Reconceptualising the Professional Practice of Environmental Health

A framework for improving practice

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Abstract

Global crises such as the COVID-19 pandemic and the increasing frequency of regional disasters such as catastrophic bushfires, earthquakes and floods are all indicators of the urgent need to improve societal practices aimed at preventing and addressing the negative impacts of human interaction with the environment. This thesis aims to contribute to addressing this problem by reporting on an empirical investigation into the variation in the ways environmental health professionals experienced the practice of environmental health.

Environmental health professionals (EHPs), the focus of this thesis, are professionals whose origins stem from the sanitation movement founded in Britain in the mid-19th century. In today's context, this group contributes to protecting human health and the environment in various capacities. Supporting improvements to this area of practice continues to be a key strategy of the Australian Government to ensure this workforce is well equipped to deal with current and future challenges. These challenges include the evolving nature of environmental health problems, changes to the regulatory and operational environments associated with this area of practice, and a range of workforce issues having implications for the environmental health profession.

However, gaining improvements to the professional practice of environmental health presents several challenges. These challenges, I contend, relate to the complexities associated with the changing and evolving context of practice and the complexities inherent in the practice itself. As such, this thesis argues that current descriptions of the professional practice of environmental health are inadequate to deal with the complexities and uncertainties associated with current and future practice. What is required is a new conceptualisation of the professional practice of environmental health.

To establish a new conceptualisation of the professional practice of environmental health, two research questions were posed. Firstly, what are the variations in the ways environmental health professionals experience the practice of environmental health? Secondly, what are the critical variations between the ways environmental health professionals experience the practice of environmental health? I used a qualitative research approach known as phenomenography to answer these questions. The phenomenographic study involved semi-structured open-ended

interviews with nineteen professionally qualified environmental health practitioners practising in an Australian context from diverse backgrounds and practice settings.

The investigation findings revealed four qualitatively different ways of experiencing the professional practice of environmental health: 'protecting', 'helping', 'collaborating', and 'leading and innovating'. These different ways of experiencing practice are described in categories of description, found to be logically linked in a hierarchical order to form an outcome space. The categories were also linked by an expanding awareness of five themes: 'outcome', 'impact', 'approach', 'agency', and 'role'. These themes supported the hierarchical relationship of the categories from less comprehensive 'protecting' to more comprehensive 'leading and innovating' ways of experiencing. The categories of description and outcome space represent a holistic experiential description of practice (HEDP) and a new and novel conceptualisation of the professional practice of environmental health.

There are several implications for improving practice arising from this research. This new way of conceptualising the professional practice of environmental health has the potential to act as a framework that can assist in improving professional practice and education for professional practice. In so doing, it can also help to address the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education. This new conceptualisation and framework are the main contributions of this thesis. This thesis also makes several other contributions to the literature. Importantly, it provides insights into the qualitatively different ways environmental health professionals experience the practice of environmental health, an area of research that is currently absent from the literature.

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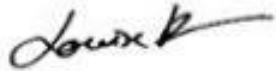
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Declaration

I hereby declare that to the best of my knowledge, this thesis contains no material that has been accepted for the award of any other degree or diploma or any material previously published or written by another person, except where due reference is made in the text of the thesis. Where the work is based on joint research or publication, I have disclosed the respective workers or authors.

Louise Dunn

Research Output

Conference presentations

Dunn, L, Mann, L & Farquharson, K (2018, November). *What is the practice of environmental health about? A description of practice as experienced by environmental health practitioners in Australia*. 43rd EHA National Conference, Rydges Esplanade Hotel, Fremantle, Australia.

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Dunn, L, Mann, L & Farquharson, K. (2017, April). *Describing what the Practice of Environmental Health is: A phenomenographic approach.* Voices, Vision, Action 15 World Congress on Public Health 2017, Melbourne Convention Centre, Melbourne. (Refereed)

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Dunn, L. (2012, May). *Issues and challenges in work-integrated learning and environmental health practice.* International Federation of Environmental Health (IFEH) 12th World Congress on Environmental Health, Vilnius, Lithuania. (Refereed)

Table of Contents

List of Figures

List of Tables

List of Abbreviations

AQF	Australian Qualification Framework
EHA	Environmental Health Australia
EHACAP	Environmental Health Australia Course Accreditation Policy
EHO	Environmental Health Officer
EHP	Environmental Health Professional
EHPA	Environmental Health Professionals Australia
HEDP	Holistic Experiential Description of Practice
NEHS	National Environmental Health Strategy
OBE	Outcome-Based Education
WIL	Work Integrated Learning

Chapter 1: Introduction

Our society is increasingly urbanised, more populous, and more complex. We have increased air, water and soil contamination, persistent chemical pollutants have become widespread and global climate change presents new environmental health hazards. The role of government is also changing. Where government was once the major provider of health services, this is no longer always the case. Australia needs to enhance its environmental health capacity in order to meet this range of changes. We need to do this by increasing our knowledge base, by developing our workforce and better harnessing the full potential of our communities **(**Commonwealth Department of Health and Aged Care, 1999, p. 1)

1.1 Introduction

The need for Australia to enhance its environmental health capacity continues to be a key objective of the Australian Government (Environmental Health Standing Committee (enHealth), 2020). However, achieving this objective is fraught with challenges. These challenges relate to the complexities and uncertainties associated with preventing and addressing an evolving range of environmental health problems, particularly for the environmental health professionally qualified workforce. This thesis aims to contribute to enhancing Australia's environmental health capacity to respond to these problems by conducting an empirical investigation into nineteen environmental health professionals' experiences of their practice in an Australian context. The research questions I posed for this investigation were:

1. What are the variations in the ways environmental health professionals experience the practice of environmental health?

2. What are the critical variations between the ways environmental health professionals experience the practice of environmental health?

I argue that investigating the variation in the ways environmental health professionals experience their practice has generated a novel and more useful way to conceptualise this area of practice by developing a holistic experiential description of practice (HEDP). I also put forward that the HEDP has the potential to act as a framework to assist in improving the professional practice of environmental health and education for professional practice. In so doing, it can also help to address the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education. An investigation of environmental health professionals' experiences from the perspective I adopted in this thesis will fill a gap in the existing research.

In the following sections, I outline the background to the study, the motivations underpinning the investigation into environmental health professionals' experiences of their practice, the guiding research question, the statement of the problem, and the aim and scope of this thesis. I conclude by providing an overview of the structure of this thesis.

1.2 Background

Ensuring the effective practice of environmental health is an essential foundation for modern society and a cornerstone of public health (Commonwealth Department of Health and Aged Care, 1999). Whilst there is no agreed description of the practice of environmental health, the area can be broadly described as "encompassing the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments" (Environmental Health Standing Committee (enHealth) 2020, p. 4).

Historically the practice of environmental health in Australia and other countries is largely associated with the sanitation movement founded in Britain in the mid-19th century (Baum, 2016; Brimblecombe, 2003; Hamlin, 1998; Lin, Smith, Fawkes, Robinson, & Gifford, 2014; Rosen, 2015). The sanitation movement is widely documented as being responsible for the first organised societal effort aimed at protecting and promoting public health (Kotchian, 1997; Lin et al., 2014; Moeller, 2011). The approach involved governments establishing legal and administrative structures to reduce the spread of infectious diseases by providing clean water supplies, removing wastes, and improving living conditions (Commonwealth Department of Health and Aged Care, 1999; Smith, 2008).

2

In Australia and globally over the last few decades, the principles and approaches associated with the practice of environmental health founded in the sanitation movement have expanded and become increasingly complex. This is due to an evolving set of interrelated factors contributing to the complexity of problems associated with human interaction with the environment and how we address these problems. These factors include globalisation, which has transformed patterns of human activity whilst bringing significant changes to our social, economic, political and physical environments (Lin et al., 2014). Other factors include rapid population growth, an ageing population, increased urbanisation, the rise of lifestyle diseases, changing patterns of consumption, growing health inequalities, war, bioterrorism and the impacts associated with global climate change (Frumkin, 2016; Commonwealth Department of Health and Aged Care, 1999; Commonwealth of Australia Department of Health and Ageing, 2000; Prüss-Ustün et al., 2017). The impacts of global climate change include an increase in the spread of infectious diseases, food insecurity and increased human displacement associated with disasters (Kinney, 2018; World Health Organisation, 2000, McMichael, Friel, Nyong, & Corvalan, 2008; Wu, Lu, Zhou, Chen, & Xu, 2016). Collectively, these factors contribute to increasing the global burden of disease, with 24% of this burden environmentally-induced (Prüss-Ustün et al., 2017).

Addressing the evolving complexity of problems related to human interaction with the environment has itself become increasingly complex. Various sectors of the community increasingly acknowledge that there is not only uncertainty associated with how to address these problems, but that a multi-disciplinary, multi-level and multi-agency response, involving a wide range of occupations, sectors, communities and individuals, is now required (Commonwealth Department of Health and Aged Care, 1999; Drew, Duivenboden & Bonnefoy, 2000). This acknowledgement has also led to an evolving and varying range of philosophies, theories, principles and approaches to preventing and addressing the negative impacts of human interaction with the environment, particularly over the last 30 years. Consequently, the traditional boundaries of the practice of environmental health, established by the sanitation movement in the early 19th century, have not only expanded but have become increasingly complex.

In recognition of the changing societal landscape in Australia and globally, together with the impacts of these changes to human health and the environment, the Australian Commonwealth

Government launched its first National Environmental Health Strategy (NEHS) in 1999 (Commonwealth Department of Health and Aged Care, 1999). A key action of the strategy was to improve environmental health practice through better management, more effective use of resources, enhanced coordination, collaboration, and promotion of consistent approaches amongst the environmental health practice workforce, to assist in safeguarding the health and environment of the Australian and broader global community. The NEHS also outlined that improvements to the practice of environmental health were required to be supported by effective education, research and ongoing professional development of the whole environmental health workforce. This workforce included professionally qualified environmental health practitioners, the focus of this thesis.

Environmental health professionals (EHPs) are a group of professionals whose origins stem from the sanitation movement founded in Britain in the mid-19th century. Nowadays, EHPs are often referred to as environmental health officers or practitioners. They are also previously known as, and still sometimes referred to as health inspectors, public health officers and health surveyors. In today's context, this group of professionals contributes to the protection of human health and the environment in a range of capacities, in both the private and public sectors. The core responsibilities of EHPs are to assess and manage environmental health risks and protect public health (Environmental Health Committee (enHealth), 2010).

In Australia, EHPs are typically involved in investigating incidents associated with food, water, air, noise and land contamination, including responding to emergencies such as bushfires or floods. EHPs are also involved in routine compliance visits subject to public and environmental health legislative control in the areas of food, accommodation and personal service industries such as tattooists. EHPs are also involved in public health planning and promotion activities such as community education, immunisation programs and disaster management. EHPs also provide input into strategic policies related to this area of practice and conduct research (Dunn et al., 2018; Environmental Health Committee (enHealth), 2009).

The Australian Government has identified supporting improvements to the professional practice of environmental health as a key strategy to ensure this workforce is well equipped to deal with current and future challenges. These challenges include the evolving nature of environmental health problems, changes to regulatory and operational environments associated

4

with this area of practice, together with a range of workforce issues. Collectively, these challenges have posed implications for the ability of the environmental health profession to address future societal needs (Commonwealth Department of Health and Aged Care, 1999; Environmental Health Committee (enHealth), 2009; Windsor and Associates, 2005; Commonwealth Department of Health and Aged Care, 2016).

In summary, an evolving set of complex environmental health problems continue to pose a significant threat to our societal future in Australia and globally. Addressing these problems has become increasingly complex and uncertain, requiring improvements to the practice of environmental health, particularly amongst the professionally qualified environmental health workforce. The need to improve the professional practice of environmental health forms the key problem underpinning the thesis. Addressing this problem through the study undertaken in this thesis is also underpinned by several additional motivations. I explore these motivations in the next section.

1.3 Motivations for this study

Addressing the need to improve the professional practice of environmental health, I posit, requires an approach that can assist in addressing a range of additional problems facing this area of practice. These problems are associated with the complex interrelationship between society, the environmental health profession and education. I explore these further problems, which have underpinned the motivation for investigating the variation in the ways environmental health professionals experience the practice of environmental health in the following sections.

1.3.1 Societal

The societal confidence in the professions, particularly over the last number of decades, has been in crisis (Kanes, 2011). This crisis is associated with the erosion of the institutional trust society has placed in these occupational groups to address societal needs in altruistic, competent and moralistic ways (Evetts, 2006a, 2011; Laffin, 1998; Scanlon, 2011). Key factors which have contributed to this crisis in confidence include globalisation, which has reshaped knowledge boundaries through rapid changes in technology (Dall'Alba, 2009a; Dall'Alba & Sandberg, 1996), the adoption of a neoliberal agenda by governments, which amongst other

influences, has emphasised individual liberty and responsibility over community responsibility (Connell, Fawcett & Meagher 2009). These factors fall within a societal context increasingly framed by supercomplexity (Barnett, 2000), wicked problems (Rittel & Weber, 1973) and liquid times (Trede & Higgs, 2019).

I refer to supercomplexity as a form of complexity that has posed challenges to our frameworks for understanding and engaging in the world. This includes a lack of clarity about our personal and institutional identities and responsibilities in addressing situations (Barnett, 2000). Wicked problems are problems that are elusive or difficult to pin down, influenced by complex social and political factors and likely to be viewed differently depending on who has a stake in the problem (Rittel & Weber, 1973; Keune, 2012). Liquid times are "constant and rapid changes that result in a focus on short-term goals, an obsession with quick fixes, the collapse of long-term thinking, a disregard for long-term consequences, and a shift of the burden of liability and responsibility onto the individual" (Trede & McEwen, 2019, p.16). Collectively, I argue, these factors have strained many aspects of the traditional characteristics underpinning the professions, raising questions regarding the future societal role of the professions and subsequently professional practice.

By adopting a preferred societal future as one in which the professions and professional practice help society deal with complexity and uncertainty, I argue that current descriptions of professional practice are inadequate to effectively deal with the complexities and uncertainties associated with current and future practice. What is required, I further argue, is a new conceptualisation of professional practice.

Thus, the key societal motivation underpinning this thesis is the need to find a new way to conceptualise professional practice, which can assist the professions, focusing on the environmental health profession, to effectively deal with the complexities and uncertainties associated with current and future practice. This is required to help restore the societal trust placed in these occupational groups to address societal needs in altruistic, competent and moralistic ways. For the environmental health profession, I further argue that achieving this outcome also requires an approach that can help address a range of complex and interrelated problems facing this area of practice. I explore these problems further in the next section.

1.3.2 Professional

The environmental health profession has been impacted by a range of complex and interrelated problems over the last 30 years in Australia and other countries globally. Problems affecting this area of practice include a lack of societal understanding, valuing and recognition of the professional role, often attributed to the preventive nature of this area of practice (Environmental Health Committee (enHealth), 2009; Knechtges, 2018; Whiley, Willis, Smith, & Ross, 2019; Windsor and Associates, 2005). The preventative nature of the professional practice of environmental health has implications for the visibility of environmental health services delivered by this group, making these services vulnerable to cuts "when working well" because such services are often not understood at the political leadership or general public level (Knechtges, 2018, p. 27). This problem is compounded by a neoliberal political context, posing challenges for the sustainability of the profession (Treser, 2018; Whiley et al., 2019), including placing pressure on the perceived benefits of the generalist specialist skill set of the environmental health profession, a key feature of this area of practice (Thomas, 1998). In addition, the fragmentation of environmental health services has also posed challenges for gaining a strong, unified identity for the profession, making this area of practice vulnerable in the wider public health agenda (Morris & Robertson, 2003). The enforcement aspect of the professional role being politically unfashionable has also been identified as having implications for this area of practice (Dhesi & Lynch, 2016).

Additional problems impacting the professional practice of environmental health include difficulties in gaining sufficient measures to support evidence-based practice initiatives. This aspect has been associated with the fragmentation of environmental health services (Commonwealth Department of Health and Aged Care, 1999; Drew et al., 2000), difficulties gaining measures to support environmental health interventions (Drew et al., 2000), target setting aligned with achieving regulatory based responsibilities in statutorily based settings (Environmental Health Committee (enHealth), 2009) and a traditional culture of practitioners as 'doers' rather than 'thinkers' (Dhesi & Stewart, 2015). These aspects have implications for adopting more strategic and holistic approaches to dealing with environmental health problems by the practice community, beyond those based on regulatory control. For example, the ability to address issues such as health inequalities and climate change (Environmental Health

Committee (enHealth), 2009) and having a voice in the broader public health policy agenda (Dhesi & Lynch, 2016; Dhesi & Stewart, 2015).

Furthermore, a focus on achieving regulatory based targets, particularly in local government settings, has led to a perception that the professional practice of environmental health has become 'stuck' in the delivery of a narrow agenda (Environmental Health Committee (enHealth), 2009). This position has led to a potential deskilling of the environmental health professional workforce, lack of attraction and retention to professional roles and workforce shortages (Environmental Health Committee (enHealth), 2009; Morton Consulting Services, 2004; Windsor and Associates, 2005). These factors have had a flow-on effect for the viability of tertiary programs aimed at professionally qualifying environmental health professionals and graduate work-readiness (Dunn et al., 2018; Day, 2016; Environmental Health Committee (enHealth), 2009; Morton Consulting Services, 2004; Windsor and Associates, 2005). A lack of clearly defined ongoing professional development pathways, notably to support advancement to leadership positions or speciality areas of practice, have also been identified as key problems impacting this area of practice (Environmental Health Committee (enHealth), 2009). An accepted universally credentialing or licensing procedure for environmental health workforce entry has been proposed as potentially lowering the standards of practice and placing the community at risk (Knechtges, 2018).

Collectively, the above problems I put forward have posed a challenge to the traditional characteristics used to describe the environmental health profession and have implications for improving this area of practice. These problems also threaten the future viability of the environmental health profession in Australia and other countries more broadly. A loss of this professional area of practice, I contend, presents a further threat to the ability of society to deal with the complexities and uncertainties associated with human interaction with the environment, both now and in the future. This threat is due to a range of unique characteristics related to the area of practice.

These characteristics relate to the critical role environmental health professionals have in responding to complex and multifaced environmental health issues (Gerding et al., 2019) and the distribution of the environmental health professional workforce throughout many sectors of the community with close ties to vulnerable groups (Environmental Health Committee

enHealth, 2009; 2010, Oosthuizen, 2009a). Such characteristics position the environmental health profession as an important group that can foster integrated partnerships and support holistic responses to complex environmental health problems (Environmental Health Committee enHealth, 2009). These characteristics are essential in a societal context where responding to such issues requires multidisciplinary, coordinated and collaborative responses (Commonwealth Department of Health and Aged Care, 1999; Drew et al., 2000; Environmental Health Committee enHealth, 2009; Day 2016). Additionally, given the inherently political nature of public health (Baum, 2016), the ability to maintain professional practitioners, underpinned by these characteristics who have an independent, critical voice that can address societal needs in altruistic, competent and moralistic ways I contend is critical to achieving an equitable and sustainable societal future for all.

Thus, the professional motivations underpinning this study relate to the critical role the professional practice of environmental health has in protecting the health and environment of Australia and the broader global community and the need to address the complex and interrelated problems facing this area of practice. This is required to help gain improvements to this area of practice and support the ongoing viability of this area of practice. However, I further argue that achieving these outcomes also requires improving current approaches to education for professional practice. I explore this aspect further in the next section.

1.3.3 Educational

The recognised need by the Australian Government to improve the professional practice of environmental health has led to the re-examination of environmental health education and training aimed at supporting this workforce (Environmental Health Committee (enHealth), 2009; Oosthuizen, 2009a). Environmental health training includes higher education programs that facilitate environmental health practitioners' professional qualification and continuing professional development programs (Commonwealth Department of Health and Aged Care, 1999; Environmental Health Committee (enHealth), 2009). A key outcome of this re-examination has involved the development of the enHealth Environmental Health Officer Knowledge and Skills framework by the Australian Government (Environmental Health Committee (enHealth), 2009). The Australian Government developed this framework to address chronic workforce shortages and provide a mechanism to build a shared understanding of the environmental health role. The framework also aimed to establish the minimum related

skills, knowledge and generic attributes required to competently perform as an environmental health officer (Environmental Health Committee (enHealth), 2009).

The enHealth Environmental Health Officer Knowledge and Skills framework was also developed to support agencies to make decisions when appointing people with the appropriate skills, knowledge and experience to perform duties related to the protection of human health and the environment, particularly when legislative acts do not specifically refer to the appointment of a professionally recognised environmental health officer, instead requiring 'suitably qualified' authorised officers to undertake such duties. The framework also serves as a guide for the professional accreditation of higher education environmental health programs in Australia, currently overseen by Environmental Health Australia (EHA), and the ongoing professional development of the environmental health practitioner workforce (Environmental Health Australia, 2014; Environmental Health Committee (enHealth), 2009).

While not questioning the value in describing the types of knowledge and skills required to support improvements to environmental health professional practice, I contend that a focus on the acquisition of knowledge and skills as a basis for professional development is an insufficient basis for improving practice. Such an approach to professional development assumes a container view of practice and fails to recognise the implications of the variation in the way practitioners experience their practice. This is important, as the way a practitioner experiences their practice is central to how they perform and develop their practice (Dall'Alba & Sandberg, 2006; Sandberg, 2001).

To improve professional practice, I argue a shift in focus from conceptualising, developing and maintaining expertise based on the acquisition of knowledge skills to one which incorporates the progressive development of knowledge and skills, whilst "developing an understanding of, and in," the professional practice in question is required (Dall'Alba & Sandberg 2006, p.401). In this model, expertise is seen as developing more comprehensive ways of experiencing practice rather than the continual refinement of skills within an existing understanding of the practice, in so doing, enhancing a practitioner's ability to effectively deal with increasingly complex, varying and uncertain situations (Dall'Alba & Sandberg 2006).

Thus, the educational motivation underpinning this study relates to the critical role education plays in developing and maintaining professional expertise to prepare practitioners to engage

effectively with situations in their professional lives (Cherry, 2005; Higgs, 2019). I argue this is particularly important in our rapidly changing societal context where such situations are becoming increasingly complex and uncertain. Thus, requiring a new conceptualisation of practice that can support the development of educational approaches which can "promote professional ways of being" that can deal with "the complexities, ambiguities, and dynamic change inherent in professional practice" (Dall'Alba & Sandberg, 2006, p. 401).

1.3.4 Personal

My initial doctoral research was focused on investigating how to improve the provision of work-integrated learning (WIL) experiences to support the development of the environmental health professional. This area of interest was motivated by my current position as a Senior Lecturer in Environmental Health at a Higher Education institution in Australia and my experiences associated with this area of practice. These experiences include those involving my role in academia over the last 23 years and those gained before entering academia. My academic role has largely been focused on teaching and research in the environmental health discipline area. It has also included a leadership position involving academic and administrative oversight of a 12-month paid industry-based learning program for undergraduate students, spanning several discipline areas, including environmental health. I also obtained my professional qualification to practice as an environmental health practitioner from the educational institution where I am currently employed.

Before entering academia, I practised environmental health in a range of settings. This experience included a one-year student paid placement with a State Government Environmental Protection Authority, which formed part of my undergraduate qualification in environmental health. Post-graduation, I completed nine years as an environmental health practitioner in a large historic and increasingly culturally diverse metropolitan council. I then completed two years of employment in a health promotion-focused role with a smaller, geographically diverse and developing metropolitan council. After a short break to have my first child, I accepted various consultancy positions and casual education and training roles in the environmental health practice area. These experiences provided me with an extensive range of insights into the practice of environmental health, including the challenges faced by this area of practice. This included the challenges associated with the provision of WIL experiences to support the development of the environmental health professional from a university, student

and industry perspective. These experiences contributed to the motivations underpinning the initial focus of this research.

The change in focus of my doctoral research took place through discussions with one of my supervisors. He asked me to describe what I thought the practice of environmental health was about, whether I had experienced a change in the way I thought about the practice and whether I thought practitioners would experience and describe the practice in the same way. He further introduced the idea of developing a description of practice based on professionals' experiences in the field to assist in improving the practice of environmental health, including helping to better prepare students for professional practice. The questions about my own experiences and understandings of the practice of environmental health I initially found challenging. How could I be teaching, researching and practising in this area if it was not reflective of what practice was all about?

The ideas and questions raised above also tested my assumptions about current approaches to education for professional practice. I also reflected on the challenges I had faced as a practitioner in describing this area of practice. These challenges included the frustrations I had experienced with respect to how people sometimes viewed this area of practice. This view was somewhat narrower to what I had experienced, posing a range of challenges. These challenges included the ability to gain recognition, amongst various community sectors, including the educational institutional setting I worked, of the increasing complexities of the professional role and the societal importance this area of practice has in addressing and preventing an evolving range of environmental health problems. These challenges also posed a range of implications, including the ability to sustain a higher education degree offering in this practice area.

