonetheless note that “the alignment of assessment with graduate attribute development is demonstrably a way forward” (p. 163). Where assessment is not aligned with ILOs and T&L activities, and where it encourages memorisation-related activities and surface learning techniques observed outcomes tend to be of a lower order (Biggs & Tang, 1997; Harvey & Kamvounias, 2008; Tang et al., 1999). The difficulties and challenges associated with assessment strategies are due often to inherent institutional and regulatory requirements, large class sizes, inflexible timetables, reduced teaching spaces, and time-honoured assessment traditions (Barrie et al., 2009c; Biggs, 1996b; Biggs & Tang, 2007). To an extent some of these barriers are simply long-established traditions, which as Hughes and Barrie (2010) note “remain unquestioned and unchallenged because of their long association with particular disciplines” (p. 330).

This section will provide an outline of the different types of assessment strategies that are most applicable for the *constructive alignment* process, and provide possible solutions to ensure the paramedic graduate attribute ILOs are appropriately assessed as OLOs using assessment approaches that are the most efficient for current paramedic programs in Australia. As argued in the previous phase, no single T&L approach is deemed ‘best’ (Biggs & Tang, 2007). Similarly, no solitary assessment strategy is considered the ‘best’ for all academic programs. With this in mind, curriculum designers and those commissioned with curriculum and graduate attribute reform in each paramedic program need to gauge each course and unit of study on a case-by-case basis to ensure the generic and discipline-specific graduate attributes are assessed. In other words, an oral defence as an assessment item may not be appropriate for a unit of study that demands declarative knowledge, but might be appropriate for functioning knowledge. Likewise, portfolio

assessment activities may not be feasible when class sizes are large, or units of study are modularised.

Because there are multiple assessment activities available for programs and units of study, it is not possible to explore each assessment option in each individual context. Rather, a number of assessment approaches that are commonly used in PBL processes will be examined in more detail because these generally have application in Australian paramedic programs. As was asserted in Phase 3, these types of T&L approaches are most effective when they are constructively aligned. As the most common teaching approach in paramedic courses, they also have the potential to be a key component in curriculum and graduate attribute reform in Australian paramedic programs.

Assessment of Graduate Attributes in Higher Education

Any course or program that is constructively aligned will have a battery of assessment activities and opportunities planned and organised in all its subjects, tied to its learning objectives and driving its T&L strategies (Bowden et al., 2000). The recent National Graduate Attribute Project, commissioned by the Australian Learning and Teaching Council, re-affirmed earlier claims that assessment was one of the key factors in the success of graduate attribute reform (Hughes & Barrie, 2010). Despite the importance of assessment, it is also noted by Hughes and Barrie (2010) that “the assessment of learning outcomes in general, and of graduate attributes in particular, is a complex and challenging undertaking and one that has often met with limited success” (p. 326).

Reliable alignment of graduate attributes with assessment tasks is, as yet, not a widespread phenomenon in Australian universities, most likely because assessment is considered one of the most challenging aspects of the T&L process (Barrie et al., 2009c; Biggs & Tang, 2007; Chalmers & Thomson, 2008; Radloff, de la Harpe, Dalton, Thomas, & Lawson, 2008; Thompson, 2007). Other causes of this ‘implementation gap’ might include i) confusion about how graduate attributes are defined and perceived by academics (Barrie, 2004a); ii) some graduate attributes not being able to be assessed in the curriculum; and iii) because students not being able to see the link between learning

objectives and assessments without some form of alignment (Harvey & Kamvounias, 2008; Kamvounias & Thompson, 2008). Radloff et al. (2008) make the following observations regarding the complexities relating to graduate attributes and assessment in Higher Education:

Therefore, the task of designing and implementing assessment activities related to graduate attributes is often the point at which issues about embedding graduate attributes come to the fore, that is, the task of assessing attributes is the litmus test of academic staff beliefs about learning and teaching and what they value as the outcomes of their teaching (para, 6).

This issue, however, is not just isolated to the Higher Education sector. Similar challenges in implementing reliable assessment and reporting of graduate attributes has also plagued the vocational education and training (VET) sector (Cummings et al., 1997). Despite ongoing attempts at developing sustainable approaches, Cummings et al. (1997) note that, “the lack of good assessment methods and reporting is considered to be a weakness of the key competency culture” (p. 228). Since this is an ongoing issue across different educational sectors, it has ramifications for the paramedic discipline, principally because some Australian paramedic programs currently cross the VET and Higher Education boundaries.

Choosing the most appropriate assessment approach is critical in demonstrating to prospective employers that students graduating from a particular university have the necessary graduate attributes that are espoused by that institution (Cummings et al., 1997). In addition, Cummings (1998) notes that “assessment should measure the extent to which universities contribute to a student’s generic attributes and produce the graduates they aim to produce” (p. 87). There must be a direct and explicit link between the assessments and graduate attributes (Scanlon, 2006), particularly as student learning and curriculum is often defined and driven by assessment (Biggs & Tang, 2007; Ramsden, 1992). Mutually, Biggs and Tang (2007), Kamvounias and Thompson (2008), and Norton (2004) make the observation that, given the importance students place on assessment, it can inherently act as a ‘fulcrum of engagement’ and encourage students to

actively engage with learning and assessment tasks. Kember (2009) adds, “If students are to develop intellectual capabilities through practising them, the assessment, therefore, should require them to deploy the capabilities to complete the assignments” (p. 47). This point was also identified in a study by Leggett et al. (2004) who found that the perceived importance of learning material (as rated by students) was explained directly by the assessment tasks that were set.

If it is accepted that learning is driven and often defined by assessment, then in order to achieve high-quality learning and high-order graduate attributes appropriately defined high-quality and high-level assessment activities should be developed simultaneously (Biggs, 1996b). Barrie et al. (2009b) suggest this is not currently taking place, noting that the assessment of graduate attributes is an area that has seen little reflection of the changes taking place in other areas of curriculum design and development. However, its importance in curriculum and graduate attribute renewal initiatives is emphasised by Barrie et al. (2009c) who claim that, “Despite the inherent challenges, improving assessment is a key focus of many current GA [graduate attributes] implementation initiatives in Australian universities” (p. 14). Addressing these challenges has the capacity to prevent the temptation for universities to assess graduate attributes as ‘stand-alone’ units of study, which is currently a widespread occurrence in Australia (Barrie et al., 2009c).

The most appropriate assessment activities to ensure the alignment of graduate attributes are those based on the principles of self-directed learning, self-motivation, and situated learning (Gibbins & Brodie, 2006; Green et al., 2009; Kift, 2002; Willey & Gardner, 2008), each of which are the characteristics mirrored in PBL. Again, this emphasises the inherent alignment between the two issues. One of the key elements in Biggs’ *constructive alignment* theory is that the ILOs are designed to guide students to develop their understanding, rather than simply declaring what they need to understand in an assessment activity such as written or multiple-choice exams (Norton, 2004). Biggs and Tang (1997) put it another way: “Verbs denoted as desirable in the objectives may not be engaged by students unless the same verbs are embedded in the assessment tasks” (p. 81).

Despite the calls to integrate alternative assessments modes, Green et al. (2009) note that, "...many academic staff continue to employ inappropriate, teacher-centred, content focused strategies in their classrooms, which in turn lead to poorer graduate outcomes for their students" (p.22). Traditionally, exams have been the central assessment approach in Higher Education, even though educational evidence suggests this type of assessment promotes surface, passive, and non-transformative learning (Biggs & Tang, 2007; Norton, 2004).

PBL and assessment

An example of aligning T&L approaches to assessment is the use of problem-based assessment strategies (Bartetzko, 2004). The use of such strategies has the capacity to assess the students' knowledge and understanding of the problem, while also assessing problem-solving, communication, and teamwork skills, all of which need to be performed during a PBL task with fellow learners. This capacity to naturally develop generic graduate attributes further supports the natural alignment that problem-based teaching and learning approaches bring to assessment strategies and *constructive alignment* in general (Stojcevski & Du, 2008).

It is unsurprising that despite the advantages of PBL assessment is its weakest link (Tang et al., 1999). Savin-Baden (2004) notes: "Assessment currently appears to be one of the most controversial concerns in problem-based learning (PBL)" (p. 223). One possible reason assessment is not as successful as it ought to be is the use of traditional assessment tasks (product-based) rather than self- and peer-based assessments (process-based), which are simply a continuation of the T&L process and fundamental in the development and achievement of functioning knowledge (Biggs & Tang, 2007; Norton, 2004).

An example of this misalignment and inability to integrate process-based assessment is illustrated in Savin-Baden's (2004) study that examined assessment in a PBL context across four disparate disciplines. Findings from this study indicated that students undertaking PBL programs frequently felt that overly complex assessment criteria often disempowered their learning in PBL tutorials, and their learning that took place during

PBL sessions was decontextualised and unrewarded. Notwithstanding the issues surrounding assessment in PBL, one assessment strategy that has been purported to strengthen the assessment link in PBL, whilst also strengthening the *constructive alignment* process, is the use of portfolio assessments (Gibbings & Brodie, 2006; Tang et al., 1999) which will be discussed below.

The assessment of discipline-specific graduate attributes, wherever possible, should include activities that are based on authentic and contextualised tasks (Hughes & Barrie, 2010). Despite the call for contextualising assessment activities, little debate in the literature on this point is featured, and in some way might explain why assessment in PBL and graduate attribute reform is considered patchy (Bartetzko, 2004; Savin-Baden, 2004). This inconsistency is emphasised by Savin-Baden (2004) who notes, "... what continually undermines such learning are the assessment processes which at worst are surveillance games" (p. 225).

The following section will outline several different non-traditional assessment strategies, such as self- and peer-based assessment and portfolio-based assessment that are naturally aligned and commonly used in PBL.

Non-traditional assessment strategies

A growing body of knowledge supports the use of non-traditional assessment strategies in the development of graduate attributes (Kamvounias & Thompson, 2008; Smith & Bath, 2006; Stojcevski & Du, 2008; Thompson & McGregor, 2009). Some of this evidence relates to the rapidly changing workforce and need for graduates to have the ability to *apply* knowledge which traditional assessment strategies often poorly facilitate (Love & Cooper, 2004). Despite this support, a range of economic, political, and social factors are providing barriers to adopting non-conventional forms of assessment (Harvey & Kamvounias, 2008). Biggs (1996a) succinctly outlines the assessment state-of-play facing all Higher Education institutions:

Economic rationalism means larger classes, which in conventional thinking means more lecturing and more final exams, especially multiple-choice, rather than coursework and assignments or other formats that are time-consuming to mark; it need not be so, but it is easy to think that it must (p. 361).

The ongoing lack of curriculum design theory exacerbates the problems with assessment. *Constructive alignment* advocates a range of assessment techniques that generates a realistic assessment profile of a graduate's capabilities. Cummings et al. (1997) make the following observation, "There has been little research into the process of assessing and reporting on generic qualities and even less experience in practice" (Cummings et al., 1997, p. 227). Biggs (1996b; 2003), Biggs and Tang (2007) and Reaburn et al. (2009) emphasise that *constructive alignment* requires performance-based assessment that is reflective, self-directed, and task-orientated. In addition to performance-based assessment is the application of self- and peer-based assessment criteria, which includes personalised assessment activities such as peer project work, case study presentations, diaries, debates, and reflective portfolios (Biggs, 1996b).

Self- and Peer-Assessment

Biggs and Tang (2007) describe the importance of self- and peer-assessment in the *constructive alignment* process: "Probably the strongest arguments for self- and peer-assessment are that they provide a TLA [teaching and learning activity] that engages crucial and otherwise neglected aspects of students' learning" (p. 187). Despite the educational rationale for embracing self- and peer-based assessment, and its inherent quality to develop numerous commonly espoused graduate attributes (i.e. think critically, teamwork, communication, and conflict resolution), many Higher Education institutions are reluctant to fully embrace their legitimacy in assessment policy and practices (Barrie et al., 2009c; Willey & Gardner, 2008; Savin-Baden, 2004). In fact, Biggs (1996b) believes that approaches such as self- and peer-assessment are actively discouraged by Higher Education institutions, despite providing access to higher-order learning and offering greater alignment between objectives, T&L, and assessment tasks.

One university that encourages self- and peer-based assessment as part of their graduate attribute reform process is the University of Queensland, which is due to offer an undergraduate paramedic program in 2012. It describes its support for self- and peer-based assessment in the following terms, “Well-constructed self-assessment and peer assessment exercises have the potential to provide valuable experiences and encourage lifelong learning” (Holzl, 2002, Policies on Assessment Section, para, 7).

Self-assessment and peer assessment affects both teachers and students. Teachers should explicitly align the ILOs to assessment criteria, while students should be supported to use self- and peer-based assessment strategies (Kamvounias & Thompson, 2008). Hughes and Barrie (2010) underlie the importance of the integration of a theoretical framework, particularly relating to assessment of graduate attributes: “... graduate attributes are most effectively embedded in assessment when they frame curriculum development and when students are *engaged as active partners* in directing their own learning ...” (p. 332, *italics emphasised*). When graduate attributes are appropriately aligned, students are more likely to value and distinguish that graduate attributes are an important part of the teaching, learning, and assessment process (Kamvounias & Thompson, 2008).

The traditional focus of assessment in Higher Education is centred on teacher authority (Biggs & Tang, 2007); that is, students are assumed not to be able to judge what should be learnt, nor what are deemed to be acceptable standards, and therefore should not be involved in how material ought to be assessed (Savin-Baden, 2004). While this approach remains the dominant method in Higher Education, commentators such as Heron (1989, cited in Savin-Baden, 2004) are challenging these views asserting that “Such unilateral control by staff is at odds with the process of [lifelong] education and ultimately breeds intellectual and vocational conformity in students” (p. 225). Others such as Boud and Falchikov (2006) also support the need to move away from students over-relying on teachers. PBL requires teachers to assume less traditional roles such as facilitators, critical-friends, and co-learners, thereby distributing learning responsibilities to students, again further supporting the coherent alignment between PBL and non-traditional assessment approaches. Nonetheless, the question remains whether the redistribution of

educational power can be provided in the context of assessment without sacrificing quality assurance (Heron, 1989, cited in Savin-Baden, 2004). Thompson (2007) suggests that assessment methods and strategies need to be reconceptualised in Higher Education: “Student self-assessment appears to be an important factor and it is interesting to note that educational research now affirms that student involvement in assessment and self-assessment is a powerful driver of learning and can substantially improve curricula” (p. 3).

Savin-Baden (2004) claims that “It is vital to de-mystify assessment criteria and help students to become stakeholders in the assessment process. One of the ways of achieving this is to ask students to develop their own marking criteria” (p. 232). One of the potential benefits of student involvement in assessment activities and marking is the likelihood for not using ‘Rules of the Game’, where they spend their time being side-tracked looking and using tactics searching for hidden assessment criteria in order to achieve higher grades (Biggs & Tang, 2007; Norton, 2004; Savin-Baden, 2004). When this occurs, the whole *constructive alignment* process is misaligned, as students are focused on trivial matters, not the core assessment requirements (Norton, 2004). However, as Barrie et al. (2009c) points out, such student engagement with assessment strategies is currently a rare event in contemporary graduate attribute and curriculum renewal initiatives in Australia.

One of the potential disadvantages surrounding student involvement in assessment strategies is the well-documented issue of fairness, ‘free riding’, and iniquitous distribution of marks, particularly when group assessment tasks are used in large classes (Stojcevski & Du, 2008; Thompson & McGregor, 2009; Willey & Gardner, 2008). To counter these issues, commonly teachers either i) do not use group assessment tasks, or ii) require individual assessment submissions from the group assessment activity. Although this latter point is not only time-consuming, but also educationally questionable as asserted by Thompson and McGregor (2009): “This method diminishes the important design criteria that group tasks should require interdependence, and tends to promote non-collaboration, plagiarism and the students’ adoption of a surface approach to their

development of group work attribute” (p. 435). Nonetheless, group work involving self- and peer assessments has many advantages as described by Davis (1993, cited in Stojcevski & Du, 2008):

The main advantage in using group work seems to be that students learn more and retain it longer when involved in ‘active learning’. The student outcomes could be; students become better at being active and tolerant listeners; students help each other master content; and students give and receive constructive criticism and manage disagreement (p. 2).

Others such as Willey and Gardner (2008) suggest that self- and peer-assessment are more effective in achieving and improving students’ learning outcomes when assessments are used in formative settings as compared with summative assessments. They also note that using a formative approach allows more effective feedback, and the better development and monitoring of graduate attributes in and across units of study (Willey & Gardner, 2008).

Students need to be informed about and engaged in the benefits and potential application for graduate attributes, and one way to achieve this is actively including students in the assessment process (Barrie et al., 2009c; Boud & Falchikov, 2006; Shepherd, 2005; Thompson & McGregor, 2009). Learning environments and activities also need to reflect the graduate attributes being assessed. There needs to be a strong commitment to change traditional practices if alternatives to assessment of graduate attributes is to take place, otherwise this will limit the effectiveness of students demonstrating graduate attribute outcomes (Hughes & Barrie, 2010). Barrie et al. (2009c) suggested greater student consultation on assessment matters is required; noting that, “The best intentions of graduate attribute assessment plans can fail to be realised if students are not made aware of these aspirations and if they are not actively engaged as partners in the assessment process” (p. 15).