After an initial review of literature as described in Chapter 2 & 3 and ongoing discussions with a wide range of people, including academics and environmental health practitioners, attendance at several workshops, including a workshop in phenomenography led by John Bowden and Pam Green, the sense of these questions became clearer. A description of practice, based on the variation in the ways environmental health practitioners experienced their practice, I considered offered the potential to do more than just help prepare students for professional practice. It also provided the potential to improve practice and education for professional

practice whilst helping to address a range of complex and interrelated challenges facing this area of practice. Thus, the investigation undertaken in this thesis was motivated by the opportunity to contribute a novel way to address the range of complex problems facing this area of practice: one which could assist environmental health practitioners effectively deal with the complexities and uncertainties associated with current and future practice and re-energise this area of practice to support the ongoing relevance and sustainability of the environmental health profession.

1.4 Guiding question

The motivations underpinning this thesis I previously described resulted in the development of a broad question to guide this study:

How can the professional practice of environmental health be reconceptualised to effectively deal with the complexities and uncertainties associated with human interaction with the environment both now and in the future?

1.5 Statement of the problem

The evolving set of complex problems associated with human interaction with the environment continue to contribute to the global burden of disease and pose a significant threat to our societal future in Australia and globally. Addressing these problems has become increasingly complex and uncertain. The Australian Government has identified supporting improvements to the professional practice of environmental health as a key strategy to ensure this workforce is well equipped to deal with the current and future challenges facing this area of practice. However, gaining improvements to this area of practice, I contend, is complicated by the changing and evolving context of professional practice and the complexities inherent in the practice itself. To address the need to improve the professional practice of environmental health, I argue that current descriptions of the professional practice of environmental health are inadequate to deal with the complexities of current and future practice. What is required is a new conceptualisation of the professional practice of environmental health.

This new conceptualisation of professional practice involves developing a holistic experiential description of practice (HEDP), constituted from the variation of environmental health

professionals' experiences of their practice. Such a conceptualisation, I argue, generates a description of practice that has the potential to help improve practice and education for professional practice whilst assisting to address the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education.

1.6 Aim and scope

The main purpose of this thesis is to explore the variation in the ways environmental health professionals experience their practice to establish a new conceptualisation of the professional practice of environmental health. This research was undertaken in an Australian context among practising environmental health professionals situated predominantly in the State of Victoria. The research for the study was conducted between November 2014 and November 2015. Practice theory (Reckwitz, 2002; Schatzki, 2012; Shove, Pantzar & Watson, 2012) and variation theory (Bussey, Orgill, & Crippen, 2013; Åkerlind, 2018) underpinned the development of the new conceptualisation of professional practice, in the form of an HEDP. Phenomenography (Marton & Booth, 1997) was the research approach used to uncover the variations in the ways environmental health professionals experience their practice.

1.7 Significance of the study

This study is significant for several reasons. Firstly, it provides new insights into what doing and knowing within practice looks like, in the form of detailed, rich, contextualised descriptions of practice, based on the variation in the ways environmental health professionals experience their practice. A description of practice from this perspective is currently absent from the existing literature, with environmental health practitioners' lived experience of practice also an unresearched area of study. Secondly, establishing a description of practice in the form of an HEDP, as this study has generated, is significant. This description provides a new way to assist environmental health professionals to effectively deal with the complexities and uncertainties associated with current and future practice. In particular, the HEDP has the potential to act as a framework to assist in improving professional practice and education for professional practice whilst helping to address the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education. In so doing, also contemporise and re-energise the professional practice of environmental health for the 21st century. Finally, this study is also of significance because it contributes to

the phenomenographic research literature by describing four qualitatively different ways of experiencing environmental health practice, extending the research literature in this area. The study also makes a practical contribution to the application of phenomenographic research methods concerning participant recruitment.

1.8 Structure of the thesis

The previous sections of this chapter introduced the key purpose of this research: to explore the variations in the ways environmental health professionals experience their practice and to establish a new conceptualisation of the professional practice of environmental health.

In Chapter 2, I first introduce the concept of practice and explore the theoretical perspectives of practice to arrive at a conceptual definition of practice to guide this thesis. This chapter also explores the implications of these theoretical perspectives for improving practice.

In Chapter 3, I turn to describing and critiquing the characteristics associated with the traditional conceptualisation of a profession due to the alignment of these characteristics with those underpinning the professional practice of environmental health. I also explore variation theory and argue that this theory provides an appropriate theoretical lens to support the development of a new conceptualisation of the professional practice of environmental health in the form of an HEDP. I also introduce phenomenography as the appropriate research approach to uncover the variations in the ways of experiencing a phenomenon, such as practice.

In Chapter 4, I explore the foundational ideas established in Chapters 2 and 3, focusing on the professional practice of environmental health. This includes exploring the historical influences on this area of practice. Collectively, Chapters 2, 3 and 4 establish the key problem, core argument and research questions underpinning the thesis.

In Chapter 5, I review the phenomenographic research approach in further detail. This chapter provides an important basis for informing the research design I adopted for the study.

In Chapter 6, I detail how I applied phenomenography to investigate the research questions posed for the study. I also highlight the strategies I used to address issues of validity and reliability to assist in facilitating judgements regarding the knowledge claims arising from the research.

Chapters 7 & 8 presents the major findings of the thesis.

In Chapter 9, I discuss the findings in relation to the research questions posed in the study and the implications of the HEDP for improving the professional practice of environmental health. I also propose that the HEDP generated from the study provides a more useful way to conceptualise this area of practice than current descriptions. This includes establishing that this new and novel conceptualisation of practice has the potential to act as a framework to help improve the professional practice of environmental health and education for professional practice.

Finally, Chapter 10 presents a summary of the findings, the contribution of this thesis to the literature, and an overview of this research's implications for improving the professional practice of environmental health. I also identify several avenues for future research.

Chapter 2: Practice

2.1 Introduction

In this chapter and the following chapter, I aim to establish the argument for the theoretical framework used to address the key problem underpinning this thesis. The key problem is the need to improve the professional practice of environmental health. This is required for this group of professionals to effectively deal with the complexities and uncertainties associated with human interaction with the environment, both now and in the future. These chapters also aim to provide the theoretical foundation for the core argument I have developed to address this key problem. The core argument of this thesis is that current descriptions of the professional practice of environmental health are inadequate to deal with the complexities of current and future practice. What is required, I argue, is a new conceptualisation of the professional practice of environmental health. To achieve the above aims, I first introduce the concept of practice and explore the theoretical perspectives of practice to arrive at a conceptual definition of practice to guide this thesis. I also explore the implications of these theoretical perspectives for improving practice.

In Chapter 3, I turn to describing and critiquing the characteristics associated with the traditional conceptualisation of a profession. This is due to the alignment of these characteristics with those underpinning the professional practice of environmental health and to further support the core argument underpinning this thesis. I also explore variation theory and argue that this theory provides an appropriate theoretical lens to support the development of a new conceptualisation of the professional practice of environmental health. In Chapter 4, I explore these foundational ideas with a specific focus on the professional practice of environmental health. Collectively, Chapters 2, 3 and 4 assist in establishing the key problem, core argument and research questions underpinning this thesis and the discussion of the phenomenographic results.

2.2 Introducing practice

The evolving complexity of problems that continue to pose significant challenges for our societal future, as outlined in Chapter 1, has led to an increased interest in investigating practice, particularly over the last 20 years. This interest has been predominantly associated with investigating complex issues such as consumption, sustainability and health (Maller, 2012; Strengers & Maller, 2014a; Warde, 2005) and as a mechanism to inform education and the design of curriculum, particularly in the higher education sector (Billett, 2004; Boud, 2012, 2016; Higgs, 2013; Higgs, 2019; Vu & Dall'Alba, 2011).

From the perspective of investigating complex issues, such as those relating to our health, the shift towards researching practices is related to the view that the outcomes of such research can generate more sustainable interventions, compared to interventions that arise from research on individual attitudes, behaviours and choices (Shove et al.,2012; Strengers & Maller, 2014). For example, understanding a person's daily routines and their association with dietary intake and obesity has been found to have significant implications for how successful interventions are at addressing the health implications associated with this condition (Maller, 2012). From an educational viewpoint, the increased interest in investigating practice has been driven by the increased pressure on higher education institutions (HEI) by governments, particularly in western contexts, to improve graduate employability outcomes (Billett, 2015; Crisp, Higgs, & Letts, 2019; Higgs, Loftus, & Trede, 2010; Orrell, 2004; Pham & Saito, 2019). These expectations have led to an emphasis on the integration of practice-based experiences, sometimes referred to as work-integrated learning (WIL) programs and authentic learning activities within higher education curriculum as a mechanism to support these outcomes (Boud, 2012, 2016; Higgs et al., 2010; Patrick et al., 2009). As a result, interest and debate have been generated regarding the nature of practice, including what constitutes a practice in the occupational setting of interest and how students can be exposed to practice-based experiences to support improved graduate employability outcomes.

The increased attention on investigating practices has also generated a renewal in theorising about practice amongst various scholars (Reckwitz, 2002; Schatzki, Knorr Cetina, & Savigny, 2001; Shove et al., 2012; Warde, 2005). This attention includes understanding practice as a social phenomenon, the approach 1 adopted in this thesis. As a social phenomenon, practice

can be described as "embracing multiple people, comprising an organised constellation of diverse people's activities" (Schatzki, 2012 p. 14). It is a way of viewing the world, where the social is a "field of embodied, materially interwoven practices centrally organised around practical understandings" (Schatzki, 2012, p. 14). This description contrasts with the view where individuals, through their own actions or interactions, languages, roles, and systems, define the social (Schatzki et al., 2001). As such, phenomena inclusive of knowledge, human meaning and understanding all occur within a field of practices and can only be analysed via this field (Schatzki et al., 2001).

In conceptualising practice as a social phenomenon or being socially produced, I also adopt the position that meanings relating to practice are not inherent in the phenomenon itself but are socially constructed. That is, meanings are created through interaction and dialogue within a particular historically situated context (Gergen, 2001). Thus, from a social constructivist perspective, understandings about practice may vary over time. Meanings associated with different experiences of practice may also differ across social groups and settings (Green & Thorogood, 2018). This perspective also suggests social reality or knowledge about it is multiple, context-dependent, and the product of social, historical, political, and cultural processes. This view contrasts with viewing practice as an objective, single and pre-existing truth, which is 'out there' waiting to be discovered (Berger, Luckmann, & Zifonun, 1967; Crotty, 1998).

In summary, the evolving complexities of problems that continue to pose significant challenges for our societal future have led to an increased interest in investigating and theorising about practice, particularly as a social phenomenon. Conceptualising practice as a social phenomenon is the position I have adopted to guide this thesis. In the next section, I establish a conceptual definition of practice to guide this thesis further.

2.3 Practice: towards a conceptual definition

There is a range of descriptions associated with the conceptualisation of practice as a social phenomenon. These descriptions arguably reflect "the varying understandings amongst practice theorists about what activities constitute practice and what connects them" (Schatzki et al., 2001, p. 2). Although, as Schatzki et al. (2001) contend, theorists who at the very least identify with the idea that practice activities are those of the person, practices are minimally

conceived as an array of human activity. Other general views associated with these ideas are that activity occurs within and are aspects or components of fields of practices as "the total nexus of interconnected human practices" (Schatzki et al., 2001, p. 2).

Considering the variety of understandings of practice and the range of theoretical aspects associated with practice, I decided to establish a conceptual definition of practice to support and guide this thesis. Using the term 'conceptual definition', I aim to signify that this is my understanding of practice as a phenomenon informed by the literature, aligned with the interpretivists' position I have adopted for this research. An interpretivist position also posits knowledge as a social construction (Crotty, 1998). To build a conceptual definition of practice to guide this thesis, I begin by exploring and comparing three descriptions of practice proposed by key scholars in the area of practice.

The first description of practice I refer to is proposed by Theodore Schatzki. Schatzki (2012) argues that "social life, or human coexistence, transpires as part of bundles of practices and material arrangements" (p.15). Practices, he describes as "open spatial-temporal nexuses of doings and sayings that are linked by arrays of understandings, rules and end-task-action combinations (also emotions and even moods) that are acceptable for or enjoined of participants" (Schatzki, 2012, p.15). According to Schatzki, this would include a cooking practice, protest practice, planning practice and so on. Material arrangements he explains as "collections of people, artefacts, organisms and things that are linked by such matters as contiguity, causality and physical connections" (Schatzki, 2012, p.15). Thus, Schatzki's description of practice is about what people do, where what people do, is comprised of a broad array of activities that are linked in differing ways.

The second description of practice I refer to is proposed by Reckwick (2002). For Reckwick (2002), a practice is social as it is a "type of behaving and understanding that appears at different locales and different points of time and carried out by different bodies and minds" (p.250). In recognition of the many theories of practice, including those discussed by Schatzki (2001), Reckwick isolates several common features and characteristics of practice using an element approach to define practice as:

> a routinised type of behaviour which consists of several elements, interconnected to
> one other: forms of bodily activities, forms of mental activities, 'things' and their use,

a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. A practice – a way of cooking, of consuming, of working, of investigating, of taking care of oneself or of others, etc. – forms so to speak a 'block' whose existence necessarily depends on the existence and specific interconnectedness of these elements, and which cannot be reduced to any one of these single elements. (2002, p. 249)

Like Schatzki (2012), Reckwick's (2002) description of practice involves people doing, which he describes as a type of behaviour involving several interconnected elements.

The third description of practice I refer to is that of Shove et al. (2012), who, whilst acknowledging Reckwicks's (2002) conceptualisation of practice, propose a simpler way to define practice. They suggest that social practices consist of "elements that are integrated when practices are enacted" in which "practices emerge, persist and disappear as links between their defining elements are broken" (Shove et al., 2012, p.1). By conceptualising practice using the element approach, they further argue that it provides a simplified way to theorise and research practice. These defining elements being:

materials including things, technologies, tangible physical entities and the stuff of which objects are made: competencies-which encompass skill, know-how and technique: and meanings-in which they include symbolic meanings, ideas and aspirations (Shove et al. 2012, p.9).

The above three descriptions of practice reflect a few similarities. These similarities include framing practice as a social phenomenon, as it embraces many people; it is about what people do, with what people do being made up of several interconnecting elements. These elements include materials, competencies and meanings. Although exploring and comparing the three descriptions of practice proposed by key scholars in this area provides a helpful way to develop a conceptual definition of practice, there is a range of other theoretical ideas associated with practice, which are important to this thesis. For example, the role of context may have implications for how practice is understood and enacted (Billett, 2015; Boud, 2012; Dall'Alba, 2009b; Higgs, 2019).

To further establish a conceptual definition of practice to guide this thesis, I explore the ideas associated with practice theory in more detail. These ideas provide a range of concepts that may influence how one might conceptualise practice and pose implications for improving practice. Exploring these theoretical ideas in relation to improving practice is of particular interest, given the key problem underpinning the thesis is the need to improve the professional practice of environmental health. I explore practice theory further in the next section.

2.4 Practice theory: establishing a conceptual definition of practice, exploring the implications for improving practice

Practice theory is complex. Derived from various fields of study, including anthropology, sociology and history, it follows that there is no one unified set of ideas with respect to practice theory (Schatzki, 2012; Higgs, 2019). Despite this, Schatzki (2001) contends that some core concepts are central to most practice theories: that practices are conceived as "embodied, mediated arrays of human activity centrally organised around a shared practical understanding" (p.2).

In this thesis, I conceptualise professional and occupational practice as a subset of practice. To generally mean a form of work, employment or a job where people are paid (Higgs, 2019). I also acknowledge that there is no agreed definition or description of a profession or a clear distinction between professions and occupations. As Scanlon (2011) argues, significant sociological research over the last 100 years has yet to arrive at a satisfactory solution regarding what a profession is or what distinguishes a profession from other occupational groups.

While recognising there is no agreed distinction between a profession and occupation, in this thesis I conceptualise a profession as having a set of sub-characteristics. These sub-characteristics further distinguish professional practice from other types of occupational practices. These characteristics are based on a traditional or historical conceptualisation of a profession (which I will refer to as traditional from now on). These characteristics are grounded in the ideas of occupations that have a contract with society, which in turn grants "status privileges and financial rewards on the understanding that they will be devoted to service, will guarantee competence, be moral in their endeavour and address society's concerns" (Cruess, Cruess, & Johnston, 2000, p. 43). Generally, such groups are self-regulated, accountable, tertiary educated and guided by codes of ethical conduct (Higgs, 2019).

By conceptualising professional practice based on the traditional characteristics, I also recognise that other occupational groups may also adopt the label of profession or being professional. For example, occupational groups who claim the label of professional, rather than this title being awarded by society, such as a professional athlete, painter or florist (Higgs 2013; Horsfall & Higgs, 2019). In doing so, as Horsfall and Higgs (2019) assert, such groups may seek the outcomes of status and reward but are less focused on societal obligation, in contrast to traditionally recognised professional groups where service to the community or civic identity is at the fore. The rationale for adopting the conceptualisation of professional practice based on the traditional characteristics of a profession is due to the alignment of these characteristics with those underpinning the professional practice of environmental health. Whilst I have highlighted a distinction between the types of occupations that may claim the title of a profession, based on the characteristic of service to the community being at the fore, in Chapter 3, I critique and explore the challenges associated with this aspect of the traditional conceptualisation of a profession in more detail.

In this section, when exploring the implications of improving professional practice in relation to the theories or ideas underpinning practice, I also include literature that refers to the implications for improving occupational practice. I include this literature as both occupational and professional practice are particular types of practice or set of bounded social practices (Schatzki 2012; Higgs 2013) and thus share the same theoretical ideas underpinning practice.

I will now explore the theoretical aspects of practice, and the subsequent implication of these theoretical perspectives for improving professional practice, under the sub-headings of:

- People and the social
- Context, experience and embodied understanding
- Communities and landscapes of practices
- Doing, being, knowing and becoming.

I conclude this section by establishing and describing the conceptual definition of practice I adopted to support and guide this thesis. I also summarise the implications of these theoretical ideas for improving professional practice.

2.4.1 People and the social

Practice is often theorised as being relational, meaning practice occurs in relation to others, and as a co-construction; that is practice is socially constructed with others (*see* Boud, 2012, 2016; Crisp et al., 2019; Higgs, 2019; Wenger, 1998). As Higgs (2019) highlights, "practice is a social construct in that to understand it we need to give meaning to it; that is a social rather than individual process of meaning making and attribution" (p.3). As a social construct, people are carriers, performers or practitioners of practice (Reckwitz, 2002; Shove et al., 2012). As such, people engaged in practice are active and reflexive and not isolated or independent (Corsini, Laurenti, Meinherz, Appio, & Mora, 2019) or a "passive entity dominated by social forces that they are unable to comprehend" (Reckwitz, 2002, p. 245). As Higgs (2019) further says, "Practice theories tend to support the value of both individual actions and agency along with culture and society. While society provides the framework (both constraining and facilitating), the individual is influenced by and can influence the system" (p.4).

Shove et al. (2012) also contend that people are often not perceived as the central object of social practice theories. Yet, in the moment of doing, those engaged in practice, Shove et al. (2012) posit, are simultaneously reproducing the practices. This includes the elements of which they are made, such as materials, meanings and competencies. However, as Higgs (2016) notes, "human bodies and bodily performance play a central role in practice, with bodily agency, expressiveness, intentionality and affective responses are all shaped by social normalisation, but human beings have the freedom to act in ways that realise these system-led normative constraints" (p.7). Additionally, as Schatzki (2012) contends, the future and past dimensions of activity determine what people do or people act for the sake of something in the future, with such activity temporal in nature and inherently teleological and motivated. Thus, human activity is a temporal-spatial event, in that what determines what people do, is only fixed or settled with its happening.

In summary, this discussion suggests that practice (what people do) as a phenomenon is a social construct with meanings about practice constituted through a socially negotiated process. Thus, to understand how to improve practice, an investigation needs to include people who practice, where improvements to practice could be influenced by many differing elements, such as materials, meanings and competencies. These ideas also suggest that developing an understanding of past practice can provide the opportunity to inform future practice. Or, as

Marton & Booth (1997) contend, "by understanding how we have dealt with aspects of the world in the past provides insight into how we may deal with such aspects in the future" (p.55).

2.4.2 Context, experience and embodied understanding

Context, experience, and embodied understandings of practice are key concepts with respect to practice theory. From a practice theory perspective, people are conceived as possessing differing individual and social group backgrounds, inclusive of culture, language, gender and education and regarded to participate in multiple and variable historically, temporally and socially located contexts (Billett, 2015; Higgs, 2019; Marton & Booth, 1997). Collectively these factors are likely to influence peoples' embodied understandings of phenomena, such as practice, with such understandings likely to vary, change and sometimes be incomplete (Dall'Alba, 2004; Dall'Alba, 2009b; Marton & Booth, 1997). By embodied, I mean "the human capacities such as know-how, skills, tacit understanding and dispositions" (Schatzki, 2012, p.14). Or, as Boud (2016) describes, practice is embodied in the persons of practitioners. Practitioners enact practice as their whole person, and "their practice involves a wide range of dispositions, motives, feelings and ideas of themselves and it cannot be separated meaningfully from the person" (Boud, 2016, p.161).

Collectively the concepts of context, experience and embodied understanding are often acknowledged in the literature as having implications for improving practice. Key implications relate to how these concepts are viewed or conceptualised with respect to educational approaches and, subsequently, learning experiences that form the basis for professional development. These experiences include developing and maintaining expert performance (Billett, 2015; Boud, 2016; Dall'Alba & Sandberg, 1996). While there is not one agreed definition of learning or 'learning experience' which is accepted by theorists, researchers or practitioners and "maybe many inherently different types of learning" (Hager & Hodkinson, 2011, p. 36) exist, I conceptualise learning as "what people construct and label certain processes/activities/products as 'learning'," (Hager & Hodkinson, 2011, p. 37).In this thesis, as I explore further in Chapter 3, this includes the ability to change a person's awareness about a phenomenon through experiencing variation.

I also recognise that professional development is not a clearly defined area. However, I conceptualise professional development as ''the ongoing education of professionals through

the various stages of their careers'' (Hager & Hager, 2011, p. 37). This includes formative formal educational experiences required to gain qualification to practise in an occupational field and those sought after this experience. For example, additional qualifications or activities set by a workplace to enhance professional skills and experiences informally gained through on-the-job learning (Dall'Alba & Sandberg, 2006).

The connection between education and practice, as a basis for developing and maintaining expertise, is highlighted by Higgs (2019) as playing a critical role in pursuing the improved qualities, knowledge and advancement "of the practices of the practice community" (p.14), with education and professional development critical factors in exploring and enacting practice relevant to the context. Higgs (2019), drawing on the ideas of Nerland (2016), points out that ongoing professional development is not only a professional expectation in the context of specialised expertise, but it is also a distinguishing characteristic of a profession. It is also necessary given the evolving nature of occupational fields, requiring associated practices to be continually developed for the professional group to maintain legitimacy and sustainability (Higgs, 2019).

Cherry (2005) also emphasises the critical role education has in preparing practitioners, particularly to deal effectively with "the generic uncertainty and deep instability of the global age" (p.309). Discussing the ideas of Marton & Booth (1997), Cherry highlights that professions by definition "are about the application of knowledge to a range of varying situation and problems" (Cherry, 2005, p. 310). Thus, she contends that handling varying and unfamiliar conditions are fundamental for effective practice in real life, particularly in a societal context where this range is susceptible to change in both speed and sometimes in scale, defying prediction. Cherry (2005) further contends that knowledge has not only become a critical commodity, but the critical skill requirement is "creating, identifying and applying the right knowledge" (p.310) with learning and acting on this learning individually and collectively a key challenge for all of us. For universities, this means trying to "prepare students to engage effectively with situations in their professional lives that are increasingly difficult to predict or define in advance" (Cherry, 2005, p. 311).

As Barnett (2000) also notes, we live in times where our world is super complex. We are increasingly faced with more competing frameworks for understanding the world, including

the open-endlessness nature of ideas and interpretations as we engage with research and understandings of our practice. These factors Barrett (2000) contends has irreversibly changed the way with think about knowledge. This knowledge can become unsettling or destabilising as it conflicts with how we think about managing our work and life. As such, curricula and pedagogy needs to open up students to unsettling possibilities whilst helping to develop the inner resources to continue to learn in a super complex world (Barnett, 2011).

With the above arguments in mind, in the next section I explore the concepts of context, experience and embodied understanding further, with respect to educational approaches adopted as a basis for professional development. This section includes discussing the implications of these concepts for improving practice. I do so under the sub-headings of a container view of practice and experiencing variation in practice.