As described in the previous section, graduate attributes are developed progressively throughout a program of study (Hughes & Barrie, 2010). Moreover, a whole-course approach is suggested in integrating graduate attributes into teaching, learning, and

assessment activities (Bath et al., 2004; Green et al., 2009; Hughes & Barrie, 2010). Commentators such as Hughes and Barrie (2010) and Green et al. (2009) suggest that the development and acquisition of graduate attributes are not likely to be assessable in the available time frames of in programs of study. Individual subjects are not expected to embed all graduate attributes, rather students should be provided with learning opportunities where the selected graduate attributes can be amalgamated over the whole program, ensuring that the generic or discipline-specific graduate attributes have been assessed (Crisp, 2003). Indeed Hughes and Barrie (2010) suggest that "... assessors need an openness to alternative and authentic forms of assessment such as capstone tasks that extend beyond or across traditional course boundaries" (p. 330). Others such as Holz (2002) argue that different assessment types are guided by year levels and complexities of the units of study; in other words, early years of programs should use exams and written assignments, while units later in the program should use more self- and peer-based assessment activities. Bowden et al. (2000) also agree with this type of assessment flexibility particularly as the profile of graduate attribute development will vary between students. Again, this supports the notion that graduate attributes are developmental and thus should be integrated in the curriculum assessment criteria accordingly. The next section will provide a brief outline of portfolio-based assessment.

Portfolio-based Assessment

The use of portfolio-based assessment in Higher Education has grown rapidly in areas such as Art, Engineering, Teaching, Architecture, and Medicine (Biggs & Tang, 2007; Cooper & Love, 2001; Cranney et al., 2005; Lambert & Corrin, 2007; Love & Cooper, 2004). Portfolios take multiple forms such as paper-based or electronic and are used to promote student reflection, collaboration and the capacity to demonstrate achievement of identified learning outcomes and graduate attributes required for employment (Cochrane, Mahony, Bone, and Johnson et al., 1999; Cranney et al., 2005; Gibbings & Brodie, 2006; Stojcevski & Du, 2008). Cochrane et al. (1999), Lambert and Corrin (2007), and Tang et al. (1999) all assert that portfolio assessment provides students with rich multi-textured learning opportunities with the capacity to develop high-level cognitive attributes such as reflection, self-discovery, generation and application of new knowledge, and learning

responsibility. In portfolio assessment, it is the responsibility of the student to provide evidence to the teacher (and themselves) that ILOs have taken place (Biggs & Tang, 1997; Tang et al., 1999). Biggs and Tang (1997) assert that portfolio-based assessments are suitable for most disciplines and programs: “APs [assessment portfolio] can be used for virtually any course content. It only requires that students attempt to demonstrate what they have learned in terms of the objectives” (p. 84). The key requirement to portfolio-based assessment is that ILOs must be explicitly stated and clearly understood by students (Biggs & Tang, 1997). Regarding the assessment of graduate attributes, Lambert and Corrin (2007) note the importance that portfolios play in embedding graduate attributes into T&L and assessment practices, and providing a means for bridging the gap between university and industry. Additional benefits of portfolio-based assessment are described in Table 7.4.

Table 7.2: Benefits of portfolio-based assessment (Cochrane et al., 1999; Cooper & Love, 2001; Emmett, 2003; Lambert & Corrin, 2007; Love & Cooper, 2004; Stojcevski & Du, 2008)

- Promotes self-directed learning, and active learning
- Innately develops graduate attributes
- Provides clarity and ‘richer’ picture of what has been learned
- Provides capacity to develop peer-supported growth and self-auditing
- Aligns instruction and assessment
- Personalises graduate attribute development
- Provides capacity to collect multiple sources of evidence
- Encourages learning about learning
- Well suited to the principle of lifelong learning
- Used in both formative and summative assessment modes
- Easily shared between faculties and industry

The Higher Education literature claims that employers would prefer more information beyond academic marks or transcripts regarding accomplishment and evidence that graduate attributes have been demonstrated (Cummings & Ho, 1996). Cummings (1998) remarks:

Instead, they would like to have available one or more of the following: evidence of the student's level of generic attribute against some criterion, a description of what constitutes this level of performance, and examples of the student's work which demonstrates this attribute (p. 89).

Evidence from the VET and Higher Education sectors suggests portfolio-based assessments are a useful way of measuring and reporting student graduate attribute development, while also playing an important role in increasing students' awareness of how each graduate attribute can be integrated in professional practice (Cranney et al., 2005; Cummings, 1998). Although Cummings et al. (1997) provide a cautionary remark, "There is some concern that a portfolio approach may be better suited to secondary schools where teachers have a more personal, pastoral care role, than in VET or universities where the lecturer-student relationship is more formal" (p. 228).

As previously emphasised, assessing graduate attributes is complex on multiple levels. A further complexity is the changing shape of university programs that are adopting flexible and modularised units of study, often extending over semesters (within unit) and years (across unit), and integrating work-integrated learning opportunities (out of unit) (Cochrane et al., 1999). These complexities have direct implications for the Australian paramedic sector since many of the paramedic programs also adopt similar approaches to curriculum. Therefore, assessing graduate attributes in single units becomes difficult as units of study and work-integrated learning span over periods of time. One solution in dealing with this difficulty is the use of portfolios, which can act as a 'catch-all' as Love and Cooper (2005) discuss, "The use of student portfolios has the capacity to resolve this problem because portfolios can collate student work across modules and supplement formal assessments with evidence from a range of sources including practicum and work-based learning" (p. 74). Barrie et al. (2009c) and Biggs and Tang (2007) also suggest using 'non-traditional' and longitudinal forms of assessment such as portfolios or capstone tasks that capture higher-level graduate attributes which can be measured over longer periods of time. This is particularly important, as noted previously, because some graduate attributes can only be developed by students over periods longer than just one semester or one unit of study.

The benefits of portfolios are well documented in both paper-based and online versions. However, there are limitations with both approaches. For example, they are time consuming to grade, which has obvious ramifications for large class sizes (Biggs & Tang, 2007). Other challenges include issues surrounding student equity, ownership of the work, and the potential risk of plagiarism (Biggs & Tang, 2007; Cooper & Love, 2001). With any integration of education technology there should be consideration of student equity, and in particular, their access to computers, adequate bandwidth, and software requirements. To avoid the potential for unfairness, Cooper and Love (2001) suggest that online portfolios use base-line or generic software to ensure that all portfolio development is standardised and does not require additional sophisticated software that some students may not have access to. Another potential issue is the notion of ownership of the portfolio material (Biggs & Tang, 2007; Cooper & Love, 2001). Emmett (2003) suggested that portfolio ownership needs to be clearly defined and publicised between students, faculties, and industry. In other words, can portfolios be used in interviews or used by industry in determining gaps in knowledge and graduate attributes? A further issue with online portfolio is the potential for plagiarism (Cooper & Love, 2001). It is suggested by commentators that plagiarism is more tempting for students given the increased reliance on the computerised environment in Higher Education (Cooper & Love, 2001). Others such as Marginson (cited in Biggs & Tang, 2007) suggest that plagiarism does not just affect portfolios, but that student plagiarism is so prevalent that using essays as a form of assessment is now a 'waste of time' (p. 240). Despite the ongoing concern of student plagiarism, one potential resolution is the use of plagiarism detecting software such as (Turnitin) which simply scans for evidence of plagiarism (Cooper & Love, 2001).

Assessment of Graduate Attributes: What are the challenges?

There are a range of difficulties associated with curriculum and graduate attribute reform. For example, adopters of alternative assessment strategies are likely to encounter resistance and challenges, ranging from colleague disapproval, rigid assessment practices, registration and accreditation restrictions, and logistical difficulties with cross-program

assessment requirements (Barrie et al., 2009c). Additional difficulties are in part caused by academics who have not previously undertaken formal teaching qualifications or been exposed to educational and pedagogical theory. Harvey and Kamvounias (2008) also assert that many university teachers do not have formal teaching qualifications and remark that "... many of us are indeed still learners in the discipline of higher education" (p. 33). It is perhaps little wonder that graduate attribute initiatives have been so varied across Australian universities, and perhaps why teachers do not respond well to imposed T&L initiatives (Harvey & Kamvounias, 2008). What appears to be consistent across each of the phases described in this chapter is the fact that teaching staff require support and appropriate resourcing. However, without institutional support and senior and multi-level leadership, it is debatable whether this support and resourcing will be forthcoming (Kamvounias & Thompson, 2008), and why the phrase 'hired to teach but paid to publish' continues to be commonly used throughout the Higher Education sector (Harvey & Kamvounias, 2008). Hughes and Barrie (2010) comment that, "It is therefore hardly surprising that academics have sometimes found the exclusion of graduate attributes from their assessment plans the most rational response to these problems" (p. 326). Harvey and Kamvounias (2008) argue that there is a need for organisational change, for example, institutional culture, communication, ownership, feedback, resourcing, and support. Appropriate recognition and rewards should be provided for innovative and dedicated teachers who are prepared to undertake graduate attribute and curriculum renewal initiatives (Radloff et al., 2008).

Hughes and Barrie (2010) make the following remarks regarding the assessment strategies in Higher Education: "Previous implementation strategies identified in Australian universities frequently omitted assessment, instead tending to focus on compliance approaches where mapping constituted sometimes the sole basis of the inclusion of graduate attributes in curriculum and teaching" (Hughes & Barrie, 2010, p. 329). This point is also reinforced by Thompson and McGregor (2009) who also claim that such omissions invariably cause students to simply focus on marks and grades, and not on the graduate attributes being integrated. Cranney et al. (2005) and Hughes and Barrie (2010) also acknowledge that because of ineffective assessment practices in

Higher Education, such as simply matching graduate attributes with assessment tasks, it is perhaps little wonder that the majority of students simply focus on academic grades and not on the graduate attributes required for employability. Cranney et al. (2005) made the following observation: “Students need to develop an awareness of graduate attributes and their relevance early in their studies so that they can take full advantage of opportunities for developing them during the course of their program of study” (p. 25). One proposed solution to improve students’ awareness of graduate attributes is through the use of portfolios as assessment tasks (Cranney et al., 2005; Gibbings & Brodie, 2006). This is achieved through greater student reflection and demonstrated by the collection of evidence that graduate attributes have been firstly understood, and secondly achieved. It is also important to note that bigger portfolios do not necessarily demonstrate or equate to better or deeper learning (Emmett, 2003).

This section has described Phase 4: Assessment in the *constructive alignment* process and has attempted to outline how graduate attributes and their transferability can be measured more effectively. Key figures in the graduate attribute and curriculum renewal discourse such as Barrie et al. (2009c), and Biggs and Tang (2007) argue that assessment offers the greatest challenge in graduate attribute reform. Others such as Tang et al. (1999) and Savin-Baden (2004) claim assessment is the weakest link in T&L approaches such as PBL. This has important ramifications for the Australian paramedic discipline and its graduate attribute reform, particularly if it adopts a more comprehensive use of PBL in its programs as argued it should in the previous section (Phase 3: Curriculum Delivery).

Given the innate alignment between PBL and *constructive alignment*, particular attention was paid to examining non-traditional assessment strategies that directly align with PBL approaches. These assessment strategies included: self- and peer-based assessments, group assessments, and portfolio-based assessments. Evidence suggests that the implementation of graduate attribute policy is best achieved when they are embedded in assessment activities (Barrie, 2004c). Moreover, the literature suggests these approaches are better suited at assessing graduate attributes over long periods of time. Despite the benefits in non-traditional approaches to assessment, there are several potential

challenges that require considered deliberation. For example, as Biggs and Tang (2007) have argued, there is no 'best' assessment approach, thus consideration of which type of knowledge is being conveyed (declarative versus functioning) should dictate whether traditional (multiple-choice questions and 'timed' invigilated exams) or non-traditional assessment modes be used (Biggs & Tang, 2007). Once more, addressing each of these challenges will be an important part in the overall success of Australian paramedic curriculum and graduate attribute renewal and the *constructive alignment process*.

Summary

The purpose of this chapter was to outline how the *PGAS* can serve as the basis for curriculum renewal and graduate attribute reform for the Australian paramedic sector. A brief description on the rationale of graduate attributes, academics and their influence on graduate attribute reform, employability, and generic versus discipline-specific graduate attributes was undertaken to provide the necessary background. The chapter examined how the *PGAS* guided by a curriculum design theory can serve as a 'curriculum blueprint' and the basis for standardising paramedic curriculum, improving its likelihood of achieving national registration, and development of a unique body of empirical paramedic-specific knowledge through nationally accredited programs. Since the membership wanted the *PGAS* to reflect the desired characteristics of professional paramedic practice, the chapter proposed a curriculum re-design approach to ensure the *PGAS* is the outcome of paramedic education programs. It was argued that such an approach is critical in the implementation process, particularly since no accreditation process has been formally adopted to date, and a range of other factors play an important part in the overall success. The re-design approach was expressed and operationalised in four phases. Phase 1 (Development of Graduate Attributes) described the *PGAS* and its desirable characteristics of professional paramedic practice. Phase 2 (Curriculum Alignment) examined the curriculum design theory of *Constructive Alignment* developed by Biggs (1999a), providing an outline of the key elements to this theory and why its theoretical framework is important in graduate attribute and curriculum reform. A brief description of course mapping was also undertaken during Phase 2. Phase 3 (Curriculum

Delivery) outlined the most relevant and naturally aligned T&L approach to *constructive alignment* and paramedic education and training: PBL. Phase 4 (Assessment) examined several non-traditional assessment strategies such as portfolio-based assessments and peer- and self-assessments that directly align with PBL T&L approaches.

Graduate attribute and curriculum renewal has been largely unsuccessful in Higher Education in Australia for well over 10 years. As Barrie (2004c; 2005) has argued, a key element in the patchy implementation of graduate attributes has been the lack of an evidence-based and theoretical curriculum model. *Constructive alignment* offers such a model, which interestingly has recently gained increased attention in the Higher Education literature, reflecting its capacity to fill the theoretical void and guide curriculum and graduate attribute reform. The Australian paramedic membership wants the *PGAS* to reflect the desired defining characteristics of professional paramedics. Using *constructive alignment* will provide the necessary ‘whole-system’ approach required to ensure the *PGAS* can be embedded and assessed in Australian paramedic programs. However, for the *constructive alignment* process to be successful clear challenges exist; for example, greater teacher support, resourcing, and training, as well as greater communication and buy-in from university management. Overcoming these challenges, coupled with the proposed four phases offers the relevant professional accreditation body, universities, and ambulance industry with important, timely, and empirically-driven curriculum and graduate attribute reform opportunities in its quest of achieving a distinct paramedic body of knowledge and recognition as a health care profession.

The next chapter will summarise the thesis and outline the conclusions, limitations, and recommendations for further research.

Chapter 8

CONCLUSION, LIMITATIONS, AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to provide an outline and summary of the key findings from the three thesis sections: Section 1: Historical Background and Context Setting (Chapters 1-3), Section 2: The Study (Chapters 4-6), and Section 3: Curriculum Requirements (Chapter 7). This final chapter will review each of these sections by describing how they addressed the research aim and research question. This is followed by the study limitations, and recommendations for future research in the area of graduate attribute and curriculum renewal for Australian paramedic education and training programs. The chapter concludes with some final remarks and reflections.

Statement outlining the scope of the study

The Australian health system and delivery of health services is under increasingly demanding performance pressures and is searching for innovative models of service delivery (National Health and Hospitals Reform Commission, 2008). One health care discipline yet to be formally involved in developing new innovative roles is the paramedic sector (ACAP, 2010d). Whilst still considered at best a ‘semi-profession’ in Australia (Reynolds, 2004), the discipline has the scope, capacity, skills, willingness, and potential to be an active component of Australia’s health reform. This capacity is perhaps best highlighted in rural and remote locations where paramedics often have extended periods of ‘downtime’ – downtime that could be more effectively and efficiently used (CAA, 2008b). Also, in these locations paramedics often have extended health care roles and responsibilities since they may be the only health care service provider within a reasonable distance. However to be part of this reform, the discipline must first examine its professional positioning, including the provision of education and training. This involves addressing how its undergraduate and postgraduate programs can produce the health care graduates required for the 21st century.

There are now numerous providers of paramedic training, offering degrees as well as VET sector diplomas. None of these programs have standardised curriculum, or agreed-upon graduate attributes. This dilemma has created a range of issues such as educational discordance between industry and universities, and uncertainties whether paramedic graduates are meeting industry and rapidly changing health service and workforce needs. This represents a major gap in the paramedic body of knowledge and inconsistency in the type of curriculum taught to paramedic students across Australia. Actively addressing this gap has the capacity to specifically tackle the issues surrounding graduate attribute and curriculum reform in paramedic programs, as well as professional positioning in the rapidly changing health care landscape.

Previous chapters in the thesis have provided a context for the research, offered a historical review of Australian paramedic education and training, and professional positioning of the discipline, explained the multivariate statistical approaches and offered an interpretation of the research results within the context of the study. This is the first time that any paramedic graduate attribute research has been undertaken within the Higher Education sector in Australia.

The context for the research, outlined in Chapter 1, and the historical literature reviewed in Chapter 2, indicate the need for research into graduate attribute reform in Australian paramedic programs. The point was reinforced following the analysis of professional theories in Chapter 3, which indicated the paramedic discipline still does not meet the requirements of a ‘full’ profession. The aim of this study was to investigate the graduate attributes that best reflect professional practice for Australian paramedics. This thesis aimed to build and develop further a body of knowledge in the discipline by addressing the following research question:

What are the graduate attributes that best reflect the desired characteristics of professional paramedic practice in Australia?