A container view of practice

Failure to recognise the influence of context, experience and embodied understanding with respect to educational approaches adopted for developing a person for occupational or professional practice is widely identified in the literature as having a range of implications for improving practice. In particular, educational approaches involving curriculum design underpinned by competency frameworks are argued to assume a container view of practice. This can lead to practice being de-contextualised and constituted as an objective structure consisting of institutionalised social rules and norms (*see* Boud, 2012; Dall'Alba & Sandberg, 2006; Hager & Hodkinson, 2011, Dalla'Alba, 2009).

The key assumptions associated with adopting a container view of practice are that expert performance can be identified based on a range of generalisable knowledge, skills and attributes or attitudes, which make up such performance. This gained knowledge and skills can then be performed within such a practice container (Boud, 2012; Dall'Alba & Sandberg, 1996; Hager & Hodkinson, 2011). Or, as Hager & Hodkinson (2011) assert, practice is conceptualised as the acquisition and transfer of knowledge based on the pre-specification and delivery of content. Adopting this approach to professional development Schön (1983, 1987) argued was inadequate and misleading, as it artificially separates theory from practice, creating a theory-practice divide, providing an insufficient basis for the preparation for the complexities of professional practice.

The theory-practice divide involves attempts to separate conceptual knowledge or knowledge grounded in scientific certainty from procedural knowledge or the tacit and less articulated aspects of practice as experienced by the practitioner, giving preference to the former as a basis for professional development (Barnett, 2000; Billett, 2015; Scanlon, 2011). It also refers to the focus of research, particularly amongst the higher education sector, on knowledge creation which contributes to ideal standards and performance (Freidson, 2001) or distances our understanding of human practices rather than deepening this understanding (Dall'Alba, 2009a). This has implications for the ability to deal with "messy problems in the swampy low land" (Schön, 1983, p3), which Schön argued are the problems of greatest human concern and fall outside existing theory and technique. Or as Cherry (2005, p.310) describes, such messy problems are becoming increasingly wicked, in that they sit outside technical rationality, occur in "white spaces" of existing knowledge or procedures, where data may be limited, ambiguous or contradictory and systemic, in that causes are not obviously connected, involving multiple variables and stakeholders. Such problems, for example, those associated with climate change, are the sorts of situations that are becoming central to the person and professional practice.

Thus, educational approaches to professional development that focus on attaining conceptual knowledge or technical rationality, as Scanlon (2011) highlights, provide an insufficient basis to tackle the complexity, uncertainty, instability and value conflict that characterise real practice. Or, as Samson (2014) argues regarding social work, a focus on science, including searches for evidence-based practice, based on gaining objective truths to inform and develop professional competency, fails to recognise "the moral and practical considerations that are involved in working with complex human beings" (p.4). As such, Samson (2014) posits practitioners need to go well beyond the scope of working from just a technical and rational standpoint to recognising both the science and artistry (encompassing experience, intuition and holistic perceptions of practice) through developing practice wisdom.

Practice wisdom, as Higgs (2016) describes, "is an embodied state of being, comprising self-knowledge, action capacity, deep understanding of practice and an appreciation of others that imbues and guides insightful and quality practice" (p.65). Taking a practice wisdom approach to professional practice recognises that effective practice needs to go beyond the use of technical knowledge, or context-independent, scientific knowledge, to the drawing on multiple forms of knowledge. This includes being able to derive knowledge from that used in practice

and recognizing the multiple world views and interests that different people and cultures, and contexts bring to the situation, including encompassing the ideas of praxis (Higgs, 2016). Praxis can be described as "what people do when they take into account all the circumstances and exigencies that confront them at a particular moment and then, taking the broadest view they can of what it is best to do, they act" (Higgs, Jensen, Loftus, & Christensen, 2019, p. 21).

The adoption of educational approaches to professional development underpinned by competency frameworks are therefore seen to promote a reductionist or narrow, technical instrumental approach to education (*see* Billett, 2015; Trede & McEwen, 2016; Walther, Kellam, Sochacka, & Radcliffe, 2011; Dall'Alba, 2009b). This is referred to as the normative professional curriculum, where content is de-contextualised, often fragmented into specific discipline and subject areas, from the basics to more applied areas, and often includes a work practicum. The expectation is that students can apply what they have learnt from this 'container view of practice' to real-life practice problems (Dall'Alba & Sandberg, 1996; Mann, 2007; Dall'Alba, 2009b). One of the key problems, as argued by Boud (2016), is that such frameworks promote individualistic learning experiences in order for students to demonstrate achievement of specified learning criteria and standards or codified knowledge, overlooking the relational, contextual, emergent and social nature of occupational or professional practice.

As Boud (2016) asserts, the concept of practice is evolving, becoming richer with the nature and variety of settings in which it takes place also changing. These contextual factors have resulted in practitioners rarely working alone, with practice multidisciplinary and often transdisciplinary in character, co-created actively with others inside and outside their professional sphere. Thus, as Boud (2016) contends, professional courses designed with a focus on individual or autonomous practice are not only a risky means of developing professionals but have an unrealistic assumption about what practice is. Furthermore, assessment practices that emphasise the attainment of codified knowledge, with less focus on the relational, co-constructive and situational nature of practice, are also risky as they reduce opportunities to develop individual and collective critical reasoning and questioning of the practice itself (Boud 2016).

The importance of reflection, grounded in the ideas of Dewey (1993), Kolb (1984), Schön (1983, 1987) and Lave (1993), together with the ability to critically and collectively reflect on

the social, organisational, cultural or contextual factors that influence practice decisions, are crucial elements required for professional learning (Boud, 2016; Boud, Keogh, & Walker, 1996; Boud & Walker, 1998; Hager & Hodkinson, 2011). These elements are essential to support the ability of practitioners to effectively perform, improve and develop their respective area of occupational practice, particularly to deal with the complexities of practice associated with the generic uncertainty and deep instability of the global age (Cherry 2005). For example, when dealing with uncertain problems, it is not enough to analyse uncertainty as a technical problem, as empirical studies have identified that for scientific advice to successfully function "a lot of boundary work between the spheres", is required which is often not publicly recognised or communicated (Craye, Funtowicz, and Van Der Sluijs, 2005, p. 234).

Thus, reflective approaches that openly deal with different societal perspectives and policy options, together with the deeper dimension of uncertainty such as "indeterminacy, ignorance, assumptions and value loadings", are therefore required (Craye et al., 2005, p. 218). These approaches are necessary to not only contribute to the negotiation of the management of risk associated with uncertainty but as a source of learning to enhance the quality and robustness of knowledge input in policymaking (Craye et al., 2005). As Estwistle (2005) also contends, professional education is more than embedding critical reflection in a curriculum but engaging students in disciplinary ways of thinking and practising.

The adoption of individual assessment practices, at the expense of critical collective reflection on the less tacit aspects of practice, can also have implications for practicums, work-integrated or practice-based learning experiences aimed to enhance students' preparation for professional practice (Billett, 2015; Trede & McEwen, 2016). As Trede & McEwen (2016) describe, a focus on assessing skills, knowledge or competencies can discourage students in workplace situations from the deep questioning about practice, including why things are done in a particular way due to a fear of being badly assessed or not fitting in. They further point out, that whilst employers encourage student questioning and value the potential opportunity to innovate and improve their own practice through these experiences, supervisors have been found to place a greater focus on ensuring completion of assessment tasks and the safety of the student, rather than providing opportunities to question the practice itself (Trede & McEwen, 2016a). Boud (2016) also argues that current university course designs, including those that use practice-based experiences, inclusive of work-integrated learning strategies or authentic learning tasks

to educate for professional practice, tend to have a poorly conceptualised view of what graduates do in their professional practice. These factors place students at risk of being trapped in current knowledge without the capacity to move beyond it.

To address the problem of a poor conceptualisation of practice underpinning course design, Boud (2012) proposes that the design of curriculum should be founded "based on a detailed analysis of the forms of practice used within the domain of the program and how they can be conceptualised and enacted" (p.64). He argues this enables greater alignment with what practice is and how it could be conceptualised in a learning context. This includes opening up opportunities to design different practice experiences to help students deal with more complex and challenging situations as they move along a trajectory more closely aligned with the typical challenges experienced in the practice settings they are likely to operate in.

Other issues associated with competency frameworks utilising a container view of practice is that professional development, including reaching expert performance, is conceptualised as filling up with new knowledge, skills or attitudes or replacing the old with the new (Dall'Alba & Sandberg, 1996). At the same time, such frameworks often adopt a stepwise or novice to expert approach to skill development (Dall'Alba & Sandberg, 2006; Scanlon, 2011). Dall'Alba & Sandberg (2006) point out these approaches have been widely criticised for failing to consider how learning content is experienced, identified in contemporary research as critical to learning. They contend that extensive empirical research identifying how practitioners experience their practice is central to how practitioners perform and develop their practice. Dall'Alba & Sandberg (2006) further argue stepwise approaches to professional development do not account for why committed individuals with extensive experiences do not achieve expert status compared to others. As they describe, if teaching is understood as knowledge transfer, efforts to improve teaching practice tend to focus on the teacher's presentation of content. Furthermore, Dall'Alba & Sandberg (2006) posit a focus on skill development can then present obstacles to achieving more complex or comprehensive or expert levels of practice. The focus becomes on refining existing skills rather than transforming to more complex levels of understanding, limiting the ability to develop expert status.

However, competency frameworks may have considerable benefits. For example, providing an explicit set of expectations of what is required to obtain professional status (Boud, 2016), or

providing a theoretical basis for making discretionary decisions in practice (Freidson, 2001). An additional challenge is agreeing on a set standard of elements for sub-specialties within the professional area (Boud, 2016). Other difficulties include the expensive, time-consuming nature of refreshing competency frameworks and the potential for such frameworks to lag behind current practice (Boud, 2016).

Experiencing variation in practice

Variations in context, experience and embodied understanding are key theoretical aspects that have implications for improving practice. Billet (2006) argues that developing effective performance in occupational practice is likely to be highly situated, associated with different workplace norms, activities, expertise and performance requirements related to the occupational setting itself. As such, practice is not fixed or a static container, and at any one given time, there is likely not to be one but many practices (Billet, 2006). Failing to expose students to the variations associated with differing occupational contexts, Billet (2006) further asserts, has implications for developing adaptable knowledge. That is, a type of knowledge that can support effective performance across various settings and times and help students transition from university to the workplace and deal with change when faced with new situations across their working lives.

The role of variation of experiences and differing understandings of workplace performance, including what constitutes skilled performance, also has implications for how practice may be enacted and performed, including developing professional competence (Dall'Alba & Sandberg (1996, 2006). Different understandings of workplace performance are associated with empirical research, which has established that people collectively experience and understand phenomena in a limited number of qualitatively different ways (Marton & Booth 1997). For example, Dall'Alba (2004) identified that different ways of understanding medical practice were found amongst a cohort of students undertaking a pre-medical professional education program. Some students experienced medical practice as patient-centred, others as a biomedical problem, despite participating in a common curriculum. Dall'Alba (2004) argues different ways of experiencing medical practice may result in inconsistencies in the types of health care patients receive. It may also have implications for developing skilled performance

by failing to prepare students to deal with the practical challenges and complexities associated with patient care, which extend beyond biomedical problem-solving.

Additionally, Dall'Alba (2004) posits that not only is there variation in the way practice is enacted, but some variations may conflict with each other. For example, viewing medical practice as diagnosing and treating the physical body (biomedical approach) is at odds with taking a holistic view of the patient that considers the impact of illness on their life (patient-centred). Dall'Alba (2004) argues these variations call into question the adequacy of professional programs that assume a container view of practice, which ignore the pluralistic and intersubjective nature of practice as a basis for developing skilled performance.

Variations associated with students' own pre-conceived ideas about a practice area, together with how academics and industry professionals involved in teaching or workplace mentoring roles, based on their own experiences of practice, can also have implications for developing expert performance (Mann 2007). As Mann (2007) argues, students may only gain a limited or partial view of practice based on these views, resulting in a less comprehensive view or understanding of the practice in question. Bennett, McCarthy, O'Flynn, and Kelly (2013) support these ideas. They found differences associated with students' reflection on the types of professional roles associated with being a doctor, such as being a communicator or collaborator, related to what had been emphasised in the prior curriculum and the historical and cultural norms of the workplace students had been exposed. These different experiences were also found to contribute to a perceived mismatch between what is taught in universities and experienced and expected in the workplace by students. In an engineering context, Jolly (2007) argues that 'real engineering' is often defined as an exclusively technical practice by both practitioners and those outside the practice community. This narrow or limited view of practice, she further argues, has implications for recruitment and reward to this area of practice, as it fails to recognise the broader aspects of engineering practice such as communication, people management and co-coordination.

In summary, context, experience, and embodied understandings of practice are key theoretical concepts that provide an additional dimension to developing a conceptual definition of practice to guide this thesis. These concepts also present a range of implications for improving occupational or professional practice. This includes the ability for practitioners to effectively

perform, improve, and develop their respective areas of practice in order to deal with complex, varying, and uncertain situations. Additionally, professional development programs underpinned by competency frameworks that adopt a container view of practice, involving a technical based curriculum, ignore the relational, contextual, emergent and social nature of professional practice. Ignoring these aspects of practice can present implications for developing practice wisdom or practice artistry while discouraging individual and collective reflection on the practice itself, posing further implications for improving and innovating practice. Competency frameworks also often adopt a stepwise approach to developing expert status, overlooking the variation in the ways practitioners may experience or understand their practice. Overlooking this variation can present implications for achieving more complex or comprehensive, or expert levels by refining existing understandings of practice. In turn, this can have implications for a practitioners' ability to deal with increasingly complex, varying and uncertain situations.

2.4.3 Communities and landscapes of practice

As described earlier, practices are also conceptualised within the literature as connecting, linking, or co-dependent with other practices across space and time, with social life built on practice (Schatzki, 2012; Shove et al., 2012). Or, as Schatzki (2012) contends, "social life transpires as parts of practice–arrangement bundles" (p.16). The idea of practices connecting, linking, or co-dependent with other practices across space and time is also reflected by Lave (1991) and Wenger (1998) in the ideas surrounding communities of practice. Wenger (1998) describes communities of practice as places where people may share, learn, and develop practice, including forming meanings and identities associated with that practice. He also proposes that communities of practice are everywhere and integral to our daily lives, meaning we can belong to several communities of practice, ranging from our own families to hobbies to those arising within our work. From Wenger's (1998) perspective, practice as a social phenomenon encompasses the negotiation of meanings and experiences, involving the whole person, encompassing our own ways of interpreting the world, the process of learning, identity formation and the creation of boundaries which may frame and link communities of practice with the rest of the world, forming a complex landscape of practice.

Landscapes of practices are also proposed by Wenger-Trayner, Fenton-O'Creevy, Hutchinson, Kubiak, and Wenger-Trayner (2014) as a key mechanism for ensuring someone becomes and

remains relevant in a particular practice domain or as a source of knowledgeability. As Wenger-Trayner et al. (2014) argue, single communities of practice miss the complexity of most bodies of knowledge, whereas different communities of practice constitute many professional and non-professional endeavours. For example, when thinking about one's own occupational practice, it is constituted or co-dependant with other different communities of practice, including those that may involve regulation, management and professional associations, all with their own histories and domains. Or, as Boud (2012) explains, "it's not just the practice of the professionals which determines the nature of the occupational practice, the work is also constructed alongside clients and customers" (p.62). Knowledgeability is thus related to engaging with various landscapes of practice.

In summary, the concepts of communities of practice and landscapes of practice provide an additional dimension towards developing a conceptual definition to guide this thesis. These concepts highlight the multiple contexts that may influence how an individual may not only experience and interpret practice through participation within specific communities, domains or landscapes of practice, but the role these contexts may have in improving practice, particularly as a source of knowledgeability. These ideas also suggest one of the key implications for improving practice, particularly when dealing with complexity and uncertainty, lies in the ability to join various landscapes of practice to effectively deal with this challenge.

2.4.4 Doing, being, knowing and becoming

Conceptualising practice based on the composition of the ideas of doing, being, knowing and becoming has gained prominence in the practice literature, particularly with respect to developing and improving professional practice (Dall'Alba, 2004; Dall'Alba, 2009; Higgs, 2012; Higgs, 2019; Higgs et al., 2010). As Higgs (2019) asserts, at the most fundamental level practice is about doing, but as I have also previously explored, the concept of doing is not as simple as this. Conceptualising practice based on the ideas of being, knowing and becoming is an additional way to theorise about practice, including the implications of these views for improving practice. These ideas are explored further in the following paragraphs.

The term 'being' reflects the idea that what we do (practice) is influenced by who we are, our identity, personal frames of reference and where we are located (Higgs 2019). Being also

reflects the ideas of "being-in-the-world in comparison to simply meaning being" (Higgs, 2019, p.4) [1]. Conceptualising practice as 'being' alerts us to the idea that practice changes as we change through our experiences of being in a changing world.

Knowing refers to recognising that knowledge is not only part of practice, but there are multiple ways of knowing, which arises from a person's being in the world through reflective experience, embodiment and theorising (Higgs 2019). These multiple ways of knowing encompass propositional knowledge gained through research and theory and non-propositional knowledge gained from personal and professional experiences (Higgs 2019). Conceptualising practice as different types of knowing alerts us to the idea that all knowledges about practice should be valued and that these knowledges are likely to change as we change through our experiences of being in an evolving and changing world.

Becoming according to Scanlon (2011) is, "an evolutionary, iterative process through which individuals develop a sense of professional self and professional identity'' (p.14). She describes professional identity as multidimensional, inclusive of our own individual, collective and provisional identity, which is situated in professional practice. The term individual refers to our own identity shaped by our own changing experiences of the world (Scanlon, 2011). By collective, Scanlon (2011) explains that our identities are also shaped by the communities of practice we engage in, reflecting Wenger's (1998) ideas of identity formation, involving the continual, negotiated experience of participation in such communities. Scanlon (2011) describes the meaning of provisional as a "kind of a rehearsal for a professional self" (p.14).

When viewing professional practice as becoming, as Scanlon (2011) asserts, "professional self is an ever-changing phenomenon and never fully realised, always in the process of becoming" (p.14). She also contends that professional practice cannot be considered a static concept where a certain level of expertise is reached, but a multidimensional ever-changing phenomenon influenced by "individuals and collective identities situated in specific professional practices" (Scanlon 2011, p.14). In this interpretation of professional practice, professionals are engaged in an iterative process of becoming, which is considered vastly different from traditional professional constructs of 'being' a professional. Or, as per Higgs

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[1] For further information about the conceptualisation of 'being' see Heidegger (1926/1990) and Wacquant (2016)

(2019), becoming relates to acknowledging that being is not static or context-free. Instead, we are essentially always in the process of becoming, as doing is a deliberate act of practice. Doing is not possible without knowledge of self, of what we are doing, or why, even if we are not conscious of it.

Conceptualising professional practice based on the composition of doing, being, knowing and becoming provides an alternative to conventional ways of conceptualising practice which adopt a container view of practice. As Higgs points out, the value of conceptualising practice based on these words is profound:

> These seemingly simple words take us to the depth of practice and practice ownership, which deals with being, embodying and becoming a professional practitioner and owing, valuing and morally enacting the type of practice that professionals espouse and to provide to their clients. It also enables us to recognise and understand practice as a journey of growth in knowledge and capability, including the ability to work in unknown and unpredictable circumstances, and critical evolution of self-determined practice and career management capabilities, rather than simply doing a job in an externally controlled, legislated and legitimated environment. (2019, p. 4)

Viewing professional development through a lens of being and becoming is also increasingly acknowledged as an important basis for overcoming problems associated with educational approaches that adopt a container view of practice. This includes providing a curriculum that integrates early exposure to contextually relevant experiences to help students understand the profession and develop professional identity (Higgs, 2013). In particular, the personal qualities critical to becoming a professional, such as how practitioners think about and approach their practices, e.g., with concern for others (Leadbeatter & Peck, 2018). As Leadbeatter and Peck (2018) contend, such developmental aspects cannot be expected to be developed separately from professional education. By focusing on more integrated and encompassing experiences of practice, rather than focusing on the fragmented and technical aspects of learning, students are also more likely to connect who they are and who they are becoming or the personal and the professional (Leadbeatter & Peck, 2018).

To address the problems associated with the theory-practice divide, Dall'Alba & Sandberg (2006) propose a professional development model that incorporates the progressive development of knowledge and skills whilst developing an understanding of, and in, the professional practice in question. Particularly as an alternate model for developing and maintaining effective practice or skilled performance by promoting professional ways of being (Dall'Alba & Sandberg 2006). I explore this alternate model further.

2.5 An alternate model for professional development: professional ways of being

Dall'Alba & Sandberg (2006) propose an alternate model of professional development to those relying on a container view of practice, based on empirical research identifying that how practitioners experience their practice is central to how practitioners perform and develop their practice. A key element of this alternate professional development model involves establishing an understanding of the different ways practitioners experience their practice. In this model, the aim is to progressively develop both the different ways of understanding or experiencing practice together with the skills required to operate within these different ways of understanding, as a form of unfolding, "professional way- of- being" (Dall'Alba & Sandberg 2006, p 380). This notion of understanding practice integrates knowing, acting and being the professional; thus, "professionals not only learn knowledge and skills, but these as renewed over time whilst becoming integrated into ways-of-being the professional in question" (Dall'Alba & Sandberg 2006, p. 389).

To explore the above concepts further, I draw on the example in Section 2.2.4, relating to different understandings of medical practice. For example, to develop and improve the practice of medicine, the focus is on developing and refining the required skills to diagnose and treat patients (from a biomedical perspective) while changing this understanding to one where the practice is also experienced as patient-centred. It also involves identifying and developing the required skills to enact practice in these different ways. In doing so, as Dall'Alba & Sandberg (2006) say, the focus on learning is "developing an understanding *of*, and *in* professional practice to form a practical understanding that is both sound and skilful" (p.402), which is embedded in the dynamic, intersubjective nature of practice. As Dall'Alba & Sandberg (2006) further describe, "medical practitioners must be not only knowledgeable about sickness,

symptoms and effective communication, but also skilful in integrating that knowledge when dealing with patients, their illness and their relatives and friends" (p.403). Thus, learning approaches that promote the acquisition of decontextualized knowledge and skills fail to address when it is appropriate to use such knowledge and skills, how to use them and for what purpose (Dall'Alba & Sandberg 2006). As Sandberg (2001) asserts, "being good at your job, means having the right understanding of your job" (p.24).

In this alternate view of professional development, understanding is not seen as limited to cognitive context, which underpins professional development models based on a container view of practice but incorporates an embodied understanding of "not only what we know and can do but also who we are becoming" (Dall'Alba, 2009b, p. 35). As Dall'Alba (2009b) further argues, if the expectation is for professional programs to transform or begin the transformation of students into becoming a particular practitioner, e.g., a medical practitioner (or for this thesis, an environmental health practitioner), then attention needs to be given to both the epistemological and ontological dimensions of practice. That is the application of knowledge and skills required of the professional area and the development of professional ways of being.

As Dall'Alba & Sandberg (2006) explain, a shift away from the traditional focus on the transfer of knowledge and skills to developing an understanding of, and in, professional practice "would mean promoting the development of professional ways of being that can deal with the complexities, ambiguities, and dynamic change inherent in professional practice" (p.401). In doing so, Dall'Alba & Sandberg (2006) further propose such a shift has implications for the design of professional education and professional development in the workplace, from both an individual and organisational level. For example, it will assist students in exploring the alternate ways of practising and developing their own stance and ways of experiencing practice whilst also experiencing variation in other views. From this perspective, curriculum development is more than just about what practitioners need to know and do; but also supports who they are becoming both personally and professionally.

In summary, doing, being, knowing and becoming provide an additional way to theorise practice, which arguably provides a simplified way to describe the phenomenon of practice. Viewing practice through this lens may also have implications for improving practice by overcoming the critiques of educational approaches that adopt learning experiences based on a

container view of practice, involving the acquisition or transfer of stepwise approaches to professional development discussed in Section 2.2.3. For example, adopting learning experiences that recognise the different ways practice may be experienced opens opportunities for practitioners to critically reflect and develop more comprehensive 'professional ways of being'. This, in turn, assists practitioners to effectively deal with increasingly complex, varying and uncertain situations whilst opening up ways to develop personal control over learning.

2.6 A conceptual definition of practice

In the previous sections, I interrogated three definitions of practice and a range of theoretical perspectives associated with practice as a social phenomenon to develop a conceptual definition of practice to support and guide this thesis. Based on this exploration, I conceptualise practice as a:

- complex, socially constructed, situated, relational, temporal, embodied phenomenon, constituted from meanings, materials and competencies, with people seen as carriers, performers or practitioners of practice; co-dependant with other communities of practice, which may frame and link such communities with the rest of the world; forming a complex landscape of practice; a form of doing, knowing, being and becoming.

In the previous sections, I also explored the implications of the theoretical concepts of context, including the influence of experience, embodied understanding, variation, community and landscapes of practice and the ideas of doing, knowing, being and becoming for improving occupational or professional practice. In doing so, I argue to improve professional practice, a shift in focus is required from conceptualising, developing and maintaining expertise based on the acquisition of knowledge and skills to recognising the implications of the ways practitioners experience their practice. I further argue that gaining improvements to professional practice requires the development of professional ways of being that can deal with the complexities, ambiguities, and dynamic change inherent in professional practice (Dall'Alba & Sandberg 2006).

From an educational perspective, I also argue that we need a shift in focus from decontextualized, individualistic and stepwise approaches to professional development based

on a container view of practice to one which incorporates the progressive development of knowledge and skills whilst developing an understanding of, and in, the professional practice in question is required (Dall'Alba & Sandberg 2006). In this model, expertise is seen as the ability to develop more comprehensive ways of experiencing practice rather than the continual refinement of skills, within an existing understanding of practice, as a way to enhance a practitioner's ability to effectively deal with increasingly complex, varying and uncertain situations, both now and in the future. In doing so, curriculum development becomes more than just what practitioners need to know and do; it also supports who they are becoming both personally and professionally (Dall'Alba, 2009b).

As such, I conceptualise expertise in this thesis as not only being knowledgeable and having skills to practice but understanding when it is appropriate to use such knowledge and skills, how to use them, and for (to) what purpose (Dall'Alba & Sandberg 2006). I also adopt the view that effective practice relies on the ability to create and apply the right knowledge to various situations and unfamiliar conditions (Cherry, 2005; Marton & Booth, 1997). Furthermore, achieving this requires ongoing critical reflection of the different ways practice is experienced to help practitioners develop more comprehensive ways of dealing with increasingly complex, varying and uncertain situations.

2.7 Conclusion

In this chapter, I introduced the concept of practice, explored the theoretical perspectives of practice and established a conceptual definition of practice to guide this thesis. I also explored the implications of these theoretical perspectives for improving practice. By examining these aspects and establishing a conceptual definition to guide this thesis, I have provided an important basis to develop further the theoretical framework required to address the key problem underpinning this thesis: the need to improve the professional practice of environmental health. In the next chapter, I explore the key characteristics of a profession, based on the traditional view of a profession, to support the key argument underpinning this thesis: the need for a new conceptualisation of the professional practice of environmental health. I also propose variation theory as an appropriate theoretical lens to support developing a new conceptualisation of professional practice.

Chapter 3: Professional Practice

3.1 Introduction

Building on Chapter 2, in this chapter, I now turn to describing and critiquing the characteristics associated with the traditional conceptualisation of a profession due to the alignment of these characteristics with those underpinning the professional practice of environmental health. I do so to establish the foundation for the core argument underpinning this thesis: that current descriptions of the professional practice of environmental health are inadequate to deal with the complexities of current and future practice. I also introduce variation theory and argue that this theory provides an appropriate theoretical lens to support the development of a new conceptualisation of professional practice. In Chapter 4, I explore the foundational ideas established in Chapters 2 and 3, focusing on the professional practice of environmental health.

3.2 A traditional view of a profession

As discussed previously, the conceptualisation of a profession I have adopted in this thesis is based on the characteristics underpinning a traditional view of a profession. In this section, I aim to describe these general characteristics as a basis to critique why such characteristics are inadequate to deal with the complexities of current and future practice.

The characteristics which underpin professions have evolved through the establishment of professional associations. Professional associations, bodies or organisations can be described as an organisation with the same occupational group members. Such groups are usually not-for-profit and seek to further the profession's interests, the individuals engaged in that profession and the public (Burrtitt, Guthrie, & Evans, 2016). Professional associations have a key role in establishing recognition of an occupation as a profession through professionalisation. Such a process involves a claim to societal recognition usually based on a range of characteristics, involving the construction of professional norms (Ferguson & Ramsay, 2010) or forming the habitus of particular groups (Rehberg, 2006). This process also includes the aim of being producers of specialised services, involving market control over expertise and the assertion of social status (Roos, 2016).

Through the examination of literature associated with occupations who have sought societal recognition as a profession (Allsop & Saks, 2002; Birden et al., 2014; Ferguson & Ramsay, 2010; Connell, Fawcett, & Meagher, 2009; Cruess et al., 2000; Evetts, 2006b, 2013; Carr-Saunders & Wilson, 1933; Hartstein & Rogers 2019; Feldstein, 2001; Higgs, 2013; Laffin, 1998; Laffin & Entwistle, 2000; Larson, 2003; Scanlon, 2011; Roos, 2016) I argue there are generally **four** characteristics associated with the traditional view of a profession.

The four characteristics which I have adopted to describe a traditional view of a profession are:

- as an ***institution*** that has been granted a moral, societal contract

- as a source of ***exclusive expertise, skills and knowledge***

- having the ability to exercise ***control over standards of practice***

- having power ***and authority*** with respect to decisions that have implications for professional practice and can exercise ***autonomy***.

The above four general characteristics of a profession I have described more fully in Table 1.

Table 1: The four general characteristics of a profession

Characteristic	General description
An institution granted a moral contract by society	A profession is an institution that has a largely unwritten contract with society, which in turn grants status, privileges, and financial rewards on the trust and understanding that it will be devoted to service, will guarantee competence, be moral in its endeavours, exercise altruism, integrity, promote public good within its domain and address society's concerns (Cruess et al., 2000; Scanlon, 2011).
A source of exclusive expert skills and knowledge	The source of expertise is developed and maintained within the profession and used to organise and deliver a range of societal services based on the rationale that the ability to deliver such services required expertise beyond that of the average citizen (Roos, 2016; Higgs, 2013). Such expertise requires long periods of education for individuals to develop the required capabilities of the profession, including developing a sense of professional identity and

Characteristic	General description
	responsibility, critical judgement, including the ability to deal with risk and uncertainty (Higgs, 2013).
Has control over standards of practice	Control extends to both technical and ethical aspects of practice gained through: (a) self-regulation of its members, inclusive of codes of conduct, to promote ongoing professional development, collegiality, research and best practice (Cruess et al., 2000; Ferguson & Ramsay, 2010). (b) external accreditation of educational programs as a means for practitioners to gain recognition to practise as part of that community. This may be linked to government regulation, e.g., authorised by statute based professional accredited qualification, usually involving a tertiary program and a period of time in a workplace (Higgs, 2013; Hartstein & Rogers 2019; Evertts, 2006b).
Has power and authority with respect to decision making and can exercise autonomy	Power and authority are related to recognised input into decisions impacting practice, such as input into government and organisational policy decisions, which have implications for the profession and subsequently professional practice; this also relates to authority over client base (Carr-Saunders & Wilson, 1933; Feldstein, 1971; Laffin & Entwistle, 2000; Allsop & Saks, 2002). Autonomy describes the ability of the profession and practitioners as members of that profession, to have independence over their practices, i.e., not subject to direction or evaluation of their own work by other professionals, and with discretion in decision making such as budget and resource allocation, processes or procedures which have implications for professional practice (Laffin, 1998; Laffin & Entwistle, 2000; Larson, 2003; Scanlon, 2011).

I have used the term 'general description' to describe the four characteristics of a profession, as the literature reflects that these characteristics are not definitive and may be described differently. For example, autonomy, as a characteristic, may sometimes be referred to in the context of professions being granted societal independence with respect to developing standards of practice (Larson, 2003). Conversely, autonomy may be described in relation to the profession or professional being granted independence over their own practices (Scanlon, 2011).

Based on the general characteristics described in Table 1, professions were regarded reasonably favourably by society in the early to mid-19th century, in western countries such as the UK (Laffin, 1998; Laffin & Entwistle, 2000). This favoured perception relates to the role professions played in defining and addressing social problems, which required the delivery of services based on specialised expertise. Such expertise was sanctioned by governments, providing autonomy and status on the basis that professions would not abuse their exclusive expertise and knowledge (Evetts, 2006b; Laffin & Entwistle, 2000). This arrangement also provided a framework for accountability that could be harnessed for public policy (Laffin, 1998; Laffin & Entwistle, 2000) whilst contributing to social cohesion (Kanes, 2010). As Kanes (2010) asserts, professions contributed to social cohesion, also described as a structural function approach to social order, as they were seen to overcome conflicts between managerial and market-based systems. This was achieved through collegial organisation and shared identity, focusing on the collective rather than the individual. These aspects also contributed to the promotion of the altruistic characteristics of the professions. During the post-war period, as Laffin (1998) contends, wide public and political acceptance of the idea of professionalism supported the creation and expansion of self-regulating professions as the major public policy response to dealing with social problems. Professionals enjoyed considerable discretion at work and influence within the public sector.

Today's societal context, however, particularly in developed countries, is markedly different from the societal context of the early to the mid-19th century. Factors such as globalisation, the adoption of a neoliberal agenda by governments, and an increased societal context of supercomplexity, wicked problems and liquid modernity, as described in Chapter 1, are what Beck and Young (2005) describe as 'an assault to the professions', and 'a crisis in confidence in the professions' (Horsfall & Higgs, 2019; Scanlon, 2011; Schön, 1987). I now turn to exploring the critiques associated with the traditional characteristics of a profession to support further the argument that a new conceptualisation of professional practice is required to deal with the complexities of current and future practice.

3.3 A critique of the traditional characteristics of the professions

Critiques of the four traditional characteristics of professions relate to a range of complex and interrelated factors emerging since the 1960s. A key factor relates to a lack of societal

confidence in both private and public sectors professions, occurring between the 1960s and 1970s. This lack of confidence has been attributed to a perceived failure of governments to deliver on post-war promises of social transformation, with the professions becoming increasingly politicised by various sectors of the community, for being unable to deliver value for money associated with the delivery of government services (Laffin,1998). This climate supported the adoption of neoliberal agendas by governments through the 1980s in many developed countries. The adoption of this agenda was on the premise that social problems could be addressed through increased economic activity by promoting individual market choice, with governments considering economic productivity to be of key importance to a nation's growth in a growing globalised economy (Laffin, 1998). These factors have also contributed to the increased privatisation of government services, mass education and an increased focus on efficiency, productivity, accountability and deregulation, often referred to as new managerialism practices amongst government and private sectors (Connell et al., 2009). This combination of factors has strained many aspects of the traditional characteristics of a profession described in Table 1. I explore these aspects further.

3.3.1 The loss of institutional trust in the professions

The institutional trust that society previously placed in the professions to address societal needs in altruistic, competent and moralistic ways have become increasingly eroded (Evetts, 2006a, 2011; Laffin, 1998; Scanlon, 2011; Dall'Alba 2009a). As Scanlon (2011) asserts, factors such as greater public accountability associated with the delivery of services by professionals requiring publication of service performance data (e.g., hospital mortality rates, school performance records), extensive media coverage of professional malpractice, easier access to knowledge by the layperson and the ability to shop around for second opinions has meant that many aspects of professional practice have become more accessible to the public to evaluate and scrutinise. The outcome of such public scrutiny is often linked to diminished public confidence associated with the key professional characteristics of altruism, competence and morality, contributing to the erosion of the societal trust previously placed in the professions.

Other key factors contributing to declining trust in the professions are the complexities associated with the 'proliferation of professions', an outcome of mass education (Horsfall & Higgs, 2019; Laffin, 1998; Laffin & Entwistle, 2000). As Laffin (1998, p 6) describes, increased education has led to more professions and would be professional groups laying claim

to "cognitive and moral territory for themselves in solving social problems". In asserting these claims, such groups must also challenge the claims of others, leading to a process of counterclaiming amongst "so-called professional experts". As a result, Laffin (1998) argues this has generated uncertainty about solutions to problems and mistrust about what knowledge is, including promoting societal perceptions of professionals as self-interested groups that complicate public policy for individual gain rather than the collective good of society. This view of the professions as self-interested groups is also reflected in the sociological literature where professions are posited as a form of dominance, power and occupational control (Freidson, 2001; Larson, 2003). Such occupational control is achieved by creating market closure through professions leveraging their superior technical, political and organisational resources to retain control over their own markets to secure financial and social reward (Muzio, Brock, & Suddaby, 2013).

The implications of the proliferation of the professions contributing to a lack of societal trust in the professions are also echoed by Horsfall and Higgs (2019). They point out the tensions arising between professionals who have the moral obligations of society at the fore and the claimed professionals or individualised professionals for whom civic identity is not central to their practice. This tension, together with academic research identifying instances of professions putting their own needs first before those of the client or patients, they posit, has had several implications for societal trust in the professions. One key implication, they argue, is that professions have failed to deal with the changing contexts of practice. As a whole, they are moving further towards individualism, self-interest and embracing market principles, rather than acting to further strengthen the collective power for the public good, including "pursuing more strongly the value of social goods and social partnerships" (Horsfall & Higgs, 2019, p. 69).

The increasing lack of societal trust in the professions described in this section, including the evolving societal context contributing to this problem, has arguably also posed challenges to the other three key traditional characteristics of a profession described in Table 1. I explore these challenges further.

3.3.2 A source of exclusive expert knowledge and skills

The claim to a source of exclusive expert skills and knowledge, as a defining feature of professional practice, has been increasingly challenged, particularly over the last 20 years (Beck & Young, 2005; Evetts, 2006a; Freidson, 2001; Burritt et al., 2016; Laffin & Entwistle, 2000; Larson, 2003; Eraut, 2011; Scanlon, 2011; Susskind & Susskind, 2015). For example, in critiquing this claim, Scanlon (2011) asserts that the key factors which pose challenges to these characteristics include a better-educated society and improved access to information via technology. As such, knowledge is not only no longer exclusive to the professions but no longer scarce. The public has become more aware of the limitations of professional knowledge, and in some cases, public knowledge may exceed that of professionals themselves.

Additionally, with the proliferation of the professions, including the development of professional sub-specialties, knowledge creation no longer takes places inside disciplinary boundaries, but increasingly between established disciplines, through cross-fertilisation between disciplines and discipline diffusion, further challenging the ideas of exclusivity of expert knowledge and skills (Muzio et al., 2013; Susskind & Susskind, 2015). Susskind and Susskind (2015) also argue that our boundaries between and within professions are eroding and as are those between humans and machines. As information becomes more widely available online, the exclusiveness of professional knowledge is increasingly challenged. These challenges to the exclusiveness of professional knowledge arguably reflect the theoretical ideas associated with practice, particularly the co-creation of knowledge between communities and landscapes of practice discussed in Section 2.4.3.

Another key critique to a claim of a source of exclusive expert skills and knowledge, as a defining feature of a profession, relates to what Schön (1983,1987) argued: a crisis in confidence in professional knowledge. This crisis in confidence is associated with the recognition that theoretical knowledge, as a key characteristic of professional expertise, is no longer a sufficient basis to deal with the complexities and uncertainties associated with the messy problems in 'the swamp land' as described in Section 2.3.3. This societal context is continuing to place pressure on the perceived value of professional knowledge. As Trede and Higgs (2019) also contend, the regard for theoretical knowledge is decreasing, giving way to feeling. There are increasing difficulties associated with real and fake news, with hard facts "a

changing notion of fluid facts" (p.56) with predictability and certainty increasingly unattainable.

Scanlon (2011) further posits rationality based on scientific certainty is being replaced by relativity and temporalisation, requiring professionals to continually "update their knowledge and in some cases unlearn what had been previously understood" (p.27). Collectively these factors have not only challenged the conceptualisation of a profession, and subsequently professional practice, as a form of mastery of technical expertise, including novice to expert knowledge acquisition, but the notion of professionals being able to achieve or claim the characteristic of a source of exclusive expert skill and knowledge.

The above changing societal context, together with the range of complexities associated with the characteristics explored in this section, also has implications with respect to a profession's control of standards of practice, including education for professional practice. I explore this further in the next section.

3.3.3 Has control over standards of practice

Professions having control over standards of practice such as technical and ethical aspects of practice through self-regulation and external regulation of professional educational programs has also been challenged, particularly over the last 30 years. These aspects are explored further in the following sections.

The loss of self-regulation of practice

The loss of control of technical and ethical aspects of professional practice has been associated with deprofessionalisation, a process involving loss of the professional characteristics associated with occupations (Scanlon, 2011). Deprofessionalisation is often linked to the adoption of new managerialist practices within private and public sectors resulting in the increased surveillance and control of professional work by managers, involving the use of performance indicators and the codification of professional knowledge (Laffin & Entwistle, 2000). Such practices are also linked to promoting individualist professional practices and a context where all workers are replaceable (Scanlon, 2011). As Scanlon (2011) posits, the implications of these factors include a loss of professional technical expertise or deskilling of the professional workforce, loss of professional identity and collegiality as professionals

withhold information for individual gain. As Muzio et al. (2013) assert, with the adoption of new managerialist practices, professional identities are increasingly framed around the logics of efficiency and commerce, displacing traditional logics of ethics and public service. In so doing, the value of the traditional institution of self-regulation is eroded, with the professional service becoming the primary site of professional regulation and control.

Other factors contributing to a loss of control over standards of practice by the professions relate to increased regulation by the government or a move to the co-regulation of the professions (Allsop & Saks, 2002; Burritt et al., 2016; Professional Standards Councils, 2015). Increased regulation has been attributed to professional malpractice, such as instances of medical malpractice (Evetts, 2011; Kenny & Adamson, 1992; Scanlon, 2011), the loss of confidence in large corporate sectors such as banking (Lewis, 2017), professional firms becoming multidisciplinary and transnational, (Muzio et al., 2013), and an increasingly litigious culture (Allsop & Saks, 2002). Increased regulative measures aimed to ensure the protection of the consumer and prevent potential abuse of professional monopolies further contributes to a loss of control standards by the professionals (Burritt et al., 2016; Lewis, 2017). Consequently, a profession's ability to control standards of practice has not only been clouded by these additional layers of regulation, but as Horsfall & Higgs (2019) assert, professions are becoming "other" (p.68) regulated. This reduces opportunities for, and expectations of, self-regulation, decreasing the pursuit of social good as a primary criterion of professionalism.

The loss of standards associated with external regulation of professional education

The main critique with respect to a loss of control over standards of technical and ethical standards of practice associated with external regulation of professional educational programs is arguably closely linked to a key factor. That factor is the ability of universities, as key bodies involved in the education of the professions for professional practice (Freeman & Evans, 2016; Orrell & Higgs, 2012), to facilitate learning experiences that sufficiently support the development of the required technical and ethical aspects of practice. This includes the knowledge, skills, attributes, attitudes, values, and capabilities that professional bodies have deemed necessary for graduates to gain or achieve readiness for membership into the professional area of practice as part of the professional socialisation process.

I refer to professional socialisation as:

> an individual's journey associated with becoming a member of a particular profession, including developing the expected capabilities and sense of professional identity and responsibility, inclusive of the way a profession, through its educators, practitioners and leaders, socialises or inducts new members Higgs (2013, p. 86).

The ability for universities to achieve the required technical and ethical aspects of practice, as a key partner in the professional socialisation process, I argue, is related to the adoption of learning approaches underpinned by competency frameworks as discussed in Section 2.4.3. The adoption of competency frameworks is connected to reforms to this sector associated with the current neoliberal political environment (Barnett, 2000; Hager & Hodkinson, 2011; Trede & McEwen, 2016). The ability for universities to address this problem, including providing learning experiences that prepare students to deal with complexities and uncertainties associated with current and future practice, while translating values of social good amongst graduates, as a key defining characteristic of a profession, is complex. These complexities, I contend, are related to a range of complex debates regarding the role of universities in today's societal context, particularly in western countries.

One such debate relates to whether universities should be a source of skilled labour, producing graduates to service current and to some extent, future economic needs aligned with the current neoliberal agenda (Crisp et al.,2019). In this view, economic goodwill translates to the common good, in accordance with a neoliberal ideology, with employability a key contributor to this outcome (Horsfall & Higgs, 2019). Alternatively, should universities be settings that aim to produce graduates who can also question current thinking and social norms? This approach is aligned with a more liberal education, where universities were valued for their public role and social purpose, through producing graduates who provided professional services in areas such as health, education and law, based on a liberal arts education (Billett, 2015; Horsfall & Higgs, 2019; Pham & Saito, 2019). As Horsfall and Higgs (2019) describe in this historical view, universities were places for students to "engage in robust, thoughtful discussion with the aim of producing responsible, highly skilled and competent, engaged citizens" (p.73). However, such historical notions often positioned universities as elitist institutions, producing graduates and research removed from local community interests (Horsfall & Higgs, 2019).

In today's societal context, the former approach, where skilled labour is a key focus of universities, with measures of graduate employability increasingly relied upon as an indicator of the societal relevance of universities, has become the dominant focus in many westernised countries, including Australia (Crisp et al., 2019; Pham & Saito, 2019). This focus, together with the massification of education, reduced public sector funding with universities becoming heavily reliant on fee-paying or partial fee-paying students, increased enrolments and class sizes, has resulted in several challenges for universities (Pham & Saito, 2019). One such challenge relates to the ability of universities to effectively support the professional socialisation process, including fostering the ethical or cultural dimension of practice or translating values of social good amongst graduates, a key defining characteristic of a profession and professional practice.

For example, as Trede and McEwen (2016) contend, the increased commodification of education has led to many universities giving leeway to marketing experts and finance managers influencing the design and delivery of education programs. These aspects, adding to the complexity of the ability to promote learning experiences that sufficiently consider the moral and social responsibilities of practice. Horsfall and Higgs (2019) also posit that the current neoliberal climate has resulted in universities pouncing on new popular trends (e.g., courses, modes of participation), with a limited critique of the cost to institutions, community and students of these new or popular trends. In some cases, this also results in the packaging of programs into "bits and pieces" (p.70), having implications for shaping novices into communities of practice. Consequently, Horsfall & Higgs (2019) further posit that the outcome of gaining a professional education in today's context is becoming more about an economic benefit to society and individual gain rather than as a service for the community.

In addition, within the current context of mass education and employability, Horsfall and Higgs (2019) argue that despite universities producing more and more graduates over the last 30 years, social injustices continue, and social inequality is increasing in many Western countries. Furthermore, as they contend, the environment is in crisis and "there is rising uncertainty about if and how the human race will survive" (Horsfall & Higgs, 2019, p. 72). This situation raises important questions concerning the logic that economic good translates into common good and universities' ability to develop graduates who have societal needs at the fore, rather than individual gain due to this context (Horsfall & Higgs, 2019). Such commentaries also arguably

raise further debate as to whether universities are achieving graduate employability outcomes if one adopts the definition of employability as the capacity to "employ" one's "abilities" (Bridgstock et al., 2019, p.91). With ability conceived as harnessing "ones" skills, knowledge and other attributes to add value across a range of different contexts across the life course, including family, community and civic engagements, as well as in work and career" (Bridgstock et al., 2019, p.91).

A further complicating factor concerning the ability of universities to design or sustain learning experiences that support the professional socialisation process is difficulties associated with the provision of practice-based experiences, for example, work-placements or work-integrated learning or other authentic learning experiences. Key problems related to providing these experiences include equity and access to industry experiences for all students, exasperated by larger student numbers, with some universities opting to impose mandatory requirements such as grade point averages for participation (Dunn, Schier, Hiller, & Harding, 2016). Other challenges also include the resource-intensive nature of WIL programs (Cooper, Orrell, & Bowden, 2010; Edwards, Perkins, Pearce, & Hong, 2015; Jackson, Rowbottom, Ferns, & McLaren, 2017), including the need for ongoing professional development and commitment of academic staff to support the provision of quality programs (Patrick et al., 2009; von Treuer, Keele, & Sturre, 2012). Other difficulties include the ability for academics to develop practice-based learning experiences without institutional and stakeholder support (Crisp et al., 2019; Dunn & Pocknee, 2009; Edwards et al., 2015). What constitutes an authentic learning experience and how this aligns with professional accreditation policies, which specify the integration of such experiences for students to enter a profession, can also be problematic (Dunn et al., 2018). A need for a greater understanding of pedagogical approaches underpinning WIL programs and greater integration between those adopted on campus to enhance student learning has also been raised in the literature (Eames & Coll, 2010; Coll et al., 2011).

In summary, professional bodies' ability to control standards of practice through the process of external accreditation of educational programs is arguably linked to the ability of universities to achieve these expected standards. This ability is further complicated by universities adopting learning approaches underpinned by competency frameworks and the complexities faced by universities in facilitating learning experiences that sufficiently prepare students for

professional practice, particularly with social good at the fore, in today's neoliberal political climate.