Key Findings

Section 1 (Chapters 1-3)

This section summarised and reviewed the three sections undertaken throughout the research process. Section 1 (Chapters 1-3) provided a historical background and contextualisation of Australian paramedic education and training and the professionalisation process. The systematic historical review identified that the Australian paramedic discipline has undergone transformation in its education and training, particularly over the past 35 years. In a relatively short span of time, the paramedic discipline has seen a paradigm shift in its education and training from no formal education (pre-1970s), to vocational education qualifications such as certificates and associate diplomas (1970-1990s), to the current university-based education that now offers Bachelor degrees up to PhD qualification.

Currently there are 12 universities around Australia offering paramedic undergraduate, double-degree (i.e. nursing/paramedic), or postgraduate conversion degrees such as a graduate diploma for nursing and allied health. With such a large number of non-accredited and non-standardised paramedic education programs, it is little wonder that a range of contentious issues have arisen. Some of these issues include:

- Educational discordance between industry and universities;
- A lack of registration or regulation nationally;
- Programs are not formally accredited;
- A lack of empirically-based national competencies; and
- A lack of empirically-based paramedic-specific graduate attributes.

At the same time the Australian health care system continues to struggle with changes in population health and varying workforce patterns. The re-positioning of the paramedic discipline within the health system is likely to cause changes to its traditional service model. With this in mind and informed by the historical review and by the input from several retired ambulance personnel and a former medical director, the following learning periods were developed (Figure 8.1).

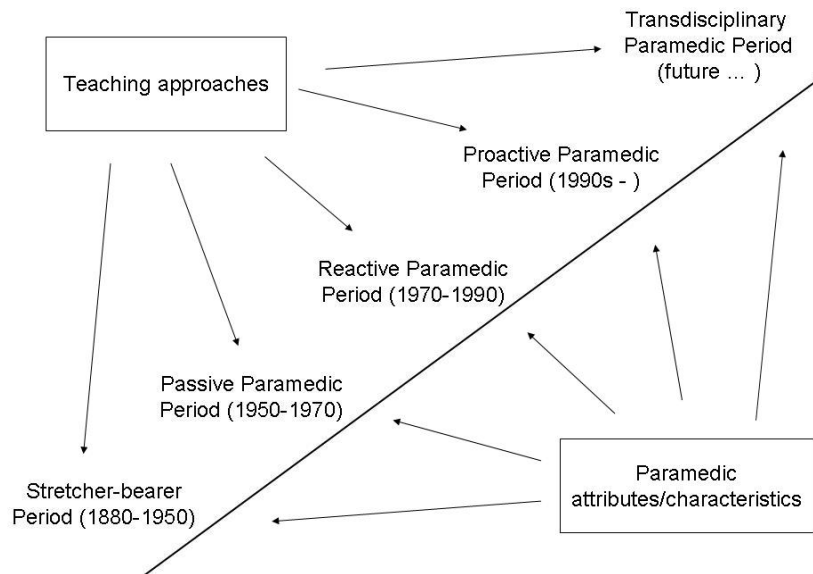


Figure 8.1: Learning periods of the Australian paramedic discipline (1880-present)

Given the current reforms and proposed future changes to the health care workforce, there is a distinct likelihood that changes to paramedic and prehospital service delivery are imminent. Likely changes relating to professionalisation of the Australian paramedic sector were discussed as part of the *Transdisciplinary* period (Figure 8.1). Critical issues identified as arising during this period included medical dominance, divisions of labour, and the potential for ‘occupational encroachment’ emphasising why galvanising professional status and support was critical. Further, a detailed examination of key theories of professionalisation and the matching of the generally accepted attributes and criteria of a full profession revealed the Australian paramedic discipline has yet to achieve full professional status.

A historical analysis and comparison with two cognate professions, nursing and physiotherapy, was undertaken to provide a comparative ‘roadmap’ in determining which elements in their discipline trajectory assisted them in becoming recognised as a fully fledged health care profession. Guided by Greenwood’s (1957) theoretical model, what emerged from this analysis was that the Australian paramedic sector did not exhibit two

key elements of Greenwood's model: i) professional authority (registration), and ii) distinct body of knowledge. These findings matched the conclusions presented by Reynolds (2004) in an earlier investigation into the professional status of Australian paramedics. Predictably, the key finding in the comparison with nursing and physiotherapy was the establishment of programs of study in Higher Education and eventual development of unique graduate attributes specific to either profession. Such attributes not only assisted the generation and adoption of national curriculum standards, professional competencies, and national accreditation, but also strengthened the case for national registration, which, once gained, provided the recognition of nursing and physiotherapy as legitimate full health care professions.

Guided by these professionalisation 'guide posts', a set of defining questions in overcoming the paramedic discipline's shortcomings as a profession emerged including: Is the paramedic discipline a profession? Does the paramedic discipline want to be a profession? How will the discipline define itself as professional? Which graduate attributes does the discipline see as professional? How does education and training contribute to the professionalisation of paramedics?

In addressing the current professional limitations, it was argued that the paramedic discipline requires a standardised national curriculum and a defined and validated set of graduate attributes. Establishing standardised graduate attributes was argued to be a critical element in developing a unique profession-specific body of knowledge, and national registration through the provision of national accreditation, ultimately leading to standardised paramedic curriculum for programs around Australia. Addressing these questions provided the necessary conceptual space for choosing the most appropriate study design, methodology, and statistical analyses.

Section 2 (Chapters 4-6)

Guided by the key findings from Section 1, it was decided to undertake a pilot study, and, if feasible, then embark on a larger national study. The initial questionnaire was developed using three sections: demographics, professionalisation, and graduate

attributes. The main aim of the professionalisation section was to evaluate if the paramedic discipline was a profession, and, if not, whether the membership wanted to be considered a profession. A systematic review of the graduate attribute literature from both cognate and non-cognate health care disciplines was undertaken. Following this review, a final list of 50 graduate attributes was generated. Following a pre-pilot validation process, the pilot study was undertaken in 2008 involving ($n=63$) participants identified as content experts and leaders in the paramedic field. An initial exploratory factor analysis (EFA) was undertaken to investigate the existence of any underlying theoretical latent constructs amongst the 50 graduate attributes. These constructs were then used as the basis for the development of the *Paramedic Graduate Attribute Scale (PGAS)* for the larger study.

The national study commenced during October 2008 and the collection of questionnaires concluded in February 2009. A secondary EFA was performed on the ($n=872$) returned questionnaires, demonstrating that the *PGAS* was a reliable and valid instrument, producing a viable seven-factor solution. In order to achieve parsimony, nine items were removed from the scale. To further validate the seven-factors derived from the EFA, a Rasch analysis was performed. While the Rasch analysis also confirmed a 7-factor solution, a further eight items were removed, either not fitting the Rasch Model or displaying differential item functioning (item bias). The final seven-factor *PGAS* contained 30 items, and is represented as shown in Table 8.1.

Table 8.1: Operationalisation of the PGAS (7 factor – 30 items) (adapted from *The CanMEDS Physician Competency Framework*, Royal College of Physicians and Surgeons of Canada, 2005).

Graduate Attribute 1: Personal Behaviour and Attitudes Scale (4 items)

Description: Paramedic Graduates will be able to provide effective care to patients, relatives and caregivers by demonstration of appropriate communication, teamwork and reasoning skills.

Desirable Characteristic: Professional paramedics are able to ...

- 3.1 Be able to work independently as well as a member of a team in planning and integrating care within the context of paramedic practice.
- 3.2 A professional paramedic should demonstrate clinical reasoning skills.
- 3.3 A professional paramedic should have effective written and oral communication skills.
- 3.4 A professional paramedic should have an ability to learn including the ability to use reflection and learn from experience.

Graduate Attribute 2: Patient Interaction and Welfare Scale (6 items)

Description: Paramedic Graduates will recognise their responsibility in patient advocacy and welfare, and display the appropriate attributes influencing health well-being.

Desirable Characteristic: Professional paramedics are able to ...

- 2.1 A professional paramedic should be non-judgemental and non-discriminatory.
- 2.2 Be respectful and consider moral, ethical, social, religious aspects of health care.
- 2.3 Strive for trust and honesty across all boundaries of health care.
- 2.4 A professional paramedic should be willing to take responsibility for their actions.
- 2.5 A professional paramedic should adhere to a code of ethics.
- 2.6 A professional paramedic should operate within appropriate ethical and legal boundaries.

Graduate Attribute 3: Scientific Approach to Patient Care Scale (3 items)

Description: Paramedic Graduates will be able to develop new ideas and solve problems through the application of research, enquiry, and critical thinking analysis.

Desirable Characteristic: Professional paramedics are able to ...

- 3.1 Recognise the need for, and application of, enquiry and research in paramedic practice.
- 3.2 Be able to demonstrate critical thinking in contextually-based problems.
- 3.3 Be able to think critically in the acquisition of new knowledge.

Graduate Attribute 4: Paramedic and Society Scale (4 items)

Description: Paramedic Graduates will recognise their responsibility and duty in providing appropriate and responsive care of patients and caregivers across the community-emergency health care spectrum.

Desirable Characteristic: Professional paramedics are able to ...