3.3.4 Has power, authority and autonomy with respect to decision making

The ability of the professions to maintain power, authority, and autonomy regarding decisions that impact their practice has also been challenged over the last 30 years. This is also associated with the changing and evolving societal context. For example, mass media, the rise of social movements such as environmental lobby groups and the creation of think-tanks are associated with lessening the power professionals held as creators and change drivers of government policy (Connell et al., 2009; Laffin, 1998; Laffin & Entwistle, 2000). Co-regulation is also linked to government authorities having more power to discipline and suspend employees, particularly in the health care sector. This increase in power has implications for maintaining professional autonomy concerning independence over standards of practice (Allsop & Saks, 2002).

The ability for professionals to work autonomously, including self-employment as a mechanism to maintain discretion in decision making, has also been subject to erosion. This has occurred due to increased corporatisation of the public sector or private franchising of professional services, where standardisation, target setting, and performance review are adopted as a form of occupational control (Evetts, 2006a; Scanlon, 2011). The outcomes of such controls have been associated with the de-motivation of professionals. In some cases, professionals' questioning their own identities having implications for recruitment and retention in the professional area of practice (Scanlon 2011). For example, Newman and Lawler (2009), in a study in New South Wales (NSW), found that nurse unit managers roles have become framed by performative management and organisational surveillance. These factors seriously diminish their ability to manage nursing services and provide professional and clinical leadership, as well as their work satisfaction, motivation and commitment. Similar outcomes have also been reported in a wide range of other professional areas (Connell et al., 2009).

3.4 Summarising the critiques to the traditional characteristics of the professions

In the preceding sections, I identified several challenges to the four characteristics associated with the traditional conceptualisation of a profession as a basis to critique why such descriptions are inadequate to deal with the complexities of current and future practice. I argue that the complexities of current and future practice relate to the complexities associated with both the changing and evolving context of professional practice and the complexities inherent in the practice itself. The changing and evolving context of practice, I argue, is associated with globalisation and the adoption of a neoliberal agenda by governments in a societal context increasingly framed by super complexity, wicked problems and liquid modernity.

The complexities inherent in the practice itself, I argue, relates to the conceptual definition of practice I adopted to guide this thesis, outlined in Section 2.6. Namely: as a socially constructed relational phenomenon; a form of doing, knowing, being and becoming. In adopting this conceptual definition. I further argue that current approaches to professional development involving a container view of practice ignore these theoretical ideas underpinning practice. As such, it provides an insufficient basis to develop and improve professional practice. These complexities have collectively challenged the traditional characteristics underpinning professional practice and the ability for professionals to effectively deal with the complexities and uncertainties associated with current and future practice. These key critiques and challenges are summarised in Table 2.

Table 2: Key critiques of the traditional characteristics of the professions

Characteristic	Critique
The loss of institutional trust	Greater public scrutiny of professional competence associated with: accountability measures, increased public access to information and media coverage of professional malpractice (Scanlon, 2011), a proliferation of the professions, leading to conflicting professional opinions, perception of occupational control and market closure (Horsfall & Higgs, 2019; Laffin, 1998; Laffin & Entwistle, 2000). Rise of claimed professionals creating tensions with professional groups who have societal needs at the fore, contributing to siloed and fragmented responses to societal problems and diminished public confidence associated with

Characteristic	Critique
	the key characteristics of altruism, competence and morality related to societal trust (Horsfall & Higgs, 2019)
The erosion of claims to exclusive expert knowledge and skill	A better-educated society through improved access to information, resulting in the public becoming more aware of the limitations of professional knowledge (Scanlon, 2011). The proliferation of the professions and development of sub-specialties resulting in knowledge creation no longer taking place inside disciplinary boundaries, eroding and challenging the exclusiveness of professional knowledge (Muzio et al., 2013; Susskind & Susskind, 2015. Crisis in confidence in professional knowledge associated with the theory-practice divide Schön (1983,1987) with rationality, based on scientific certainty as a defining feature of expertise, no longer sufficient to deal with complexity and inherent uncertainty associated with messy and wicked problems.
The loss of control of standards of practice	Deprofessionalisation linked to the adoption of new managerialist practices within private and public sectors, resulting leading to increased surveillance and control of professional work by managers (Laffin & Entwistle, 2000). Increased regulation by the government or a move to co-regulation of the professions associated with regulative measures aimed to ensure the protection of the consumer and prevent potential abuse of professional monopolies (Allsop & Saks, 2002; Burritt et al., 2016; Professional Standards Councils, 2015). Complexities faced by universities in facilitating learning experiences that can sufficiently support the professional socialisation process in today's neoliberal political environment (Barnett, 2000; Hager & Hodkinson, 2011; Trede & McEwen, 2016).
The loss of power and authority over decision making	Rise of mass media and social movements such as environmental lobby groups and the creation of think-tanks, lessening the power professionals held as creators and change-makers. Increased corporatisation of public sector or private francisation of professional services standardisation, target setting, and performance review are adopted as a form of occupational control (Connell et al., 2009; Laffin, 1998; Laffin & Entwistle, 2000).

Given the complexities outlined in this section, it is clear that not only are the professions in crisis, but this critique also raises several questions regarding the societal future of the professions and professional practice. For example, do we need professions at all? To further build the core argument underpinning this thesis: that current descriptions of the professional practice of environmental health are inadequate to deal with the complexities of current and future practice, I explore the ideas regarding the future of professions and professional practice further.

3.5 The future of the professions and professional practice

Thinking about the future of the professions and professional practice arguably requires thinking about what the future will look like and what sort of knowledge and expertise will be needed to meet future societal needs. As Cork and Horsfall highlight, thinking about the future of practice brings a range of questions such as:

> Whether all members of society have a clear picture about what type of future they would like, if this future is same future shared by all or different versions depending on your culture, why we should care about the possible future of practice and who should be interested, educators who train practitioners, practitioners and/ or their professional bodies, or even the whole of society? (2019, p. 18).

Adding to the above complex questions is that the future is not only unknowable in detail, but planning using prediction is invalid and risky (Cork & Alford, 2019). Cork & Alford (2019) posit that an alternative to prediction is to consider how technological, economic, political, legal and other factors may interact together using scenario-thinking, focusing on critical uncertainties. For example, when thinking about the future of jobs and skills in 2030, examine critical uncertainties (e.g., economy, social conditions) and how these interact to help decide what is probable. In so doing, as Cork & Alford (2019) contend, scenario- thinking still comes with major uncertainties, requiring other plausible pathways to be rehearsed so that surprises are reduced and societal preparedness increased.

These complex questions about what the future will look like and how to plan for future societal needs also leads to questions about how the professions and professional practice fit within this uncertain and complex future. Namely, what is the probable, plausible or preferable future, and

how do the professions and professional practice fit within this future, particularly given the complexities of current and future practice I have canvased in this Chapter. Do we need the professions at all?

In considering the opportunities and responsibilities for professional practice futures, Cork (2019) suggests at one extreme individuals may continue developing skills as per our current context, "presumably with more tools to collect, share and manage information" (p.88), with individuals practices potentially still coordinated and regulated by professions. In this scenario, Cork (2019) further suggests that professions regaining their trusted leadership in society is unlikely to happen. At the other extreme, he describes, we may see more of the provision, analysis and interpretation of knowledge by artificial intelligence, blurring the boundaries between disciplines and the disappearance of anything resembling today's professions. In the latter case, as Cork (2109) further points out, some have argued that artificial intelligence can do at least as good a job as humans in acting in ethical, moral and trustworthy ways. A more likely and optimistic view he puts forward is "that people with exceptional training, skills and ability work together in some sort of formal or informal institution to help society achieve the integration across all sorts of knowledge and value systems" (Cork, 2019, p. 88). In considering this latter view, particularly in the context of the unknown potential of artificial intelligence, he further proposes there will be unpreceded societal demand for help and leadership from the professions. This help and leadership will be required to not only deal with complex and wicked problems but develop the ability to meet this demand as "information, communication and other technologies go through exponential increases in capabilities" (Cork, 2019, p. 88).

When considering a preferable future, Horsfall & Higgs (2019) raise concerns regarding the current dominance of market forces in shaping future society and the implications of this dominance for the good of the people, the planet, and the future professions role within this landscape. Drawing on a range of ideas, including those of Kreber (2016) and Sullivan (2004), they raise the need for professions to regain public leadership in solving problems. This requires professionals to practise being political and visible by justifying actions and decisions in public spaces and working with others (as equal players) to collectively re-imagine and activate a more just and equitable society. As they argue, "what is required in terms of professional practice is a narrative, future-oriented imagination where we try to imagine other's

point of views, recognising that there are a plurality of right views, right ways and right action" (Horsfall & Higgs, 2019, p. 76).

By re-imagining professional practice as inclusive of others' point of view, Horsfall & Higgs (2019) believe this can strengthen the professions as they become more "embedded in, responsive to and valued by the people they purport to serve" (p.76), resuming a commitment to the public good. Achieving these outcomes, they further argue, requires the critical questioning of the "increasingly accepted nexus between education, industry and the professions and to challenge the taken-for-granted assumption what is good for the industry is good for most people and the planet" (p.76). Thus, a preferable future they propose involves "a way which embraces complexity, relationships and human messiness whilst at the same time, harnessing for the common good, the collective power already existing in the professions and made manifest in practice" (Horsfall & Higgs, 2019, p. 77).

Trede and McEwen (2016), in considering the complexities and uncertainties associated with our societal future, also raise the need for industry, universities, and students to consider the moral and social responsibilities of practice more effectively. This, they claim, is required to rebalance the dominant neoliberal ideology, which tends to place market interests above common good interests. One of the key challenges to achieving this outcome, Trede and McEwen (2016), further contend, relates to the design of learning experiences that focus on assessing competencies. Such practices they posit leave limited pedagogical space for collective critical reflection of the social role of professional practice. To address this problem, they propose the future of professional practice requires reconceptualisation based on the idea of the deliberate professional. The deliberate professional Trede and McEwen define and explain as:

> a practitioner, an educator, but also a student. In this sense, the term 'professional' is not used to refer to the narrowly defined role of the expert—objective, all-knowing, and superior. On the contrary, we use the term to indicate a dialogical, collaborative, thoughtful, yet assertive and decisive disposition in practice settings that considers social responsibility, others, moral commitment to democratic values and duty of care (2016, p. 6).

To develop the deliberate professional, Trede and McEwen further contend this requires to be supported by a pedagogy of deliberateness based on four key ideas:

> (1) deliberating on the complexity of practice and workplace cultures and environments; (2) understanding what is probable, possible and impossible in relation to existing practices, others in practice and to change practice; (3) taking a deliberate stance in positioning oneself in practice as well as in making technical decisions; and (4) being aware of and responsible for the consequences of actions taken or actions not taken in relation to the doing, saying, knowing and relating in practice (2016, p. 7).

Whilst acknowledging there is no certainty regarding our societal future or the implications of this future for the professions, there still appears to be support within the literature for such occupational groups, despite the challenges to the professions raised in this chapter. For example, the need for professions, inclusive of professional associations to provide leadership, involving greater collaboration in sharing and developing specialist expertise to assist the community in dealing with risk and uncertainty and protecting from unscrupulous market forces (Evetts, 2011, 2013; Burritt et al., 2016; Professional Standards Councils, 2015). There is also support for maintaining the credentialing of such expertise and improving the ability of professions to control their own standards of practice, as a mechanism to reduce the economic burden to the governments experienced through co-regulation of the professions (Burritt et al., 2016; Professional Standards Councils, 2015).

Returning to the questions I posed earlier, namely what the probable plausible or preferable future is and how do the professions and professional practice fit within this future, arguably there is no clear agreement or certainty regarding our societal future and those of the professions. However, considering what type of preferable future would be best for society, I seek a preferable future as one in which social good is at the societal fore. In this preferred future, I also adopt an optimistic position that the professions and professional practice or a specialised type of occupational practice are part of this future, conceived by society as trusted individuals and groups who can effectively contribute to achieving positive societal outcomes in moralistic, competent and altruistic ways. This future is one which I see in preference to an alternate, and arguably plausible future, where societal needs, including dealing with

complexity and uncertainty, are decided amongst self-proclaimed experts debating fake news. In this latter scenario, I envisage the outcomes of such debates as not only being unhelpful in responding to societal needs but likely to be of significant collective detriment to our societal future.

By adopting the position of a preferred future as one which the professions have a role to play, including helping society deal with complexity and uncertainty, together with the critiques of the traditional conceptualisation of a profession associated with the four characteristics of a profession described in this chapter, I argue that current descriptions of professional practice are inadequate to effectively deal with the complexities of current and future practice. What is required to address these critiques and challenges is a new conceptualisation of professional practice. Such a conceptualisation is needed to help improve practice and education for professional practice whilst assisting to address the complex and interrelated relationship between society, the professions and education. In so doing, also contemporise professional practice for the 21st century.

As I have previously argued, education is one of the first steps of the professional socialisation process. Education plays a critical role in preparing aspiring practitioners to deal with the complexities and uncertainty associated with current and future practice and foster the ethical or cultural dimension of practice or translate values of social good amongst graduates. These latter aspects are key defining characteristics of a profession and professional practice. I consider achieving these outcomes essential elements in helping to restore the societal trust placed in the professions to address societal needs in altruistic, competent and moralistic ways.

In adopting the above perspective, I also adopt the position that professional education programs are required to do more than just prepare students to perform specific tasks in the workplace. Instead, they should promote "a critical approach to current practice and the contribution this practice makes to broader society" (Dall'Alba, 2009a, p.6). From a university perspective, whilst recognising the current constraints facing this sector associated with today's neoliberal environment, I also contend achieving this outcome requires examining current practices associated with the provision and delivery of professional programs and the implications of these practices for broader society.

In summary, by adopting a preferred future as one in which the professions have a role to play, I argue that current descriptions of professional practice are inadequate to deal with the complexities of current and future practice. What is required is a new conceptualisation of the professional practice. I explore this new conceptualisation of practice further.

3.6 A new conceptualisation of professional practice

Based on the conceptual definition of practice I have adopted in this thesis, together with the implications of the key theoretical concepts associated with this definition for improving professional practice, I discussed in Chapter 2; I argue that a new conceptualisation of professional practice can be gained through the lens of variation theory. This new conceptualisation of practice involves developing a holistic experiential description of practice (HEPD), constituted from the variation of practitioners' experiences of their practice. In the following section, I establish the rationale for developing this description of practice by briefly exploring the theoretical concepts underpinning variation theory. Chapter 5 explores these theoretical concepts in further detail in relation to gaining this description of practice using a phenomenographic research approach. Following this rationale, I conclude this chapter by describing the five characteristics I propose the HEPD must have to support this new conceptualisation of the professional practice. I further suggest that a description of practice based on these five characteristics has the potential to act as a framework to assist in improving professional practice and education for professional practice. In so doing, it also can also help to address the challenges associated with the complex and interrelated relationship between society, the professions and education, as well as contemporise professional practice for the 21st century.

3.7 Variation theory

Variation theory has stemmed from the empirical research approach known as phenomenography (Bussey et al., 2013; Åkerlind, 2018). Variation theory explains why people experience and understand phenomena in a limited number of qualitatively different but interrelated ways, which may also result in practice being enacted in varying ways by both individuals and groups. Phenomenography is the research approach used to uncover the variations in ways of experiencing a phenomenon (Marton & Booth, 1997). Variation theory also adopts a non-dualist ontology (Bussey et al., 2013; Åkerlind, 2018). This means that the

way a person experiences and understands the world is not independent of human interpretation, as assumed with an objective or positivist approach to understanding experience. It also means that the way a person experiences and understands the world is an internal constitution between the person and the phenomenon of interest or is relational. Therefore, a person's knowledge and awareness of a phenomenon are influenced by the object of their attention and the person's interpretation of that object. Knowledge is thus constituted through the interaction of the person and the phenomenon (Bowden, 2005). As Mann (2007) asserts, "the focus is not on the subjective experiences of a person, or 'what people think' *per se*, but instead what their experiences have been in situations where they have had to deal with aspects of the world" (p.54). The key ideas underpinning why people experience and understand phenomena, in a limited number of qualitatively different but interrelated ways, is related to several concepts. I explore these concepts further

3.7.1 Discernment and simultaneous awareness

Discernment and simultaneous awareness are key concepts that underpin variation theory. As Orgill (2012) explains, any given phenomenon has a large amount of information associated with it. Due to our limited capacity to process information, we are unable to attend to every aspect of a phenomenon at the same time; thus, some aspects come into our focal awareness, with others fading to the background. Therefore, how we experience or understand a phenomenon depends on which aspects we discern and simultaneously hold in awareness at a particular time. Which aspects we attend to are influenced by our background and previous experiences of the world and the context in which the experience occurs (Bussey et al., 2013; Marton & Booth, 1997). As such, two people may attend to the same phenomenon but come to experience or understand it in qualitatively different ways, depending on which aspects they attend to (Orgill, 2012). Additionally, there are only a limited amount of qualitatively different ways of experiencing a phenomenon due to our ability to only discern and simultaneously hold in our awareness a limited amount of aspects at any one time (Collier-Reed & Ingerman, 2013; Marton & Booth, 1997).

To explain the above concepts further, returning to the example in Section 2.4.2, experiencing medical practice as patient-centred or experiencing medical practice as biomedical problem-solving are arguably two distinctively different ways of experiencing the phenomenon of medical practice. They are qualitatively different as they describe and reveal something

distinctly different about the way a phenomenon is experienced (Marton & Booth,1997). Identifying the various combinations of different features or aspects that a person focuses on or becomes part of their awareness during their experience, in this case, of medical practice, aims to characterise these different ways of experiencing. The description of the characterisation of the different ways of experiencing a phenomenon is referred to as a category of description in phenomenographic research (Marton & Booth, 1997).

3.7.2 Critical aspects

According to variation theory, amongst the different aspects that come into our focal awareness, some critical aspects or features enable us to experience a phenomenon in a particular way. However, to discern a critical aspect of a phenomenon, you must experience variation in the dimensions corresponding to that aspect (Orgill, 2012). Drawing on the example of the concept of a 'ripe banana', Orgill (2012) explains this further by proposing that if a critical aspect of the concept of a 'ripe banana' is the colour yellow, then it is through experiencing under-ripe bananas as 'green' and over-ripe bananas as 'brown', that this variation in the critical feature of banana 'colour' enables the individual to create meaning related to the concept of banana ripeness. Thus "the colour of blue would have no meaning in relation banana ripeness colour within this context" (Orgill, 2012, p. 3392). Additionally, 'colour' could be considered to be one of the many critical features which contribute to the meaning of banana ripeness. For example, the taste of the banana could also be a critical feature of banana ripeness and, when held in simultaneous awareness with colour, provides a deeper understanding of the concept of banana ripeness. Alternatively, other features or aspects of a banana, such as banana size, could be considered a non-critical feature or aspect of banana ripeness if this aspect did not contribute to the meaning or understanding of this concept (Bussey et al., 2013).

Thus, according to variation theory, it is through experiencing variation in past experiences of the world that helps us discern and make sense or assign meaning to phenomena. In other words, we only discern what varies, as Marton and Booth contend:

> if we are capable of a total experience of situations and phenomena, as a sort of panaesthesia, and if we made sense of this capability all the time, things would look the same all the time and for all of us (1997, p. 101).

Additionally, suppose we want a person to experience or understand a phenomenon in a particular way. In that case, it then follows that it is important to discern the critical features associated with experiencing a phenomenon in that way by experiencing *variation* in these features. As Orgill (2012) explains, it is not enough just to be told what the critical features are; it is by experiencing variation we are more likely to gain this understanding by being able to contrast what something is with what it is not. For example, by experiencing a ripe banana as 'yellow' and contrasting this with an under-ripe banana as 'green'.

3.7.3 Experiences are logically and structurally related

According to Variation theory, the different ways of experiencing a phenomenon are logically and structurally related. They are related as the different ways of experiencing are sets of critical features or aspects that may intersect or be subsets of each other (Bussey et al., 2013). As Marton & Booth (1997) also claim, as people, we participate in an ongoing constitution of the world; therefore, our experience of the world is always partial. Our experience will always be a subset of the infinite ever-changing picture but will include some critical features or aspects of the phenomenon being experienced. Therefore, experiencing variation in these past experiences helps us to discern which features are important or critical, assisting us to form meaning about a phenomenon as well as help us distinguish one phenomenon from another. Experiencing variation in experiences also enables us to build on these critical aspects to develop more comprehensive experiences of a phenomenon. Thus, as we experience a phenomenon such as practice in different ways and we can discern the variation within it, our experience becomes more comprehensive. As Marton & Booth (1997) further contend, it is "by experiencing a varying past we become capable of handling a varying future, or we can prepare for the unknown by building on the known" (p.56).

Thus, from a variation theory perspective, identifying the critical variation *between* the qualitatively different ways of experiencing a phenomenon is experienced is important. It is important, as this not only assists in delineating one way of experiencing from another but has implications for enabling a phenomenon to be experienced in more comprehensive or complete ways (Ling & Marton, 2011; Lo, 2012; Pang, 2003). Identifying the critical variation *between* the different ways of experiencing a phenomenon involves identifying and gaining a description of the critical features or aspects that vary *between* the different ways of experiencing (or categories of description). They are the key variants that help describe the

shift in focus of awareness from one category to another, contributing to the qualitatively different ways of experiencing a phenomenon.

The variation in the critical features or aspects *between* the different ways of experiencing may also be grouped into themes of expanding awareness as a dimension of variation. For example, in the above example, relating to banana ripeness, colour may be a dimension of variation, having implications for how banana ripeness is experienced. These themes can be used as a framework to describe the relationship between the categories of description (Åkerlind, 2002; Daniel, 2016). Such themes are found to reoccur in the different ways of experiencing but may be progressively more expansive, supporting the formation of a hierarchical relationship between the different ways of experiencing from less to more comprehensive ways.

To explain the above concepts further, returning to the example in Section 2.4.2, medical practice was experienced in two qualitatively different ways: biomedical problem-solving and patient-centred. This represents one critical variation *between* the way students experienced medical practice. Additionally, adapting the example by Dall'Alba (2004), a dimension of variation or theme of expanding awareness could be the 'role' of a medical practitioner as a critical feature or aspect of practice. From a biomedical perspective, the theme of 'role' may incorporate a focus on diagnosing the health problem and prescribing a treatment routine for the patient, where the medical practitioner's role is to effectively communicate this information to the patient. From a patient-centred perspective, the theme of 'role' could be considered more expansive as the medical practitioner focuses on incorporating both the views of the practitioner (based on their biomedical knowledge) and the patient (based on their understanding of the health problem) and arrives at a treatment that is acceptable to both treating the problem and meets the needs of the patient. In this latter case, the role shifts from being a communicator to that of a collaborator, with being an effective communicator subsumed as part of the role.

In the above example, patient-centred care could be interpreted as representing a more comprehensive and inclusive way of experiencing medical practice, with the role of a practitioner helping to describe this relationship. It is also important to note that experiencing medical practice as a biomedical problem is not wrong but a partial way of experiencing medical practice. Thus, identifying and describing the shift in awareness from one category to

(i.e. the critical variation *between* the categories) is important, as this firstly aims to support the identification of these two qualitatively different ways of experiencing the phenomenon of medical practice. Secondly, it also provides the basis to interpret and describe how these different experiences relate to each other to form a more comprehensive or complete way of experiencing medical practice. In so doing, in a learning context, it provides the basis to help students experience medical practice in more comprehensive ways by changing a students' awareness from experiencing practice as a biomedical problem to experiencing practice as patient-centred, with the role of the practitioner as a theme of expanding awareness used to help shift this awareness.

In summary, I propose that variation theory provides an appropriate theoretical lens to develop a new conceptualisation of professional practice in the form of an HEDP. Variation theory explains why people experience and understand phenomena in a limited number of qualitatively different but interrelated ways, which may result in practice being enacted in varying ways by both individuals and groups (Bussey et al., 2013). Understanding the qualitatively different ways a phenomenon is experienced is of importance; as previously discussed, it has been empirically established that how practitioners experience their practice is central to how practitioners perform and develop their practice (Dall'Alba & Sandberg, 1996; Dall'Alba & Sandberg, 2006; Sandberg & Pinnington, 2009; Marton & Booth,1997). Thus, conceptualising practice through the lens of variation theory provides the opportunity to describe practice that recognises the relational nature of practice and the variation in the ways practitioners may experience their practice. It also offers the opportunity to develop a framework that has implications for improving practice and education for professional practice through identifying and describing the critical variation between the different ways of experiencing practice.

In the following section, through the lens of variation theory, I propose five characteristics the HEDP must have to support the development of a new conceptualisation of the professional practice. I also describe why these characteristics provide an important basis to assist in improving practice and education professional practice.