- 4.1 A professional paramedic should be able to see things from the patient's point of view.
- 4.2 A professional paramedic should understand their role in providing a primary care health service.
- 4.3 A professional paramedic should be culturally sensitive and have an inclusive approach to differences.
- 4.4 A professional paramedic should understand the role of paramedic care within the broader health care system.

Graduate Attribute 5: Commitment to Professional and Health Care Outcomes Scale (5 items)

Description: Paramedic Graduates will be committed to personal and intellectual autonomy while developing and maintaining professional relationships in the provision of quality health care outcomes.

Desirable Characteristic: Professional paramedics are able to ...

- 5.1 A professional paramedic should have a commitment to self-development.
- 5.2 Be capable of working in interdisciplinary teams in providing quality health care outcomes.
- 5.3 A professional paramedic should have the capacity to undertake self-directed approaches to learning.
- 5.4 A professional paramedic should be able to take responsibility for the quality of care and health outcomes.
- 5.5 A professional paramedic should follow evidence-base practice.

Graduate Attribute 6: Professional Behaviour Scale (4 items)

Description: Paramedic Graduates will be committed to the provision of quality patient care and promotion of health and well-being through the demonstration of high professional standards, knowledge, and understanding.

Desirable Characteristic: Professional paramedics are able to ...

- 6.1 A professional paramedic should integrate population-based care into their practice.
- 6.2 A professional paramedic should be committed to the discipline.
- 6.3 Be capable of contributing to continuous improvement within the health care system.
- 6.4 A professional paramedic should embrace social responsibility.

Graduate Attribute 7: Interaction Skills Scale (4 items)

Description: Paramedic Graduates will have the capacity to provide the necessary leadership, mentorship, and communication skills in the provision of education and training.

Desirable Characteristic: Professional paramedics are able to ...

- 7.1 Be able to demonstrate good listening skills.
- 7.2 Work with, and provide leadership, mentoring and supervision.
- 7.3 Demonstrate effective ability to accept guidance from colleagues as required for the best possible patient care.
- 7.4 Continue to learn and to help others learn.

The creation of Australia's first set of empirically-based graduate attributes which reflect contemporary paramedic practice provides an opportunity for the discipline to develop a unique body of knowledge that is shaped by national educational standards. This body of knowledge will not only assist paramedic professional practice, but also play an influential part in asserting the need for national registration, national education program accreditation, and ultimately being accepted as a legitimate health care profession.

Various elements of the study, including the research design, statistical analyses, and the interpretation of results, highlighted several contentious areas. For example, feedback from one peer-reviewer on a paper presenting the results of the study, questioned why a Likert response was chosen over Rank Ordering for determining the most desirable graduate attributes. While a valid question, it was felt that since both approaches provide similar information (i.e. ordinal data), a Likert-scale would provide a more interpretable

set of data for a Rasch Rating Scale Model (Andrich, 1978) on the basis that rank ordering is more productive using the partial-credit model (Linacre, 1989).

While the research design and statistical analyses in this study used mainly traditional measures, two elements of the research process were somewhat unusual. The use of two EFA and the decision to use Rasch analysis instead of Confirmatory Factor Analysis (CFA) varied from the standard trajectory of empirical research in that it combines Classic Test Theory (CTT) with Item Response Theory. A rationale on these decisions will now be discussed.

In typical CTT, potential items for a self-report scale are generated from a researcher's own professional expertise, knowledge, and work-related experience. Other sources of items can include a detailed review of the cognate body of literature as well as consulting known experts in the field. Items can also be generated via qualitative research methods such as key informant interviews or focus groups. Then these items are formatted for proper wording and phrasing. Next a response method is selected; for example, is the response format going to be nominal level (i.e. yes/no; true/false; agree/disagree) or ordinal level (i.e. disagree strongly, disagree, no opinion, agree, agree strongly). The next step is to collect data from a group of respondents and then analyse the data to see if any viable constructs emerge.

In the context of this study, items for the *PGAS* were generated from an extensive literature review. Then the items were rated by a group of 63 paramedic content experts and discipline leaders. The item ratings were factor analysed to determine whether any viable constructs existed. From this initial analysis, seven preliminary factors emerged. The items were then sent to the paramedic membership within Australia. The respondent data was then factor analysed a second time using EFA, and the same seven factor structure emerged. This seven factor structure provided the basis for the confirmatory validation phase of the study using Rasch analysis. Although two initial factor analyses were completed, the first one was preliminary and provided the basis for the formal EFA

to be completed. Then instead of completing a CFA using CTT, it was decided that the factor structure of the *PGAS* would be confirmed using Rasch analysis.

Traditionally in CTT, underlying factor solutions produced in exploratory factor analysis are normally validated by CFA. However, in this study an alternative approach was taken. The traditional CFA approach was replaced with the Rasch Model (Item Response Theory). The decision to use the Rasch Model instead of CFA was based on Rasch's ability to interpret and treat ordinal-level data as interval-level data, which CFA is unable to accomplish. Rasch analysis also allows differential item functioning of scale items to be investigated. Rasch analysis can also handle incomplete data sets and indicate any respondents who are outliers or misfits. Thus, the outcome of this approach is that further follow-up testing or secondary validation of the instrument can be achieved with interval-level data. In addition to its primary use as a curriculum blueprint, if the *PGAS* is used for other purposes such as a selection or admission or clinical placement or scenario assessment rating scale, then administrators can be confident that the measurements are based on interval-level data, and therefore reflect a more accurate assessment.

Results from the pilot and national studies provided important answers to the questions, assertions, and proposed learning periods made highlighted in Section 1. The final section (Chapter 7) examined how the validated and reliable *PGAS* could be integrated into paramedic education and training programs.

Section 3 (Chapter 7)

The research indicates the Australian paramedic membership i) wants to be considered a profession, and ii) that the *PGAS* reflects the desired defining characteristics of a professional paramedic, thus providing the basis for a national curriculum ensuring that graduates are aware of, and capable of, what the industry expects of them as professionals. At the same time it will allow the paramedic sector to build a unique set of knowledge, skills, and attitudes, plus the capacity to gate-keep its membership.

Therefore the aim of the final section was to examine the curriculum requirements in integrating the *PGAS* into national paramedic education programs. This was undertaken using a proposed four-phase approach: 1) *PGAS*; 2) curriculum alignment; 3) curriculum delivery; and 4) assessment. As emphasised, graduate attributes are complex objects, manifested by changing political, economic, and global changes impacting on the Higher Education sector. Their complexity was further highlighted by Barrie's (2006) phenomenological study which found widespread disparate understanding and definitions of graduate attributes amongst academics. These complexities, plus an apparent lack of a theoretical basis to curriculum design, have led to largely unsuccessful attempts at the adoption and integration of graduate attributes and curriculum reform within Australian universities (Barrie, 2004c; 2005).

One area that is slowly gathering support in the graduate attribute literature is the curriculum theory of *constructive alignment* (Biggs, 1999a). *Constructive alignment* appears to offer curriculum designers and professional accreditation bodies the necessary theoretical framework to ensure the consistent implementation of graduate attributes. Evidence indicates that simply adding graduate attributes on an ad-hoc basis or as a bolt-on to existing courses does not provide the contextualised learning processes required. Additionally, undertaking course mapping exercises has been likened to a 'tick and flick' approach and in isolation is ineffective in ensuring that espoused graduate attributes are experienced and demonstrated by students (Barrie et al., 2009c; Bath et al., 2004).

While the proposed four phase approach provides the necessary stakeholders with a curriculum design blueprint, there are a range of challenges that face each institution, and individual paramedic departments. Some of these challenges include greater ownership, teacher support, training, and project management resourcing, as well as support and leadership from university management. Other issues concern the use of 'just in-time' teaching approaches such as PBL and accompanying assessment approaches, which are often considered non-traditional. These challenges are not insurmountable, particularly given the recent move of paramedic education into the Higher Education sector. For example, large scale or national curriculum renewal initiatives have yet to take place, nor

are curricula constrained by industry or accreditation bodies. This indicates that the paramedic discipline is actually well-placed for broader graduate attribute and curriculum reform. Given this fortunate timing and educational context, the paramedic discipline has the opportunity to use existing ‘guide posts’ and learn from previous underestimates in earlier curriculum and graduate attribute reform, suggesting the *PGAS* has a potentially integral part to play in this process.

Limitations

This study applied a survey design approach by asking paramedics, paramedic managers, paramedic educators, and academics involved in teaching paramedic programs to rate the desirability of graduate attributes from the *PGAS* and professional standing of the paramedic discipline. While the study sample was limited to those involved in the paramedic discipline, further research could be extended to other health care professions such as nursing, physiotherapy, occupational therapy, and medicine. Indeed this research could be broadened to include public and community perceptions. The use of qualitative methods (such as key informant interviews or focus groups) could also provide a richer data source, particularly relating to items involved in the professionalisation section. Moreover, further research could include the use of alternative theoretical models to professional trait theory in characterising and defining professional paramedic practice.

While the sample size used in the national study was large ($n=872$) and represented paramedic college members from every Australian state and territory, participants were recruited via convenience sampling, presenting the potential for biased respondents. However, for ethical reasons, respondents could not be mandated or ‘forced’ to complete the surveys. Replicated research might consider including non-paramedic college members to better represent the paramedic population, or consider alternative sampling techniques such as randomised, cluster or stratified sampling.

The use of self-reporting measures has a range of limitations such as the potential for vulnerability for over-rater or under-rater bias, respondents’ limited understanding of

limitations and biases, and the potential for acquiescence in item response. However, the limitations of self-reporting measures are minimised when the measures have adequate psychometric properties, which was the case following the Rasch analysis.

Recommendations for future research

There are a number of recommendations for future research in the area of graduate attribute and curriculum renewal for Australian paramedic programs in Higher Education. These recommendations aim to assist future research ventures and might include the following:

- This study investigated paramedic perceptions of the most desirable graduate attributes. Future research avenues might explore and extend these perceptions to a broader range of participants, such as cognate, non-cognate professions, community members, and those involved in accreditation, governance, and registration organisations.
- Opportunities for national and international benchmarking exist, particularly relating to research-led teaching, student experiences, and assessment strategies. Outcomes of this research may address the communalities between programs, while also developing novel approaches to teaching, learning, and assessment approaches. A secondary outcome of this process could potentially lead to formalised student and academic transfers between institutions.
- Whilst this study developed a set of graduate attributes primarily for Bachelor-level undergraduate programs, further research could investigate the application of the *PGAS* in diploma-level programs from the vocational and education sector, double-degrees (i.e. nursing/paramedics) and postgraduate programs, such as graduate diplomas and research higher degrees from the tertiary sector.

- While this study examined graduate attributes at one time point, future research should also consider some form of horizon-based study design. For example, this might include a longitudinal follow-up one or two years post graduation to examine the utility of the *PGAS* and its desirable characteristics, and should include input from graduates, industry, universities, and peak and accreditation bodies. Similarly, closer examination of students' perceptions of and attitudes to the *PGAS* might occur through the progression of their coursework program.
- An area that is indirectly related to this study is the concept of informal and hidden curriculum. Currently, no formal examination of informal or hidden curriculum has taken place in Australian tertiary paramedic programs. Further investigation using qualitative methods are likely to reveal elements of both forms of implicit curriculum. This research would provide an opportunity to re-examine if further additions to the *PGAS* and accreditation process need to take place.
- While results from this study found the *PGAS* to be a valid and reliable graduate attribute tool for curriculum renewal, another area of research should investigate the efficacy of the *PGAS* as a selection or admissions tool when choosing potential candidates for universities and ambulance organisations. This research could also extend as a rating scale tool for students during work-integrated learning on clinical placements, as well as a rating template for students undertaking simulation scenarios during their undergraduate coursework programs.
- Since the body of knowledge related to the construct validity of an instrument is dynamic evolving process, the psychometric properties of the *PGAS* should undergo further examination by other researchers and in different contexts. This might result in further refinement and revision of the *PGAS* (e.g., include further reduction in the total number of items, or perhaps the overall number of factors).

Final Thoughts and Reflections

By undertaking the first attempt at developing an empirically-based paramedic graduate attribute scale, this study makes an important and informed contribution to knowledge, theory, and practice, and thus makes a significant contribution to the paramedic body of knowledge.

First, by developing, testing, and finally validating a psychometrically-sound graduate attribute scale, the Australian paramedic discipline is provided with an agreed-upon set of attributes that reflect current and future characteristics of professional paramedic practice. Having an established set of paramedic graduate characteristics for future practice offers the paramedic membership professional identity, which appears to be crucial in today's health care climate, particularly when the health care boundaries seem to be adjusting to the changing demands of alternative service delivery models.

Second, proposing that a theoretically-based and constructively aligned approach be used in the reform process, places the relevant stakeholders responsible for curriculum reform in a better position, and better informed to make the necessary changes to curriculum that reflect the desired defining characteristics of professional paramedics.

Third, the opportunity for the Australian paramedic discipline to integrate the *PGAS* as a curriculum blueprint and, hence, the capacity to standardise and formally accredit the growing numbers of paramedic programs is now available. Accompanying this standardisation will be nationally consistent curricula, providing some assurance that graduates are meeting industry and community expectations, and the capacity to finally develop a unique body of knowledge on a national and unified scale. The outcome of the graduate attribute and curriculum renewal process is that it signals to other health care professions, industry partners, and state and federal governments that the discipline is serious in its attempts to be accepted as a member of the national registration and accreditation scheme, and, hence, recognised as a legitimate health care profession.

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Appendix A: Pilot Study (PGAS)

MONASH University



Examination of the history of paramedic education and training in Australia: An Investigation of Paramedic Graduate Attributes

Please indicate your level of agreement/disagreement with each statement below, by ticking one option using the following scales:

Section 1: About You	
1.1 Age (in years)	
1.2 Gender	
1.3 In which state, territory or country are you located?	
1.4 Where are you primarily employed? (Ambulance Service, University, Other- please list)	
1.5 What is your current role? (Paramedic, Paramedic Field Instructor, Paramedic Educator in HE, Other – please list)	
1.6 How long have you been in that position?	

Please indicate your level of agreement/disagreement with each statement below,
by ticking one option using the following scales:

Section 2: Professionalising the Paramedic sector	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.1 The Australian Paramedic sector will benefit from becoming recognised as a profession.					
2.2 The Australian Paramedic sector already exhibits the characteristics of a profession.					
2.3 The Australian Paramedic sector already possesses its own unique body of knowledge.					
2.4 The Australian Paramedic sector already has a high degree of clinical autonomy in the provision of emergency health care.					
2.5 The Australian Paramedic sector will have national registration within the next 2 years.					
2.6 The Australian Paramedic sector should align itself with Nursing to enhance its chances of becoming a profession.					
2.7 The Australian Paramedic sector should align itself with Medicine to enhance its chances of becoming a profession.					
2.8 The Australian Paramedic sector depends upon Higher Education to enhance its chances of becoming a profession.					

Please indicate your level of agreement/disagreement with each statement below,
by ticking one option using the following scales:

Section 3: Graduate Attributes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CORE PRACTICAL ATTRIBUTES					
3.01 A professional paramedic should have clinical competence.					
3.02 A professional paramedic should have developed counseling skills.					
3.03 A professional paramedic should be able to think critically.					
3.04 A professional paramedic should have a good understanding of their patients' welfare.					
3.05 A professional paramedic should practice preventative healthcare.					
3.06 A professional paramedic should integrate population-based care into their practice.					
3.07 A professional paramedic should understand their role in providing a primary care health service.					
3.08 A professional paramedic should demonstrate critical thinking.					
3.09 A professional paramedic should demonstrate clinical reasoning skills.					
3.10 A professional paramedic should be autonomous.					

Section 3: Graduate Attributes	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
CORE PROFESSIONAL ATTRIBUTES					
3.11 A professional paramedic should adhere to local practice guidelines and policies.					
3.12 A professional paramedic should contribute to continuous improvement within the healthcare system.					
3.13 A professional paramedic should be adaptable to changes in clinical practice.					
3.14 A professional paramedic should attempt to attain high clinical status within the healthcare system.					
3.15 A professional paramedic should understand the role of paramedic care within the broader healthcare system.					
3.16 A professional paramedic should operate within appropriate ethical and legal boundaries.					
3.17 A professional paramedic should follow evidence-based practice.					
3.18 A professional paramedic should be committed to the discipline.					
3.19 A professional paramedic should adhere to a code of ethics.					
3.20 A professional paramedic should be aware of, and regard for, professional issues such as; accountability and confidentiality.					

Section 3: Graduate Attributes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CORE EDUCATION ATTRIBUTES					
3.21 A professional paramedic should have specialist knowledge (e.g. practitioner or extended scope roles).					
3.22 A professional paramedic should have an ability to learn including the ability to use reflection and learn from experience.					
3.23 A professional paramedic should be willing to undertake ongoing education.					
3.24 A professional paramedic should be able to apply knowledge of the basic sciences.					
3.25 A professional paramedic should be able to respond to changes in the provision of health care due to evolving community expectations.					
3.26 A professional paramedic should be able to continue to learn and to help others to learn.					
3.27 A professional paramedic should have the capacity to undertake self-directed approaches to learning.					
3.28 A professional paramedic should have the capacity for enquiry and research.					
3.29 A professional paramedic should have theoretical knowledge.					
3.30 A professional paramedic should have a commitment to self-development.					