3.8 A holistic experiential description of practice (HEDP)

In the previous section, I proposed that variation theory provides an appropriate theoretical lens to develop a new conceptualisation of professional practice, involving the development of an HEDP, constituted from the variation of practitioners' experiences of their practice. To develop this new conceptualisation thus requires to be underpinned by five key characteristics. These five characteristics, I contend, can generate a description of practice that has implications for improving professional practice and education for professional practice. In so doing, it can also help to address the challenges associated with the complex and interrelated relationship between society, the professions and education.

For example, from a professional practice perspective, the implications of the HEDP relate to challenging the current focus on developing and maintaining expertise as a foundation for effective practice based on the acquisition of knowledge skills to recognising the implications of the ways practitioners experience their practice. In particular, as a way to promote the development of professional ways of being that can deal with the complexities, ambiguities, and dynamic change inherent in professional practice, as I described in Section 2.5, by developing more comprehensive ways of experiencing practice.

From an educational perspective, the implications of the HEDP relate to challenging current approaches to the professional development of both students and practitioners. In particular, approaches to professional development that focuses on acquiring knowledge and skills, involving decontextualized, fragmented, individualistic, and stepwise learning experiences. As I argued in Chapter 2, such approaches are an insufficient basis for dealing with the complexities of current and future practice, requiring an alternate approach to professional development based on professional ways of being. Furthermore, the implications of the HEDP relates to generating a description of practice that reflects the reality of what practice is and how it is enacted to assist in the design of learning experiences. This includes the ability to design learning experiences to support the deliberate professional development (Trede & McEwen, 2016) described in Chapter 2.

In the following section, I describe in further detail the five key characteristics of the HEDP.

3.8.1 The first characteristic

The first characteristic involves gaining an experiential description of practice based on the lived experience of practitioners. A description of practice based on this characteristic is required to achieve a description of practice that reflects the realities of practice, due to the conceptualisation of practice I have adopted to guide this thesis: as a socially constructed relational phenomenon, with practitioners' performers or carriers of practice and a form of doing, knowing, being and becoming.

Thus, practice in this thesis is not conceived as an objective, single and pre-existing truth out there waiting to be discovered that can be described or reduced to represent a single reality. Practice is conceived as being influenced by many multiple factors, in which there are likely to be multiple 'realities of practice'. It also refers to gaining a description of practice based on a non-dualist or relational view, involving practitioners' experience of practice grounded in situations they have dealt with in the past relating to the phenomenon of practice. This is an alternative to gaining a subjective view of practice, which may represent what practitioners 'think' practice should be rather than gaining a description based on their lived experience of this aspect of the world. Gaining a description based on the realities of practice is important, as this aims to support the acceptance and applicability of the findings amongst the practice community. It also aims to provide insight into how practitioners enacted practice and why, in order to assist in bridging the theory-practice divide, a key critique underpinning current research into human practices (Dall'Alba, 2009a).

3.8.2 The second characteristic

The second characteristic involves gaining a description of practice constituted from practitioners varying backgrounds, experiences and contexts of practice. I argue that establishing a description of practice based on these characteristics helps generate the most complete or comprehensive description of practice due to the key concepts underpinning variation theory discussed in Section 3.7. Of particular importance is the perspective that practitioners' varying backgrounds, experiences and contexts of practices may influence what critical features or aspects practitioners discern and simultaneous hold in their awareness at a particular time, accounting for the different ways practitioners may experience and understand their practice. By gaining a description of practice amongst a group of practitioners, based on

the above characteristics, we can aim to incorporate these varied aspects of practice 'in action', at both the individual and collective level. This includes capturing the influence of communities and landscapes of practice on a practitioner's awareness of critical features of practice. In doing so, this will assist in representing the most complete or comprehensive description of the different ways of experiencing practice, as "by examining many peoples' experiences, a larger picture of the aspect of the world can be constructed" (Mann, 2007, p 47).

3.8.3 The third characteristic

The third characteristic involves gaining a description of practice constituted from the critical variation *between* the ways of experiencing practice. Gaining a description of practice from this perspective is of importance as a focus on the critical variation between the ways of experiencing aims to capture:

- the number of qualitatively different ways practice is experienced by identifying the critical features or aspects which vary from one way of experience practice to another
- how these experiences (as partial views of practice) are logically and structurally related to form a holistic description of practice.

Logically related, as described in Section 3.7.3, means that these different ways of experiencing may intersect or be subsets of each other, thus building on previous experiences, described using themes of expanding awareness. Structurally refers to how the relationship between these different ways of experiences is organised to form a more complete or holistic description of practice. In many cases, the relationship is hierarchical, from less to more comprehensive ways, but there may also be branches and forks (Marton & Booth 1997). The organisation of different ways of experiencing (or categories of description) forming a holistic description of practice is also referred to as the outcome space in phenomenographic research (Marton & Booth 1997).

A description of practice based on this third characteristic is also of importance as:

- by depicting the relationship between the categories as a holistic representation of practice (outcome space) has implications for enabling the phenomenon to be experienced in more complete or comprehensive ways (Lo, 2012; Tan, 2009).
- it differs from other descriptions of practice which may be gained through alternate qualitative approaches such as thematic analysis (Daniel, 2016).

70

As Daniel (2016) describes, in thematic analysis, different themes of variation may be interpreted from a data set and reported as less or more prevalent, or less or more crucial than others. However, there is no particular focus on the relationship or hierarchies between these themes. In effect, such descriptions of practice are unrelated, fragmented or present as a flat structure, thus cannot be used to enable practitioners to experience practice in more comprehensive ways.

3.8.4 The fourth characteristic

Building on the third characteristic, the fourth characteristic involves gaining a detailed holistic description of the different ways of experiencing practice. Detailed refers to describing:

- each of the categories of description in a way so that each category can be clearly understood on its own
- in detail the critical variations between the different ways of experiencing practice supported by a description of themes of expanding awareness.

Holistic also refers to:

- gaining a description of practice which can provide insight into why and how practice is enacted in a particular way, as a form of doing, knowing, being and becoming rather than a decontextualized description of practice, such as describing the knowledge and skills required to practice.

By gaining a description based on the fourth characteristic, aims to not only provide insight into how practitioners deal with the complexities and uncertainties of practice but also support the development of a framework to assist in improving practice and education for professional practice, by developing an understanding of and in, practice as described in Section 2.5.

3.8.5 The fifth characteristic

The **fifth characteristic** involves gaining a description of practice that has high communicative validity to the practice community or makes sense to the practice community. This characteristic is of importance, as by gaining a description of practice that reflects the reality of practice, as experienced, as opposed to abstract or objectified description, together with a description of practice that illustrates how these experiences fit together to form the practice

itself, as a holistic description, I argue enhances the practical application of description. Alternate descriptions, for example, those using thematic analysis, may provide insight into various aspects of practice but do not provide a description that could be used as a pathway for professional development.

In summary, the new conceptualisation of professional practice, based on the five characteristics I am proposing, generates a description of practice that I contend has the potential to act as a framework for improving professional practice and education for professional practice. In so doing, it can also help to address the complex critiques and challenges associated with the traditional conceptualisation of a profession canvased in this chapter. This new conceptualisation is required to assist professionals to effectively deal with the complexities and uncertainties associated with current and future practice, help restore the moral contract with society and contemporise professional practice for the 21st century.

The five characteristics of the HEDP, forming the new conceptualisation of professional practice, I have summarised in Table 3 and below. It involves a description of practice:

- based on the lived experiences of professionals
- constituted from varying backgrounds, experiences and contexts of practice
- constituted from the critical variation in the ways of experiencing practice
- involving a detailed, holistic description of the different ways of experiencing practice
- which has high communicative validity.

Table 3: Five key characteristics of the holistic experiential description of practice (HEDP)

Characteristic	Summary of the characteristic
First	An experiential description of practice, based on the lived experiences of practitioners, represents the realities of practice rather than an objectified view, which may be elicited from a pre-determined survey.
Second	A description of practice constituted from practitioners' varying backgrounds, experiences and contexts of practice generates the most complete or comprehensive description of practice, enhances the applicability to a range of settings.

Characteristic	Summary of the characteristic
Third	A description of practice constituted from the critical variation in the ways of experiencing practice aims to capture the qualitatively different ways practice is experienced and how these experiences are logically and structurally related to form a holistic description of practice. Differs from alternate descriptions, such as one based on thematic analysis, having implications for enabling the practice to be experienced in more complete or comprehensive ways.
Fourth	A detailed holistic description of the different ways of experiencing practice enables insight into why and how practice is enacted. Detailed also refers to describing each of the categories in a way in they can be clearly understood their own, while describing in detail the critical variation between the categories. Supports the development of a framework to improve practice by developing an understanding of, and in, practice whilst acting as a roadmap for professional development.
Fifth	A description of practice that has high communicative validity to the practice community or makes sense to the practice community enhances the practical application of the description.

3.9 Conclusion

The key aim of this chapter was to build on the previous chapter to establish the theoretical framework used to address the key problem underpinning this thesis. The key problem is the need to improve the professional practice of environmental health. This chapter also aimed to provide the foundation for the core argument I have developed to address this key problem. Namely, current descriptions of the professional practice of environmental health are inadequate to deal with the complexities of current and future practice, requiring a new conceptualisation of the professional practice of environmental health.

To achieve this aim, I critiqued the characteristics associated with the traditional conceptualisation of a profession. I argued that such characteristics are inadequate to deal with the complexities of current and future practice. This is due to the changing and evolving context of professional practice and the complexities inherent in the practice itself. By adopting the position that the professions and professional practice or a specialised type of occupational practice form part of our societal future, to address the critiques and challenges to the traditional

conceptualisation of a profession, I argued that a new conceptualisation of professional practice is required.

Through a lens of variation theory, I have proposed that a new conceptualisation of professional practice can be established involving the development of an HEDP. Such a conceptualisation of practice, I further propose, generates a description of practice that can act as a framework to assist in improving professional practice and education for professional practice. In so doing, it can also help address the challenges associated with complex and interrelated relationships between society, the professions, and education. In the next chapter, I use these foundational ideas as a basis to argue for a new conceptualisation of the professional practice of environmental health.

Chapter 4: The Professional Practice of Environmental Health

4.1 Introduction

In the previous chapters, I established the theoretical framework and the foundation for the core argument I have developed to address this thesis's key problem. The key problem is the need to improve the professional practice of environmental health for this group of professionals to effectively deal with the complexities and uncertainties associated with human interaction with the environment, both now and in the future. In this Chapter, I now turn my attention to applying the foundational ideas from Chapters 2 & 3 to the professional practice of environmental health. I do so by firstly discussing the challenges associated with describing the practice of environmental health, followed by a historical description of current influences on this area of practice. This is required to assist in establishing the context and focus of this research and provide a basis for discussing the phenomenographic results arising from the study.

I then critique the traditional characteristics underpinning the professional practice of environmental health to support the argument that a new conceptualisation of the professional practice of environmental health is required. Informed by the previous chapters, I conclude this chapter by outlining the research questions needed to establish this new conceptualisation of the professional practice of environmental health. The following chapter discusses the research approach I applied to answer the research questions, phenomenography.

4.2 Introducing the challenge of describing the practice of environmental health

Establishing a description of the practice of environmental health is a challenging task. It is a challenging task as, from the outset, establishing an agreed description of environmental health as a subset of practice to guide what practitioners 'do' is difficult. As Couch, Barratt, Dhesi, Stewart, & Page (2016) describe, environmental health is a relatively new term that does not have a simple definition, with the words "environment" and "health" (p.29) difficult to define

and then combine. These ideas are also reflected by Lin et al. (2014). They posit that the word environment and its connection to health may involve a view of the environment as an external factor emphasising the physical elements to which a person or population may be exposed as the cause of ill health. This perspective is aligned with a biomedical view of health. Alternatively, the word environment may involve a view encompassing the physical, biological, social, cultural and economic environments and the interrelationship of people and populations with these differing environments. This view aligns with a broader well-being understanding of health (Lin et al., 2014).

The differing views of environment and health may further be reflected in the way environmental health is defined. For example, definitions of environmental health may reflect a narrow view, focusing on protection from environmental hazards, such as air pollutants, hazardous materials, or microbial contaminants (Frumkin, 2016). Conversely, definitions may adopt a broader well–being perspective, "inclusive of city planning, building design, transport systems, workplace facilities, housing density and quality" (Lin et al., 2014, p. 286) or a system based ecological perspective encompassing a far wider view of environmental health (Frumkin, 2016). Furthermore, like Drew et al. (2000) posits, although the concept of environmental health in many European contexts may be well established due to historical, political, cultural and linguistic factors, the conceptual equivalent in many other countries does not exist. The differing views of what environmental health is was also recently reflected in the identification of a non-exhaustive list of 28 different definitions amongst health services providers in the United States (Knechtges, 2018).

Another layer of complexity with respect to establishing a description of the practice of environmental health is understanding the relationship between public health and environmental health and the overlap with other discipline areas, which may also have a focus on protecting and promoting human health and the environment. For example, the relationship between public health and environmental health was considered by the Australian Commonwealth Government in 1999 to assist in more clearly defining the environmental health sector to guide future practice (Commonwealth Department of Health and Aged Care, 1999). In doing so, the government defined public health as "the science and art of preventing disease, prolonging life and promoting health" while acknowledging that environmental health and public health were previously synonymous (Commonwealth Department of Health and

Aged Care, 1999, p. 7). The Australian Government further articulated environmental health as a more clearly defined sector within public health. Both areas use the same tools (surveillance, monitoring, epidemiology, biostatics, health economics) but adopt different approaches. For example, public health approaches focus on the Ottawa Charter for Health Promotion. In contrast, environmental health approaches focus more on environmental health impact assessments (Commonwealth Department of Health and Aged Care, 1999).

Environmental health has also been identified as overlapping with community health and occupational health (Lin et al., 2014) and environmental protection (Commonwealth Department of Health and Aged Care, 1999). Recently, other terms such as environmental public health and environmental health promotion have emerged (Environmental Health Standing Committee (enHealth) 2016; Knechtges, Kearney, & Resnick 2018) with the Australian Government stating that the work of environmental public health programs "predominantly focuses on understanding community concerns about health and wellbeing in a societal context" (Environmental Health Standing Committee (enHealth) 2020, p.7). The government further describes the work associated with delivering environmental public health programs as being carried out by those holding qualifications and expertise from several fields, inclusive of public health, environmental science and environmental health (Environmental Health Standing Committee (enHealth) 2020, p.7). The overlapping of various fields and differing terminology associated with this area of practice arguably provides an additional layer of complexity for establishing a description of the practice of environmental health.

Another key factor that adds to the complexity of establishing a description of the practice of environmental health relates to how environmental health services are organised and who is involved in the delivery of such services. Given the widening burden of environmental health problems, addressing such problems is now considered to be beyond the traditional role of local government, requiring contributions from many sectors, disciplines, occupational groups and the community (Battersby, 2016; Brennan, Konkel, & Lewis, 2009; Commonwealth Department of Health and Aged Care, 1999; Drew et al., 2000; Environmental Health Standing Committee (enHealth) 2020). In Australia, environmental health services aimed at protecting human health and the environment reflect this position and are spread across commonwealth, state and local government agencies (Lin et al., 2014). Whilst generally located in health portfolios, consistent with a view that health agencies have primary accountability for the

community's health (Environmental Health Standing Committee (enHealth) 2020), such services may also be located in environmental protection, natural resource, conservation and agriculture portfolios, with each jurisdiction defining, organising and focusing on environmental health in different ways (Lin et al., 2014). Additionally, other sectors such as Non-Government Organisations (NGOs), educational institutions and private contractors are now widely recognised as contributors to this area of practice (Battersby, 2016; Commonwealth Department of Health and Aged Care, 1999; Gordon, 2002; Knechtges, 2018), arguably having further implications for how the practice of environmental health is described and understood.

Coupled with the widening burden of environmental health problems and the delivery of environmental health services by multiple agencies, has been an expansion in the range of disciplines contributing to environmental health. For example, the Australian government in 1999 identified environmental health as a multidisciplinary area drawing from the areas of chemistry, microbiology, engineering, statistics, epidemiology, physiology, toxicology, virology and sociology whilst incorporating the skills from communication, health promotion, law management, planning and the finance sectors (Commonwealth Department of Health and Aged Care, 1999).

The Commonwealth Government further described the environmental health workforce as inclusive of environmental health officers, environmental health workers, researchers, engineers, administrators, allied health professionals, other professionals and managers (Commonwealth Department of Health and Aged Care, 1999). This position is reflected in other countries, with Gordon (2002) proposing that two types of groups comprise the environmental health workforce. Firstly, environmental health and protection professionals who have been educated in various environmental health and technical components. Secondly, professionals in environmental health and protection comprising of other essential personnel such as chemists, geologists, engineers, social scientists, planners and epidemiologists, to name a few.

Given the above complexities, it is arguably not surprising to find that various sectors of the community, including governments, professional associations, researchers and agencies, often adopt differing definitions to describe environmental health and, subsequently, the practice of

environmental health. The current definition adopted by the Australian Government includes the World Health Organisation (WHO) definition of environmental health, supported by an additional clarification. These descriptions are:

> **Environmental health** is defined by the World Health Organisation (WHO) as all the physical, chemical and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, and genetics. (Environmental Health Standing Committee (enHealth) 2020, p. 4)

Additional clarification:

> The Australian Government Department of Health adopts the WHO definition of environmental health. It further states that environmental health involves those aspects of public health concerned with factors, circumstances, and conditions in the environment or surroundings of humans that can exert an influence on health and well-being. In this way, environmental health provides the basis of public health, with improvements in sanitation, drinking water quality, food safety, disease control, and housing conditions central to the significant improvement in quality of life and longevity experienced over the past hundred years. Environmental health practice, therefore, addresses emerging health risks arising from the pressures that human development places on the environment. (Environmental Health Standing Committee (enHealth) 2020, p. 5)

In summary, establishing an agreed description of environmental health as a subset of practice as a basis to guide what practitioners do is a challenging task. It is challenging due to a wide range of factors, such as the term environmental heath being relatively new and how the words 'environment' and 'health' may be conceptualised, influencing how environmental health is defined. In addition, the widening burden of environmental health problems has also influenced the way environmental health services are organised, delivered and who is involved in the delivery of such services. These factors also arguably suggest that those involved in this area

of practice, including individuals, policymakers, communities and environmental health professionals, are likely to experience and understand the practice of environmental health in varying ways, reflective of the theoretical nature of the practice described in Chapter 2. I now turn to describing the professional practice of environmental health to further support the key argument underpinning this thesis.

4.3 The professional practice of environmental health

In this thesis, I conceptualise the professional practice of environmental health as a sub-set of environmental health practice, as an occupation established based on the traditional characteristics of a profession as described in Chapter 2. The rationale for focusing on this area of occupational practice, rather than on other groups who may identify as practising environmental health as described in 4.1, and may also identify as professionals, is due to the motivations underpinning this research as outlined in Chapter 1.

In the following sections, I provide a brief overview of the establishment of the environmental health profession, followed by an overview of the requirements outlined by Environmental Health Australia (EHA) to support the professional accreditation of educational programs in Australia. I then critique current educational approaches adopted by universities for graduates wishing to gain professional recognition to practise environmental health in Australia. These sections are important as they aim to support the key argument underpinning this thesis, including the adoption of variation theory as the approach for developing a new conceptualisation of the professional practice of environmental health. I commence this section by exploring the establishment of environmental health as a profession in Australia.

4.3.1 Establishment of environmental health as a profession

To understand the establishment of environmental health as a profession, it is helpful to briefly explore the establishment of environmental health as a profession in England and Wales. This is due to the far-reaching impact this had on the foundational development of the environmental health profession in many countries, including Australia.

Environmental health as a profession in England and Wales arose due to reforms initiated by the sanitation movement in the mid-19th century, as introduced in Chapter 1. These reforms principally involved the establishment of legal and administrative structures to enable

communities to have expertise and authority to build works under the auspice of governments to reduce the spread of infectious diseases through the provision of clean water supplies, removal of wastes and improved living conditions (Aston & Seymour, 1998; Baum, 2016; Lin et al., 2014; Smith, 2008). These reforms also resulted in the enactment of the English Public Health Act 1848 and the legislative appointments of Medical Officers of Health (MOH) to control disease and Inspectors of Nuisance who identified, recorded and reported threats to health usually to the MOH (Battersby, 2016; Brimblecombe, 2003; Hamlin, 1998; Parkinson, 1991; Parkinson, 2015).

Nuisance Inspectors appointed by governments in England and Wales during the mid-1800s required no specific qualification and were poorly paid, holding a low status within urban government (Battersby, 2016; Brimblecombe, 2003). Further disease outbreaks in England and Wales during the late 1800s resulted in legislative reforms increasing controls on food, housing and hygiene and the Nuisance Inspector soon became the Sanitary Inspector (Brimblecombe, 2003). As Brimblecome (2003) describes, an increase in workforce demand and responsibilities of the Sanitary Inspector led to the formation of associations that placed mounting pressure on governments for professional recognition and qualification of Sanitary Inspectors. These associations argued that the public health protection role required officers who were responsible, skilled in engineering and science, independent professionals, certified by exams and practical experience due to the increased complexity of the health protection role. This resulted in English Public Health legislation specifying that after 1894, to be appointed to such a role, persons were required to hold a certificate of competency approved by the Local Government Board (Brimblecome, 2003).

After a range of debates regarding the depth of theoretical knowledge and practical experience required to gain certification to be appointed to practice as a Sanitary Inspector, professional associations adopted an accreditation role with respect to certifying training for the role, marking the establishment of the Sanitary Profession (Brimblecome, 2003). Today, the professional group is now more commonly referred to as the Environmental Health Profession, representing environmental health officers or practitioners, also previously identified as sanitary inspectors and in some instances still referred to as health inspectors, public health officers and health surveyors, as outlined in Chapter 1. These changing titles reflect the broad changes in society and the demands placed on the professional role (Brimblecombe, 2003;

Parkinson, 1991; Parkinson, 2015; Talbot, James, Verrinder & Jackson, 2007), inclusive of battles associated with gaining professional status amongst the occupational dominance of medical officers of health (Parkinson, 2015). Today, a key differentiating aspect of the environmental health profession from other public health occupations relates to the regulatory or enforcement role of the professional area of practice (Dhesi & Stewart, 2015).

During the mid-late 1800s and early 1900s, countries such as the United States of America (USA), Canada, New Zealand, Scotland, Ireland, and Australia adopted similar models introduced by the British for the protection of health, involving the introduction of Public Health Acts and the development of a professional group to administer the Acts, with each country having its own historical nuances associated with this professional journey (Bell, 2002; Douglas & Best, 2010; Friis, 2012; Frumkin, 2016; Knechtges, 2018; Lyons & Malowany, 2009; Aston & Seymour, 1998). This arrangement also generally provided a pathway for membership to professional organisations to further support the recognition of the professional status of practitioners inclusive of codes of conduct or standards of professional practice, reflective of the traditional characteristics of a professional as described in Chapter 2. In today's context, several environmental health professional bodies globally accredit environmental health training programs to support the professionalisation of the environmental health workforce. In Australia, Environmental Health Australia (EHA), established in 1936, is the accrediting body for environmental health education programs (Environmental Health Australia, 2014; Talbot et al. 2007; Oosthuizen, 2009a). This organisation has also undergone several name changes since its establishment, reflective of the changing nature of this area of practice (Environmental Health Australia, 2014; Talbot et al., 2007).

I explore the professional accreditation process further in the next section.

4.3.2 Professional accreditation of environmental health programs in Australia: an overview

Environmental Health Australia is the professional body that accredits Australian higher education programs at undergraduate and postgraduate entry levels, providing graduates with professional recognition to practice environmental health as an environmental health officer (EHO). As the EHA course accreditation policy (EHACAP) outlines, "the role of an accredited environmental health course is to provide training to enable graduates to practice as an EHO,

providing an entry pathway into the profession" (Environmental Health Australia, 2014, p. 3). The EHACAP details the skills and knowledge universities must demonstrate will be developed in graduates through their environmental health course before courses gaining accreditation. These encompass the areas of:

- communication
- environmental health risk assessment and management
- law governance and policy
- management and administration
- public health and sustainability principles
- research and critical thinking skills
- science.

The policy also states, "these skills and knowledge form the accreditation criteria for environmental health courses" (Environmental Health Australia, 2014, p. 3). The EHACAP also outlines how universities must demonstrate how each knowledge and skill criterion is met before accreditation, is awarded in accordance with an Outcomes-Based Education (OBE) approach. This includes defining the learning outcomes for each subject/unit (including electives) and demonstrating how the assessment practices achieve the respective learning outcomes for the subjects/units. Universities are also required to outline their approach to developing graduate work readiness. The policy also describes a range of work-integrated learning strategies that universities could adopt to support this outcome, ranging from workplace visits to laboratory activities whilst also recommending a six-week work practicum. The aim of these activities is "to provide authentic opportunities and environments where the learner draws on theoretical knowledge to build practical knowledge and skills in real or authentic simulated work environments" (Environmental Health Australia, 2014, p. 10).

The EHACAP also aligns with the enHealth Environmental Health Officer Skills and Knowledge Matrix (Oosthuizen, 2009a) as described in Chapter 1, whilst adopting the expected graduate attributes and capabilities to be developed in graduates as articulated by the Australian Qualification Framework (AQF). The policy also describes the nine applied areas in which universities must demonstrate how they prepare their graduates to apply the underpinning skills and knowledge.

This includes the areas of:

- prevention and control of notifiable and communicable conditions
- water management
- environmental management
- land use management
- built environment
- indigenous environmental health
- sustainability and climate change
- emergency management.

The EHACAP acknowledges that linking the underlying skills and knowledge and applied areas to develop environmental health professionals who attain the attributes, capabilities, skills and knowledge which EHA accreditation requires, "is left to the course organisers, provided they can demonstrate to the satisfaction of the Accreditation Panel that their program will achieve the required outcomes*" (Environmental Health Australia, 2014, p. 10).

4.3.3 A critique of current approaches to environmental health education

The model adopted for delivering professionally accredited environmental health programs in Australia is based on a conventional curriculum design, indicative of the design of most higher education programs as I described in Chapter 2. For example, environmental health programs typically involve basic units in science, e.g., microbiology, chemistry, health and social sciences, disciplinary-specific units with higher-level units such as research or problem-based units aimed to further demonstrate the application of skills and knowledge to the disciplinary context. Additionally, the incorporation of a work practicum or a range of work-integrated learning (WIL) activities to support preparation for professional practice is often considered by employers as essential for this practice area (Windsor and Associates, 2005; Morton Consulting Services, 2004; Dunn et al. 2017; Dunn & Tenkate, 2011).

For example, graduates who have participated in practical placements as part of their qualification are often perceived by stakeholders, including industry and educators, to have gained a better grasp of the practice of environmental health. This assists in workforce retention and the ability to 'hit the ground running,' particularly in well-structured and resourced

programs (Dunn et al., 2018; Dunn & Tenkate, 2011; Morton Consulting Services, 2004; Windsor and Associates, 2005; Page 2008). As Page (2008) contends, exposing the developing environmental health professional to the act of professional practice provides the opportunity to apply knowledge and skills, reflect individually or as part of a team on best practice solutions and areas to improve. Achieving these outcomes is also reflective of the broader literature highlighting the value of work-integrated learning contributing to graduate learning outcomes (Patrick et al., 2009).

However, challenges have also been identified with the provision of WIL in environmental health education programs in Australia and other countries. Challenges include the resource-intensive nature of WIL program delivery, the ability of students and industry to participate in WIL experiences, assessing the authenticity of WIL activities to satisfy professional accreditation requirements, the debate regarding the length of time students should spend in the workplace to achieve competencies, issues associated with the quality of student mentoring and the ability to expose students to a broad range of experiences to meet the required learning outcomes (Adams, Davis, Rossignol, & Silverman, 2001; Dhesi & Lynch, 2016; Dunn et al., 2018). The work-readiness of graduates, including a greater understanding of the environmental health practice role and the development of more practical expertise, has been a common issue in environmental health workforce studies in Australia (Environmental Health Committee (enHealth), 2009; Morton Consulting Services, 2004; Windsor & Associates, 2005). This issue appears to continue, despite student participation in workplace experiences and programs traditionally led by practitioners in the field (which is also an accreditation requirement of the EHACAP) and strong engagement with industry professionals in the delivery of environmental health programs.

The above problems associated with environmental health graduates' work-readiness arguably support critiques of educational approaches, which typically focus on the assessment of knowledge and skills to practice. As I discussed in Chapter 2, this approach to professional development is an insufficient basis for the preparation for professional practice as such approaches reinforce the artificial divide between content, propositional formalised knowledge, and direct thinking about practice as a separate activity from the practice itself. In so doing, these approaches fail to recognise that skilful practice requires an integrated understanding of "knowing, acting and being the professional" (Dall'Alba, 2004, p. 43),

overlooking the need to integrate the ability for students to develop personally and professionally, whilst learning the theoretical and technical aspects of practice.

In summary, the establishment of the practice of environmental health as a professional area of practice in Australia has been founded based on the traditional characteristics of a profession. The professionalisation journey, of which the origins have stemmed from those established in the UK, has spanned over 100 years. The professionalisation process has been supported by the development of a required body and knowledge and skills and expected attributes to be developed by graduates as a basis for gaining professional qualification to practise. While I acknowledge this basis can act as a useful guide for achieving consistency regarding what graduates should know and be able to do (Boud, 2012), focusing on these aspects alone is insufficient for developing the environmental health professional. I argue that what is required is a focus on what practitioners need to know and do and who they are becoming personally and professionally (Dall'Alba, 2009b).

To further describe the professional practice of environmental health as focused in this thesis and to assist in supporting the research questions and the discussion of the findings arising from the study, the following section provides an overview of key influences on current understandings of the professional practice of environmental health.

4.4. Key influences on current understandings of the professional practice of environmental health

The following sections aim to provide a historical overview of the key influences underpinning current understandings of the professional practice of environmental health based on three historical phases. I have selected these phases as this is generally reflective of how this area of practice is described in the literature (Friis, 2012; Smith, 2008; Yassi, Kjellström, De Kok, & Guidotti, 2001). I also commence this description in the early 19th century as this era is often associated with the "genesis and evolution" of the environmental health practitioner (Battersby, 2016, p. 8). This description is not an exhaustive account but aims to capture the key influences that have contributed to the evolving complexity of this area of practice, emphasising the Australian context due to the geographical focus of the thesis.

4.4.1 First phase: early 19th century to mid-20th century

Several factors have influenced the professional practice of environmental health in Australia and many countries, in addition to the foundations established by the sanitation movement I outlined in Section 4.2. Key factors that have influenced this area of practice include a range of significant scientific discoveries during the mid-19th century. One such discovery, frequently attributed to John Snow, involved the linkage of water consumption with cholera outbreaks. This connection was established when the broad street pump in central London was removed (Battersby, 2016; Frumkin, 2016; Lin et al., 2014). This discovery introduced the linear cause-effect relationship between health and the environment and epidemiological evidence as a basis for public health intervention (Battersby, 2016; Eyler, 1973; Friis, 2012; Lin et al., 2014). This discovery also initiated a shift from previous theories of miasma, which posited that disease resulted from bad smells and filth to the recognition of environmental agents as a cause of disease (Baum, 2016; Friis, 2012; Lin et al., 2014). This shift paved the way for the modern movement of environmental health using evidence as a basis for decision making (Eyler, 1973).

Further discoveries and scientific advances in the mid-late 19th century included the formulation of germ theory of disease by Louis Pasteur, the establishment of the field of bacteriology, and the development of vaccines and pharmacotherapies to assist in disease prevention (Battersby, 2016; Brimblecombe, 2003; Frumkin, 2016). These advancements also resulted in the greater medicalization of public health involving an increased focus on surveillance and screening of disease (Hamlin, 1998; Kotchian, 1997). Further refinement of the theoretical understandings of disease causation, taking place during the latter part of the 19th century, involved the introduction of the classic epidemiological triad of 'host – agent – environment'. This understanding further extended scientific insights regarding disease causation beyond the linear- cause-effect relationship to the recognition of a more complex relationship between each of the triad components in disease causation (Parkes, Panelli, & Weinstein, 2003). These concepts further provided the basis for an evidence-based approach to environmental health practice, involving the adoption of risk assessment and management principles, which are a core element of environmental health decision making today (Priestly, Di Marco, Sim, Moore, & Langley, 2007).

From an Australian perspective, the gold rush of the 1850s notably posed threats of epidemic diseases, leading to the adoption of sanitary reforms modelled on those initiated in England

and Wales described in Section 4.3 (Talbot et al., 2007; Smith, 2008). These reforms principally involved the development of legislation and the provision of resources by governments to control the physical and biological environment as mechanisms to protect public health, including building a workforce to implement these measures (Smith, 2008). It also included the appointment of sanitary inspectors and medical officers of health in locally governed areas. During the early to mid-part of the 19th century, as Baum (2003) describes protection of public health during the early to mid-part of the 19th century principally involved "health inspection activities" to strengthen "the race' (p. 24), associated with ideas of efficiencies, virtue, survival of the fittest and the development of ideal clean cities.

Key strategies generally adopted by the government to protect health during this phase involved community education and surveillance involving the collection and reporting data of public health interest. It also involved the policing of standards associated with air, water, food, waste disposal and nuisance activities, quarantine measures and the introduction of immunisation programs (Reynolds, 1995; Smith, 2008). Legislative measures during this period included an evolving range of top-down specialised public health legislation built on the assumption that penalties were needed to encourage adherence to public health requirements (Reynolds,1995). These measures were referred to as a command and control legislative model, based on "paternalistic principles to prevent harm", with public health becoming an inherently political activity (Baum, 2003, p. 74).

In summary, the earliest influences on the professional practice of environmental health in Australia included those facilitated by the sanitation movement in England and Wales and a range of scientific discoveries which provided the foundation for evidence-based decision making. Practices aimed at protecting public health during this period were primarily focused on the administration of top-down legislation involving inspection, surveillance, community education and the provision of immunisation services. These practices represent the traditional environmental health paradigm. This period also provided the foundations for the establishment of the environmental health professional workforce in Australia.

4.4.2 Second phase: late 1950s to late 1990s

A wide range of complex and interrelated factors influenced the professional practice of environmental health in Australia and globally during this phase. Due to this complexity, I canvas these factors under the subheadings of:

- Clinical medicine

- Addressing the determinants of health

- Uncertainty, risk assessment and the environment in focus

- Changing regulatory and operational environments

Clinical medicine

A key factor influencing the professional practice of environmental health during the 1950s to 1970s, particularly in developed countries such as Australia, relates to the decline in infectious diseases and the increase in non-communicable diseases such as cancers and heart disease (Baum, 2016). These changing disease patterns resulted in a shift towards hospital-based services and clinical medicine to conquer illness, placing an increased focus on the role of medicine in addressing public health issues (Aston & Seymour, 1998; Baum 2016). The shift also increased the emphasis on health education campaigns targeting individual behaviour change as a key public health strategy due to epidemiological studies linking specific behaviours such as smoking, inactivity, and poor nutrition to increasing chronic disease (Lin et al., 2014). From an environmental health practice perspective, a greater focus on the biomedical model of health lessened the focus on the traditional approaches underpinning this area of practice, such as controlling the physical environment as a means to prevent diseases (Baum, 2016).

Addressing the determinants of health

During the late 1970s to early 1980s, factors such as the economic burden associated with governments globally investing heavily in clinical medicine to conquer disease, together with concerns of increasing chronic disease, disability, and mental illness, led to a renewed emphasis on addressing the social and economic determinants of health as a means to address public health problems (Baum, 2016; Lin et al., 2014; Smith, 2008). This renewed emphasis was facilitated by reports such as the Lalonde Report (1974), which suggested health care services

were not the most critical determinant of health and significant advances in health would result from improvements in lifestyle, environment and knowledge of human biology (Handcock, 1986). This report was further supported by a growing field of research identifying the profound impacts of social, environmental conditions on health (Cassel, 1976) with evidence attributing improvements in health outcomes to improved living standards, nutrition and hygiene standards rather than medical intervention (McKeown, 1979). This research included recognising the influence of lifestyle, social support and socioeconomic status in reducing health inequalities (Lin et al., 2014).

The above factors and events led to what is often referred to as the 'New Public Health' era (Baum, 2016). This era resulted in Australia's approach to public health being influenced by World Health Organisation (WHO) policies such as the Alma Ata Declaration of 'Health for all by the year 2000' (1978) and the Ottawa Charter for Health Promotion (1986) (Baum, 2016). These policies advocated for adopting actions based on a preventative model of health, encompassing building public health policy, creating supportive environments, developing personal skills, strengthening community action and re-orienting health services rather than a focus on disease causation (Baum, 2016).

Further models such as the 1991 Dahlgren-Whitehead rainbow model also emerged during this phase as a mechanism to support the identification of the relationships between individuals, their environment and health, to tackle health inequalities (Cragg & Nutland, 2015; Lin et al., 2014). The identification of this interrelationship also promoted the socio-ecological model of health to address such inequalities. This model encouraged consideration of factors that influenced health at the intrapersonal level (e.g., individual attributes), interpersonal level (e.g., relationships between others), institutional level (organisational rules), community (relationship between organisations), public policy (laws) and development of strategies that addressed each of these factors as a system or concerning each other as a multilevel intervention (Cragg & Nutland, 2015). In Australia, this phase also saw a rise in social movements that advocated for health policy reforms to address the needs of various groups, including women, immigrants, and indigenous populations, more effectively. This phase also resulted in the provision of a range of community-based health services, in addition to the increased provision of community welfare, education and social housing services by governments (Lin et al., 2014).

The implications of the above factors on the practice of environmental health were "the realisation that environmental health is broader than just legislation and administration of the physical environment", but now involves consideration of the "social dimensions as well" (Smith, 2008 p.73). Thus, it required a stronger focus on practices associated with health promotion, environmental health planning and education. Oldenburg, Burton, & Parker (2004) also contend that this area of practice is well-positioned to reduce health inequities by addressing poorly maintained social and physical environments, characteristics often associated with socially disadvantaged groups. This period also signalled the expanding nature of players in the broadening public health arena, including professional bodies, community groups and an increased emphasis on the involvement of stakeholders in decision making (Lin et al., 2014).

Uncertainty, risk assessment and the environment in focus

Additional factors which influenced the practice of environmental health, particularly between the latter half of 1970 to the late 1980s, included a growing body of research recognising that factors and conditions which cause disease were not only linked in complex ways but exist in a broader context (Lin et al., 2014). For example, the linking of cancers to environmental factors or a combination of factors such as tobacco smoke, sunlight, heavy metals, added elements in the diet, asbestos, chemical substances, and socioeconomic status. These complex factors also pose a range of challenges for determining the responsible agent or agents, the most hazardous agent and the most appropriate intervention, particularly when many complex uncertainties are associated with each of these factors (Lin et al., 2014).

Recognition of the complexities and uncertainties associated with identifying and addressing disease causation amongst population groups by governments, researchers and the broader practice community led to the emergence and formalisation of a range of risk assessment and management models, particularly during the latter part of the 20th century (enHealth, 2012; Lin et al., 2014; Robson & Toscano, 2007). Lin et al. (2014, p. 74) describe such models as providing a framework to assess the hazardous nature or toxicity of environmental substances (inclusive of physical, chemical and biological substances) by estimating the impact of exposure on human health and the appropriate risk management response. The appropriate risk management response was also required to consider how to respond to the risk "within a

context of community values and what is feasible - practically, economically and politically" (Lin et al., 2014, p. 87).

The increased focus on developing risk assessment and management models during this phase was also linked to increased societal and political concern for the environment during the 1970s. This concern was facilitated by Rachel Carson's 1962 book, *Silent Spring*, which broadly raised concerns regarding the relationship between humans and the natural world, particularly about the agricultural use of chemicals such as dichlorodiphenyltrichloroethane (DDT) (Paull, 2013; Sheehan, Lam & Burke 2016). These concerns also contributed to the initiation of environmental protection laws and specific government agencies focusing on organised environmental protection in the USA, together with the concept of environmental justice (Friis, 2012). Environmental health justice refers to the fair treatment and meaningful involvement of all people, irrespective of racial background, country of origin or socio-economic status, in developing and implementing legislation and policy (Friis, 2012; Sheehan et al., 2016). In Australia, from an environmental health practice perspective, the increased focus on risk and the environment influenced the legislative basis for decision making and the development of specific environmental protection laws.

Changing regulatory and operational environments

Throughout the 1980s in Australia, the increased focus on addressing the social determinants of health, together with a greater emphasis on risk assessment and management models and the impacts of environmental pollution on human health and wellbeing, expanded the legislative basis associated with the practice of environmental health. This expansion involved a shift from a focus on drains, rodents and protection from adulterated food to a greater set of "sophisticated legislation" (Reynolds, 2011, p.7). This legislation included food laws based on national standards for hygiene and manufacture "focused on the needs of the industry as well as public health", legislation relating to lifestyle diseases such as tobacco control, legislative requirements to address the wider determinants of health through the development of municipal public health plans and formal requirements for reporting diseases, coupled with the emergence of environment laws (Reynolds, 2011, p.7).

The expanded legislative basis associated with environmental health practice was also underpinned by changing perspectives on models and approaches to public and environmental

92

health regulation. As Reynolds (2011) highlights, this was due to criticisms that traditional command and control regulatory frameworks were inflexible, outdated, and unnecessarily combative and achieved only incremental public and environmental health gains. These changing perspectives signalled a move to other forms of regulation such as "responsive regulation" (Reynolds 2011, p.143). Responsive regulation is a regulative model in which enforcement decisions are underpinned by an enforcement pyramid, with prosecution at the tip, preceded by persuasion, informal or formal warnings and remediation orders. In other words, prosecution is used as a "last resort" where possible (Reynolds, 2011, p.144).

In Australia, new regulation models continued to be developed through the 1990s, with a combination of regulatory approaches adopted by the government to address public health and environmental concerns (Peterson & Fensling, 2011). For example, rule-based regulation prescribing a standard to be met or how to behave (Reynolds, 2011), such as prohibiting the sale of food containing a hazardous substance as well as outcome-based regulation. Outcome-based regulation shifts the obligation to demonstrate conformance with a standard to those performing tasks, such as a food proprietor showing how they achieve safe food outcomes (Smith, Ross, & Whiley, 2016). In addition, harm or risk-based regulation, which focuses regulatory efforts "in a way which ensures the problem receives attention in proportion to the risk of harm they present," also became a key legislative approach (Reynolds, 2011, p. 148).

Changes in regulatory perspectives in Australia were also taking place alongside a changing economic climate during the 1990s, based on a wave of neoliberal reforms impacting public health locally and globally. These reforms involved government adoption of new managerialist principles focused on setting explicit standard performance measures and reducing the regulatory burden to both government and business by providing more efficient and effective regulation (Peterson & Fensling, 2011). These changes also initiated a renewed interest in evidence-based policy, impact assessments, increased accountability in response to less societal trust in governments and a greater desire for objective evidence regarding how governments reduced risks to society (Peterson & Fensling, 2011).

The changing regulatory perspectives and operating environments also posed a new set of challenges and complexities for the practice of environmental health in Australia and more widely. These complexities included the need to develop enforcement policies to reflect these

changes by statutory agencies such as local government agencies. This included providing direction about how frequently businesses should be inspected, based on health risk they may pose, and the adoption of a hierarchy of enforcement options, usually involving a graduated response from no action, education to fines or prosecution (Victorian Competition and Efficiency Commission, 2007; Reynolds, 2011). Such policies aimed to support discretionary decision-making associated with the implementation of legislation by the environmental health practitioner to promote fairness, consistency, and transparency according to the principles of good regulatory practice (Victorian Competition and Efficiency Commission 2007; Reynolds, 2011). Criteria underpinning the exercise of enforcement discretion policies involved a range of considerations, from the degree of risk, the seriousness of the offence, the offender's general attitude and the likely effectiveness of the various enforcement options (Reynolds, 2011).

In Australia, changes in regulatory perspectives also led to a greater need for education amongst those subject to regulation, particularly amongst the food sector, regarding how to comply with the new regulatory measures. This need was further complicated by an increasingly culturally and linguistically diverse (CALD) food community, which necessitated resourcing and professional development support for the environmental health practice community in an increasingly resource-challenged environment (Dunn, 2002; McKernan & Dunn, 2009).

Sustainable development and climate change

Further developments influencing the practice of environmental health globally during this phase relate to the increased societal recognition of the complex interrelationship between the built and natural environment, population growth, economic development, health inequalities, resource depletion, globalisation and human-induced climate change (Commonwealth Department of Health and Aged Care, 1999; Frumkin & McMichael, 2008; Parker, Rhodes, & Schwartz, 2016; World Commission on Environment and Development, 1987). These factors were raising serious concerns for human health and wellbeing and the future sustainability of our planet.

Strategies to address the negative societal impacts from human interaction with the environment became the focus of various global reports and policies. This included *Our common future* (World Commission on Environment and Development, 1987), which advocated that human activities should follow a path of ecologically sustainable development.

This path involves maintaining natural capital stocks, including fully functioning ecosystems (World Health Organisation, 2000), whilst satisfying basic human needs and promoting intrageneration and intergenerational equity (Holden, Linnerud, & Banister, 2014; Parker et al., 2016). A further key strategy involved the development of the European Charter on Health and Environment (World Health Organisation, 1989). This Charter served as a guide for governments to develop environmental health policies and programs to enhance international collaboration in addressing health and environmental problems. The Charter included environmental justice principles, emphasising the shared responsibility of individuals, public authorities, and economic sectors in achieving improved health and environmental outcomes and the precautionary and polluter pays principles (World Health Organisation, 1989). The precautionary principle, a concept to address issues of complexity and scientific uncertainty, urges policy decisions to "better be safe than sorry" (Friis, 2012, p. 11).

A wide range of other key events and developments also continued to take place during the 1990s, which have had implications for the practice of environmental health. These include the development of the 1992 UN Framework Convention on Climate change, the establishment of the International Panel on Climate Change (IPCC) and the initiation of treaties such as the Kyoto protocol as a mechanism to reduce greenhouse emissions globally and address climate change (Friis, 2012; Lin et al., 2014). In addition, Agenda 21, a non-binding action plan which set targets for governments to implement at local, national and global levels as a means to achieve global sustainable development, was established (Parker et al., 2016;). These actions were followed by the 1996 (UN) conference on Human Settlements, which promoted the societal need to advance other policy responses in various areas, including improving equality, eradicating poverty, education, sustainable development, quality of life, and protection of families. It also involved promoting civic engagement and enhancing government responsibility, partnerships and international cooperation in addressing growing health inequalities and unsustainable global development (UN-Habitat, 1996).

From an environmental health perspective, collectively, the developments described above set the context for initiating and developing several environmental health frameworks and policies both internationally and locally. For example, the 1994 Environmental Health Action plan for Europe advocated to create a wide range of initiatives, such as developing institutions and sectors (both private and public) to foster a holistic approach to environmental health (World

Health Organisation, 1994). The action plan also advocated for developing professional education and training curricula to strengthen the workforce's capacity in recognition of the increasing complexity of environmental health problems. In Australia, these initiatives were reflected in the professional qualifications to practice environmental health progressing to degree level in the 1990s. This was followed by the further development of professional accreditation curriculum requirements (Talbot et al., 2007) and a focus on the professional development of the environmental health practitioner community (Oosthuizen, 2009a; Smith, 2008). Additionally, in 1999, Australia's first National Environmental Health Strategy was launched, as described in Chapter 1.

In summary, a range of complex, interrelated factors influenced the professional practice of environmental health during this phase. Key factors included greater recognition of the interrelationship between the social determinants of health, protection of the environment, the adoption of socioecological approaches in protecting and promoting human health and wellbeing, and a changing political environment involving the adoption of new managerialist practices. The implications for the professional practice of environmental health included a shift in focus from the control of the physical and biological environments to practices associated with health promotion, environmental health planning and education. This phase also set the stage for a greater focus on addressing climate change and sustainable development issues. This was coupled with a shift from top-down legislative models to responsive regulatory frameworks and an increased emphasis on evidence-based practice, efficiency and accountability, and stakeholders' involvement in decision making.

4.4.3 Third phase: 1999 to present

I have selected 1999 as the beginning of this phase to canvas the key factors that have influenced the professional practice of environmental health in Australia, as this year marked the establishment of Australia's first National Environmental Health Strategy (NEHS). This strategy adopted many of the frameworks and principles developed at a global level outlined in Section 4.3.2 as a mechanism to address current and future threats to human health and the environment. These are reflected in the NEHS's Charter of Entitlements and Responsibilities, underpinned by the concept that all Australians are entitled to live in a safe and healthy environment (Commonwealth Department of Health and Aged Care, 1999). A summary of the guiding principles aimed to support the attainment of this entitlement is in Table 4.