Section 3: Graduate Attributes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CORE INTERPERSONAL AND COMMUNICATION ATTRIBUTES					
3.31 A professional paramedic should have the capacity to use communication and information technology effectively and appropriately.					
3.32 A professional paramedic should have effective written and oral communication skills.					
3.33 A professional paramedic should be literate and numerate.					
3.34 A professional paramedic should be a good listener.					
3.35 A professional paramedic should be able to accept guidance from colleagues.					
3.36 A professional paramedic should value the importance of teamwork.					
3.37 A professional paramedic should be able to work in interdisciplinary teams.					
3.38 A professional paramedic should have the ability to work independently as well as a member of a team.					
3.39 A professional paramedic should be able to provide leadership, mentoring and supervision skills.					
3.40 A professional paramedic should be able to take responsibility for quality of care and health outcomes.					

Section 3: Graduate Attributes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CORE PERSONAL ATTRIBUTES					
3.41 A professional paramedic should be selfless.					
3.42 A professional paramedic should be trustworthy.					
3.43 A professional paramedic should be able to see things from the patients' point of view.					
3.44 A professional paramedic should be non-judgemental and non-discriminatory.					
3.45 A professional paramedic should be caring and empathic.					
3.46 A professional paramedic should be self-aware, recognising personal responsibilities and limitations.					
3.47 A professional paramedic should be respectful and consider moral, ethical, social, religious aspects of healthcare.					
3.48 A professional paramedic should be willing to be responsible for their actions.					
3.49 A professional paramedic should embrace social responsibility.					
3.50 A professional paramedic should be culturally sensitive and have an inclusive approach to differences.					

Are there any other graduate attributes you feel should be added to this list?

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Appendix B: Explanatory Statement

MONASH University

Explanatory Statement



Title: “Examination of the history of paramedic education and training in Australia: An Investigation of Paramedic Graduate Attributes”

This information sheet is for you to keep.

An Invitation

You are invited to participate in this study which has two aims:

- 1 Examination of the history of paramedic education and training in Australia, and
- 2 Investigate the desired paramedic graduate attributes.

This research is part of a PhD study currently being undertaken by Brett Williams from the Department of Community Emergency Health & Paramedic Practice. Supervising this PhD is Associate Professor Andrys Onsman from Centre for the Advancement of Learning and Teaching, and Dr Ted Brown from the Department of Occupational Therapy at Monash University. We are inviting retired ambulance officers, paramedic clinical managers, educators and academics to participate in this project.

What the Study is about

We are investigating the history of Australian paramedic education and training, in particular:

- What teaching approaches were used during different eras?
- What learning needs and expectations were apparent during different eras?
- What were the perceived graduate attributes during the different education eras?

The aim/purpose of the research

This project aims to examine the historical educational developments of the Australian paramedic discipline and provide a blueprint for curriculum change based upon desired paramedic graduate attributes.

Possible benefits

The findings of the project are expected to provide a better insight into our education and training past. It is also anticipated that this will inform teaching institutions and industry with potential contemporary developments in education and training, whilst producing a more standardised paramedic graduate. It is also hoped that a standardised reporting instrument will developed for in-field auditing and/or entry requirements into higher education programs.

What does the research involve?

The study involves participation in a self-reporting questionnaire that will explore the desired paramedic graduate attributes.

How much time will the research take?

The paper-based questionnaire should take no longer than 10 minutes.

Inconvenience/discomfort

There should be no inconvenience or discomfort when completing the questionnaire.

Can I withdraw from the research?

Being in this study is voluntary and you are under no obligation to consent to participation. However, if you do consent to participate, you may only withdraw prior to the questionnaire being submitted.

Confidentiality

You are not required to provide any information which can identify you. All data will be anonymous. Only the researchers will have access to the original data. Only group data will be reported, so the identity of every participant is protected.

Storage of data

Storage of the data collected will adhere to the University regulations and kept on University premises in a locked cupboard/filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Your data will not be used for any other study purposes.

Results

If you would like to be informed of the research findings, please contact Brett Williams on (03) 9904 4283 or email brett.williams@med.monash.edu.au

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research project [CF08/1124] is being conducted, please contact:
Brett Williams Phone: (03) 9904 4283 Fax (03) 9904 4168 Email: brett.williams@med.monash.edu.au	Human Ethics Officer Standing Committee on Ethics in Research Involving Humans (SCERH) Building 3e Room 111 Research Office Monash University VIC 3800 Tel: +61 3 9905 2052 Fax: +61 3 9905 1420 Email: scerh@adm.monash.edu.au

Thank you.

Brett Williams

Appendix C: National Study (PGAS)

MONASH University



An Investigation of Paramedic Graduate Attributes

Please indicate your level of agreement/disagreement with each statement below, by ticking one option using the following scales:

Section 1: About You	
1.1 Age (in years)	
1.2 Gender	
1.3 In which state, territory or country are you located?	
1.4 Where are you primarily employed? (Ambulance Service, University, Other- please list)	
1.5 What is your current role? (Paramedic, Paramedic Field Instructor, Paramedic Educator in Higher Education, Other – please list)	
1.6 How long have you been in that position?	

Please indicate your level of agreement/disagreement with each statement below,
by ticking one option using the following scales:

Section 2: Professionalising the Paramedic sector	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.1 The Australian paramedic sector will benefit from becoming recognised as a profession.					
2.2 The Australian paramedic sector already exhibits the characteristics of a profession.					
2.3 The Australian paramedic sector already possesses its own unique body of knowledge.					
2.4 The Australian paramedic sector already has a high degree of clinical autonomy in the provision of emergency health care.					
2.5 The Australian paramedic sector will have national registration within the next 2 years.					
2.6 The Australian paramedic sector should align itself with <u>Nursing</u> to enhance its chances of becoming a profession.					
2.7 The Australian paramedic sector should align itself with <u>Medicine</u> to enhance its chances of becoming a profession.					
2.8 The Australian paramedic sector depends upon Higher Education to enhance its chances of becoming a profession.					

Please indicate your level of agreement/disagreement with each statement below,
by ticking one option using the following scales:

Section 3: Graduate Attributes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.01 A professional paramedic should be non-judgemental and non-discriminatory					
3.02 A professional paramedic should have the capacity for enquiry and research.					
3.03 A professional paramedic should be respectful and consider moral, ethical, social, religious aspects of healthcare.					
3.04 A professional paramedic should demonstrate critical thinking.					
3.05 A professional paramedic should be trustworthy.					
3.06 A professional paramedic should be literate and numerate.					
3.07 A professional paramedic should be aware of, and regard for, professional issues such as; accountability and confidentiality.					
3.08 A professional paramedic should be able to see things from the patients' point of view.					
3.09 A professional paramedic should understand their role in providing a primary care health service.					
3.10 A professional paramedic should follow evidence-based practice.					
3.11 A professional paramedic should be willing to be responsible for their actions.					
3.12 A professional paramedic should be culturally sensitive and have an inclusive approach to differences.					
3.13 A professional paramedic should be able to think critically.					
3.14 A professional paramedic should have developed counseling skills.					
3.15 A professional paramedic should be adaptable to changes in clinical practice.					

3.16 A professional paramedic should be a good listener.					
3.17 A professional paramedic should have a commitment to self-development.					
3.18 A professional paramedic should be able to work in interdisciplinary teams.					
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3.20 A professional paramedic should be able to provide leadership, mentoring and supervision skills.					
3.21 A professional paramedic should be able to accept guidance from colleagues.					
3.22 A professional paramedic should have a good understanding of their patients' welfare.					
3.23 A professional paramedic should understand the role of paramedic care within the broader healthcare system.					
3.24 A professional paramedic should value the importance of teamwork.					
3.25 A professional paramedic should adhere to a code of ethics.					
3.26 A professional paramedic should operate within appropriate ethical and legal boundaries.					
3.27 A professional paramedic should be caring and empathic.					
3.28 A professional paramedic should have the capacity to undertake self-directed approaches to learning.					
3.29 A professional paramedic should have clinical competence.					
3.30 A professional paramedic should attempt to attain high clinical status.					
3.31 A professional paramedic should integrate population-based care into their practice.					
3.32 A professional paramedic should be committed to the discipline.					
3.33 A professional paramedic should have theoretical knowledge.					
3.34 A professional paramedic should contribute to continuous improvement within the healthcare system.					
3.35 A professional paramedic should embrace social responsibility.					

3.36 A professional paramedic should be able to continue to learn and to help others to learn.					
3.37 A professional paramedic should be able to apply knowledge of the basic sciences.					
3.38 A professional paramedic should be able to respond to changes in the provision of health care due to evolving community expectations.					
3.39 A professional paramedic should be willing to undertake ongoing education.					
3.40 A professional paramedic should have the ability to work independently as well as a member of a team.					
3.41 A professional paramedic should be able to take responsibility for quality of care and health outcomes.					
3.42 A professional paramedic should demonstrate clinical reasoning skills.					
3.43 A professional paramedic should have effective written and oral communication skills.					
3.44 A professional paramedic should practice preventative healthcare.					
3.45 A professional paramedic should be self-aware, recognising personal responsibilities and limitations.					
3.46 A professional paramedic should have specialist knowledge (e.g. practitioner or extended scope roles).					
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