Table 4: Guiding Principles of Australia's National Environmental Health Strategy (NEHS)

Guiding principle	Description
Protection of Human Health	Protect human health by identifying threats posed by environmental hazards as early as possible by introducing appropriate safeguards. Ideally, these should be sustained cost-effective
Interrelationship between Economics, Health and Environment	Economic development and environmental protection are inextricably linked. Economic development should proceed hand in hand with measures to protect the environment and promote high standards of environmental health.
Sustainable development	Future human health requires that development meets the needs of the present without compromising the ability of future generations to meet their own needs.
Local and Global Interface	Changes to local and global environments are interactive and significantly impact human health. Environmental health programs need to consider that global environmental protection requires local action and local actions impact globally.
Partnership	Planning, implementing and evaluating programs requires that all involved work together; the general public, all levels of government, business, non-government agencies, health and scientific communities; cooperation extends to include policies and programs not environmental specific but have an environmental impact or component
Risk-Based Management	Tools to address existing or potential threats to human health and adverse effects on people, communities and economic interest, risk management assess likely impact, development strategies for prevention, minimisation or removal.
Evidence-Based decisions	Decisions based on analysis of available scientific evidence, absence of conclusive evidence is no excuse for inaction
Efficiency	Improving the delivery of environmental health services, encouraging innovation, and careful examination of how environmental health services are provided, including each alternate's relative costs and benefits.
Equity	Socioeconomic status and other social factors such as access to community networks, family support are key determinants of health, providing access to all Australians with access to appropriate environmental health services to help reduce the gaps in health status between different population groups.

In addition, the key objectives of the NEHS included a focus on improving collaboration, management practices and decision-making ability, increasing the capacity of the environmental health workforce and promoting healthy environments to support the attainment of the Charter of Entitlements and Responsibilities (Commonwealth Department of Health and Aged Care, 1999). Further reviews of the NEHS continue to redefine environmental health and refine priorities for action whilst still observing the underlining principles and objectives of the NEHS (Environmental Health Standing Committee (enHealth) (2020). These priorities continue to focus on ensuring the enhancement and improvement of environmental health practice, including the ongoing development of the environmental health workforce as described in Chapter 1.

Another reason I selected 1999 as the 3rd phase to canvas the key factors which have influenced the professional practice of environmental health in Australia is due to the increased societal recognition and concern for the global and local implications of human interaction with the environment, as we entered the 21st century. As McMichael and Martens (2002) contend, the last quarter of the twentieth century saw evidence of the unpreceded disturbance and weakening of the world's life support systems by humankind globally. This disturbance reflected "the combined pressure of rapidly increasing population size, and a high consumption, energy-intensive and waste generating economy" (McMichael & Martens, 2002, p. 3). Such disturbances have serious impacts on population health. The WHO estimates more than 24 percent of preventable diseases are environmentally induced, with the global burden of disease predicted to worsen over the coming decades (Prüss-Ustün et al., 2017). These factors also contributed to the development of the Millennium Development Goals (MDGs) in 2000, revised in 2015, which set targets to be achieved by governments globally, from eradicating poverty to ensuring environmental sustainability (United Nations, 2015).

In addition to the above, it has also become increasingly recognised that disease causation is attributed to complex and interconnected underlining changes in social, economic, cultural and environmental conditions, with many environmental health problems now considered wicked in nature (Kreuter, De Rosa, Howze, & Baldwin, 2004; Parker et al., 2016). As Kreuter et al. (2004) argue, many environmental health problems fit the criteria of wicked problems as they are enmeshed in the community's political, cultural and economic structures, with this complexity often compounded by scientific uncertainty. The COVID-19 pandemic is an

example of a wicked problem characterised by multiple competing and conflicting issues, such as protecting lives versus preserving livelihoods (Cohen & Cromwell, 2020). These problems are not easily solvable due to the high infection rate of the virus and scalability (Moon, 2020), with many unknowns or uncertainties regarding the virus itself, human behavioural response and the necessary governance measures (Luo, 2021).

From an environmental health perspective, recognising the increasing complexities and wicked nature of environmental health problems has led to an increased emphasis on adopting ecological or systems-based approaches and systems thinking (Brown, Harris & Russell, 2010; Neller, 2000; Parker et al., 2016). An ecological approach views humans as nested within ecosystems, with an ecosystem defined as a "complex system of organisms, their environment and the interactions which connect them", and recognition that ecosystems are integral to our survival (Parkes & Horwitz, 2016, p. 216). The approach involves integrating environmental and social factors whilst highlighting system characteristics such as "complexity, emergence and feedback loops" in addressing environmental health problems (Parkes & Horwitz, 2016, p. 216). Systems thinking also aims to consider the complexity of interdependence associated with complex and wicked problems to foster a collective understanding of the problem whilst embodying a world view in addressing such problems (Kreuter et al., 2004).

Parkes and Weinstein (2004) argue that adopting an ecosystems approach to any environmental health problem enables environmental health professionals to make an important contribution towards health and sustainability at local and global scales by avoiding short-term and oversimplified actions. It requires practitioners to see beyond the boundaries "between the environment and socioeconomic determinants, health protection and health promotion or between environment and health sectors" (Parkes & Weinstein, 2004, p. 64). This approach also requires a greater focus on developing research methods that evaluate the dynamic interactions between the ecological hierarchy and links between humans, wildlife and ecosystems (Parkes & Weinstein, 2004).

In addition to the increased emphasis on the application of ecosystem and systems thinking approaches to addressing environmental health problems, has been the increased focus on the adoption of adaptation and mitigation strategies (Dakubo, 2010; McMichael, Friel, Nyong, & Corvalan, 2008) and a range of risk management models to support this area of practice. This

includes risk assessment models such as Driving Forces, Pressure, State, Exposure, Action (DPSEAA), Health Impact Assessments (HIA) and Environmental Impact Assessments (EIA) to deal with complex issues such as those associated with climate change (Horwitz & Parkes, 2016; Lin et al., 2014).

As Lin et al. (2014) describe, models such as DPSEAA provide a basis for dealing with complexity and uncertainty by recognising the iterative nature of hazards, risks, and events, with causation grounded in physical and biological science incorporating actions based on risk analysis and practicalities. Application of these models also requires the adoption of transdisciplinary and interdisciplinary strategies, including qualitative research approaches to improve understanding of complex exposure pathways and the influence of social factors on environmental health outcomes (Brown et al., 2010; Couch et al., 2016; Jordan, Dunt, Dunn, & Verrinder, 2008; Keune, 2012; Rehfuess & Bartram, 2014; Scammell, 2010). Keune (2012) also proposes that "critical complexification" (p.4) is a practice now required. This need is associated with the view that perfect knowledge about complex issues is not attainable, with critical reflection constantly required on the choices made to deal with complex problems as "we choose our own picture of reality but have to realize that each has picture has limitations" (Keune, 2012, p.3).

The implications of the events and developments described above for the professional practice of environmental health, in Australia and globally, has been the broad recognition that this area of practice is now bigger in scope. It now involves a much larger and more complex set of practices than those originating in the sanitation movement (Battersby, 2016; Commonwealth Department of Health and Aged Care, 1999; Day, 2016; Friis, 2012; Frumkin, 2016; Smith, 2008). These practices include a stronger emphasis on evidence-based practice and the adoption of risk identification, management and communication strategies, underpinned by ecological and systems-based approaches to solving environmental health problems, including recognition of the local to global implications of these problems (Couch et al., 2016; Day, 2016; Frumkin, 2016; Smith, 2008). These practices also require a greater focus on collaboration, cooperation and partnership and the creation of ownership and shared responsibility for addressing environmental health problems, including the adoption of holistic, integrated approaches. In addition, less reliance on regulatory based measures whilst ensuring resource-efficient evidence-based responses as means to gain sustainable, positive health and

environmental outcomes is now required (Battersby, 2016; Environmental Health Committee (enHealth), 2009). These approaches also involve consideration of the wide range of principles now underpinning this area of practice. Collectively, these practices represent the modern environmental health paradigm.

In summary, the three phases I described in the preceding sections aim to provide a historical overview of key influences on current understandings of the professional practice of environmental health, focusing on the Australian context. In doing so, I argue this description highlights the complexity and evolving nature of the professional practice of environmental health and arguably has implications for the way the practice of environmental health is experienced and understood amongst practitioners. A summary of these three phases is in Table 5.

Table 5: Summary of the three phases of environmental health practice

Phase	Focus	Key practice activities	Key underpinning theories/approaches
First Phase	Control of the physical and biological environment to protect public health influenced by British practices built on sanitation movement, nation-building ideal clean cities	Establishment and implementation of localised environmental health services involving top-down command and control of public health legislation Community education, surveillance, policing standards focused on the physical environment, nuisance activities, protective infectious diseases measures such as immunisation and quarantine	Theories of miasma to the evolution of the germ theory. Epidemiological evidence as a basis for intervention, establishing foundations for an evidence-based approach to decision making Paternalistic principles to prevent harm
Second Phase	Clinical medicine to control and prevent non-communicable diseases focus on biomedical models of health	Community education, with a greater emphasis on health education, promotion and planning activities Increased attention on the assessment of environmental health risks communication and	The socio-ecological model of health Recognition of the complexity and uncertainty of determining causative agents of disease

Phase	Focus	Key practice activities	Key underpinning theories/approaches
	Addressing health inequalities renewed emphasis on the determinants of health.	management strategies involving community consultation	and most appropriate intervention
	Shift to risk and outcome-based legislation in areas of food, environmental protection and public health planning.	Move to performance-based management based on new managerialist practices involving priority setting of environmental health services.	Responsive regulatory models based more effective in achieving health gains, underpinned by neoliberal agenda
	Global climate change and sustainable development	Policy development to address the increasing complexities of environmental health problems	Increased recognition of the complex relationship between factors such as population growth, health inequities, globalisation and climate change on human health and wellbeing
Third Phase	Implications of climate change, local to global impacts of human interaction with the environment, including the weakening of life support systems and wicked nature of environmental health problems	Emphasis on evidence-based practice and ecological and systems-based decision making, interdisciplinary and transdisciplinary solutions involving collaboration and partnership, shared responsibility for environmental health problems including whole societal response, less reliance on legislative measures for sustainable gains. Adoption of adaptation and mitigation strategies	Adoption of global principles, e.g., the precautionary principle in National and local strategies, e.g., Environmental Health Strategy (NEHS) Holistic and Ecological approaches, viewing humans nested within ecosystems, with ecosystems integral to our survival.

To support the key argument underpinning this thesis: current descriptions of the professional practice are inadequate to support current and future practice, I now critique the traditional characteristics underpinning the professional practice of environmental health.

4.5 A critique of traditional characteristics of the environmental health profession

As previously discussed in this thesis, I conceptualise the professional practice of environmental health as a sub-set of the practice of environmental health, as an occupation based on the traditional characteristics of a profession. In Chapter 3, I also identified several challenges to the four characteristics associated with the traditional conceptualisation of a profession as a basis to argue why such descriptions are no longer adequate to deal with the complexities of current and future practice. In doing so, I also argued these challenges were associated with a range of complex and interrelated factors, including globalisation and the adoption of new managerialist practices amongst government and private sectors. In the following sections, applying the same traditional characteristics I used to describe a profession in Chapter 3, I now turn my attention to critiquing these characteristics in relation to the environmental health profession, as a basis to also argue why such descriptions are no longer adequate to deal with the complexities of current and future practice. I do so under the headings of:

- The loss of institutional trust in the environmental health profession
- The erosion of claim to exclusive knowledge and skills
- The loss of control over standards of practice
- The loss of power and authority over decision making

4.5.1 The loss of institutional trust in the environmental health profession

I argue several factors pose implications for the societal trust placed in the environmental health profession to address societal needs in altruistic, competent and moralistic ways as key defining characteristics of a profession. One key factor relates to the societal trust placed in governments, an important determinant of citizens' compliance with public and environmental policies (Blair, Morse, & Tsai, 2017; Blythe, Grabill, & Riley, 2008; McKee & Coker, 2009). This arguably has implications for the environmental health profession, given implementation of government policies is core to this area of practice.

For example, challenges to the societal trust in governments have been revealed when it comes to achieving adherence to public health restrictions and guidelines, such as social distancing measures and immunisation uptake, with these challenges relevant to this area of practice.

These challenges have been reported in relation to managing infectious disease outbreaks such as measles-mumps-rubella (MMR), Ebola (Blair et al., 2017) and, recently, COVID-19, in various countries (Dryhurst et al., 2020; Legido-Quigley et al., 2020). Clark, Davila, Regis, & Kraus (2020) also suggest that the public is more likely to adhere to advice regarding COVID-19 if interventions focus on the efficacy of strategies such as handwashing, wearing of facemasks and the importance of these measures to their own general health, rather than interventions promoting trust in governments.

Distrust in governments concerning public health interventions has been associated with historic mistrust in governments as public health agencies (Larson & Heymann, 2010). This distrust is often predominant in less developed countries with long legacies of government weakness, poor access to health care, limited mass communication of health messages and unfamiliarity with western medicine (Blair et al., 2017). Distrust of governments in public health interventions has also been reported amongst indigenous communities, due to the impacts of colonization and failures by governments to address the health inequalities (Durey & Thompson, 2012). Populations who are experiencing hardship have been found less likely to express trust in governments for public health measures, leading to "a vicious cycle between distrust, non-compliance, hardship and further distrust" (Blair et al., 2017, p. 89). The current COVID-19 epidemic and the complexities of maintaining trust with government measures to protect health as economic hardship also increasingly reflect these challenges (Udow-Phillips & Lantz, 2020).

Trust in government-administered public health interventions has also been associated with public scepticism regarding the motives of the government. For example (Meyer et al., 2017) identified that gaining the trust of the food industry for decisions relating to compliance with legislation is a highly complex task. Key factors include poor engagement and communication by food regulators with industry and a perception amongst smaller sized food industries that the motives of food regulators are more about protecting corporate industrialized food safety systems rather than public health. Additionally, McKee and Corker (2009) contend that if the community believes it lives in a politically morally corrupt community, gaining trust for regulatory compliance decisions may also be hindered by a perception that government is motivated by the ability to profit from an intervention or to stifle civil liberties, rather than to protect public health. This can also lead to a perception of corrupt scientific advice (Blair et

al., 2017) and conspiracy theories. This trust is further complicated when multiple governments are involved in addressing issues that have public health implications (McKee & Coker, 2009).

Other factors such as a better-educated society and the proliferation of the professions described in Chapter 2 have also posed implications for this practice area. Couch et al. (2016) posit that as with any profession, environmental health is subject to increased scrutiny from a more knowledgeable and well-informed public which is also increasingly distrustful about the expertise of governments. Although there appears to be a lack of research concerning the implications of the proliferation of the professions and the societal trust placed in the environmental health profession, Carpenter et al. (2016) suggest conflicting expert opinions when dealing with complex health issues are "arguably natural and expected" (p.1173). They further contend such conflicting health advice amongst experts has raised trust issues amongst the public, leading to perceptions of intentional bias, expert incompetence, and lowering intentions to adopt health advice when there is clear scientific evidence (Carpenter et al., 2016). From an environmental health perspective, given the multiple professions now involved in this area of practice, together with the complexity of health and environmental problems, challenges to the public trust placed in the environmental health profession is also arguably to be expected.

Other issues having implications for the institutional trust placed in the professional practice of environmental health relate to inconsistency in enforcement practices and a perception of overregulation by industries regulated by the environmental health professionals (Meyer et al., 2017), together with regulators and environmental health practitioners not always getting it right or making poor decisions (Pond & Pedley, 2016). The ability to achieve consistency in environmental health practice, particularly for the regulatory role of the practitioner, has been identified as a source of frustration for practitioners, industry and regulators alike (Windsor, 2005; Morton Consulting Services, 2004). Consistency in this context often refers to "the ability to adopt similar approaches to options for enforcement rather than ensure uniformity" (Davey & Battersby 2016), with gaining consistency in environmental health practice identified as a complex task (Windsor & Associates, 2005; Couch et al.,2016). As Couch et al. (2016) point out, immersed in the messy reality of the street, environmental health practitioners may need to rely on relativist tools to deal with such realities. Through a relativist lens, "compliance is constructed in the field from the relationships between rules and social

practices", which these authors point out poses difficulties for gaining similar approaches to enforcement, given that there are likely to be multiple realities associated with the adoption of such practices (Couch et al.2016, p.110).

Furthermore, as Lipsky (1980) contends, public servants such as environmental health practitioners are front line workers and Street-Level Bureaucrats (SLB), defined as "public service workers who interact directly with citizens in the course of their jobs, and who have substantial discretion in the execution of their work" (p.2). Through the lens of street-level bureaucracy, Lipsky (1980) further posits that workers are often faced with uncertainties through the execution of their work. These uncertainties include ambiguous work expectations, complexities associated with the people they encounter, limited information and time to respond to situations with the rules public servants need to follow, often not linking to the specific problem they are involved in. As such, SLBs often use discretion in the performance of their work, resulting in policy adjustment at the street level to respond to such situations. Viewing environmental health practice through a street-level bureaucracy lens also highlights the challenges of gaining consistency in approaches to enforcement options.

Another factor that arguably contributes to a loss of institutional trust in the environmental health profession relates to concerns raised by the environmental health practice community in Australia and other countries about the lack of societal understanding and valuing of the environmental health profession (Blake, 2007; Dhesi & Lynch, 2016; Environmental Health Committee (enHealth), 2009, 2010; Fabian, 1996; Knechtges, 2018; Morton Consulting Services, 2004; Treser, 2018; Whiley et al. 2019; Windsor &Associates, 2005). This poor understanding has been attributed mainly to the invisibility of the profession, which is associated with factors such as the effectiveness of this area of practice, the preventative nature of environmental health and the low profile of the profession in mainstream media (Blake, 2007; Burke, 2002; Knechtges, 2018; Treser, 2018; Whiley et al., 2019). Additionally, as Briley, Fowler & Teel (2000) point out, many media reports associated with this area of practice often focus on failings in the system. To address this problem, they argue greater promotion of the positive outcomes of environmental health practice interventions is required. This promotion is necessary to instil trust in the local community to accept and adopt environmental health professional advice and to enable professionals to influence policy to gain public health positive outcomes, given the political nature of public health interventions.

In summary, several factors have implications for the societal trust placed in the professional practice of environmental health to address societal needs in altruistic, competent and moralistic ways as key defining characteristics of a profession. These factors are reflective of those canvased in relation to the professions in Chapter 2. They include loss of institutional trust in government public health policy, a better-educated society, proliferation of the professions and inconsistency in decision making. Poor visibility, lack of societal understanding and valuing of the environmental health profession also have implications for trust in environmental health professional advice and the ability for this professional area of practice to have a voice in the wider public health arena.

4.5.2 The erosion of claim to exclusive expert skills and knowledge

The claim to a source of exclusive expert skills and knowledge as a defining feature of the professional practice of environmental health, I argue, has also been subject to challenge over the last 30 years. Key factors contributing to this challenge include the increased complexity and widening of the societal burden of environmental health problems, the increased use of performance-based management techniques in the delivery of environmental health services, an increasingly well-informed public, and the proliferation of the professions. I explore these aspects further.

With respect to the complexity and widening of environmental health problems, as previously discussed, it is now widely recognised that addressing such issues requires contributions from many sectors, disciplines, occupational groups and the community. However, environmental health professionals are often referred to as 'generalist specialists', possessing a range of unique characteristics (Gerding et al., 2019). These characteristics include multidisciplinary training, equipping practitioners to deal with a broad range of environmental hazards, from air to food contaminants (Environmental Health Australia, 2014; Environmental Health Committee (enHealth), 2009). This training also equips practitioners to make connections between problems and solutions (e.g., removing the hazard from one area can cause a problem if disposed of elsewhere) whilst providing the legal and administrative expertise to address such issues (Thomas, 1998). As Thomas (1998) posits, on this basis, a claim to exclusive expertise based on these unique characteristics could be made.

However, the alternative argument to the generalist specialist view of the environmental health profession as a basis to claim a source of exclusive knowledge and skills is that "no single set of experts can generate effective solutions to environmental health problems" (Environmental Health Committee (enHealth), 2009, p. 30), due to the increasing complexity and widening burden of environmental health problems. Thomas (1998) also argues that with the domain of environmental health work now being so wide, drawing on both the natural and social sciences, there is no single part of this area of practice that could not be carried out by another profession, challenging the exclusivity of professional knowledge. Thomas (1998) further argues that codification of environmental health knowledge, in the form of checklists to gain uniformity in undertaking environmental health activities (e.g., food safety audits), to facilitate the delivery of environmental health services in accordance with performance-based management techniques, has the potential to reduce the mystery of environmental health work, making it easier for other professional groups to lay claim to this expert territory. Additionally, an increasingly well-informed public, together with the proliferation of the professions, as discussed in Chapter 3, also arguably places an additional strain on the exclusivity of environmental health professional knowledge.

In summary, despite an alternative argument of a 'generalist specialist' view of the professional practice of environmental health, as a basis to claim a source of exclusive expert skills and knowledge, modern approaches to dealing with environmental health problems now require holistic, integrated partnerships, involving the input of many disciplines and sectors. This includes the need to draw on knowledge from many different fields and perspectives to address environmental health problems. This position is also reflective of the ideas associated with the theoretical notions of practice I described in Chapter 2, which recognises the multiple influences on practice, including those arising from the co-creation of knowledge between communities and landscapes of practice. When viewing practice from this theoretical perspective, this also highlights that a claim to an exclusive body of knowledge and skills is difficult to make as a defining characteristic of the environmental health profession.

4.5.3 The loss of control over standards of practice

The environmental health professions retaining control over standards of practice such as technical and ethical aspects of practice, through self-regulation and external regulation of

professional education programs, has also been challenged, particularly over the last 30 years. I explore these aspects further below.

Loss of self-regulation of practice

Loss of self-regulation of the professional practice of environmental health, I argue, is also applicable to this area of practice. Key factors influencing this characteristic of the environmental health profession relate to the adoption of new managerialist practices, concerns of deprofessionalisation associated with the appointment of environmental health technicians (EHT) and government involvement in the appointment of persons to undertake environmental health activities. Other factors relate to the power or degree of oversight EHA or other professional organisations such as Environmental Health Professionals Australia (EHPA) have over the adherence to professional standards by practitioners. I explore these areas further in the following paragraphs.

The types of new managerialist practices which I argue have implications for the loss of self-regulation of the professional practice of environmental health include the increased codification of environmental health knowledge as outlined in Section 4.5.2. This codification also serves as a mechanism for measuring accountability and efficiency and supports outsourcing environmental health services (Thomas, 1998). Adopting these practices has been an increasing part of the environmental health landscape over the last 30 years in Australia and other countries (Commonwealth Department of Health and Aged Care, 1999; McCarthy, 1996; Plume, Page, & Garelick, 2018 Windsor & Associates, 2005).

Whilst research regarding the implications of new managerialist practices for the self-regulation of the environmental health profession is limited, in the United Kingdom (UK) Plume et al. (2018) identified concerns for the loss of professional values of environmental health associated with the outsourcing of environmental health services. For example, some practitioners perceived that commercial models might lose the "public service ethos", particularly for long-term preventative interventions such as those aimed at reducing poverty and health inequalities. This was due to concerns that these activities would not hold enough interest in companies on 10-15-year contracts (Plume et al., 2018, p. 7). Conversely, practitioners involved in the delivery of outsourced environmental health services considered the essence of environmental health was not lost in translation, with such models providing the

opportunity to focus on what was "really needed rather than carrying on and doing more or less of the same" (Plume et al., 2018, p. 7).

In the Australian context, workforce studies point towards a concern about the deprofessionalisation of the professional workforce because of the increased appointment of environmental health technicians (EHTs) by local and state governments. These appointments are associated with a shortage of professionally qualified practitioners, with EHTs undertaking aspects of the professional role, such as low-risk environmental health activities (Environmental Health Committee (enHealth), 2009). Whilst there is acknowledgement within the practice community that such appointments may enable professionally qualified staff to undertake more strategic roles, thus strengthening the professional base of the workforce, other concerns have been raised. One key problem relates to the potential undermining of the profession by lesser qualified and possibly cheaper workers replacing the professionally qualified workforce (Environmental Health Committee (enHealth) 2009).

The other key aspect which has implications for the loss of self-regulation of practice by the environmental health profession relates to the increased involvement of the Australian Government in guiding and/or regulating standards of practice relevant to this area. This has two aspects. The first aspect relates to the involvement of the Australian Government in the development of resources and guidelines to support statutory or local government authorities in making decisions with respect to appointing a person to act as an authorised officer. Such authorised officers are given the power to undertake functions within the remit of those performed by the professionally qualified environmental health workforce, including those of EHTs. These guidelines are inclusive of the enHealth Environmental Health Officer matrix (Environmental Health Committee (enHealth), 2009) developed in response to the factors outlined in Chapter 1, involving chronic workforce shortages and changes to legislative provisions regarding the appointment of persons to perform duties specified in environmental health-related legislation. The context surrounding the development of these guidelines and resources arguably has implications for the ability of the environmental health profession to maintain control over the standards of practice associated with addressing environmental health problems.

The second aspect posing a challenge to the loss of standards of practice by the profession relates to the power or degree of oversight EHA or other professional organisations such as Environmental Health Professionals Australia (EHPA) have over the adherence to such standards by practitioners. For example, whilst gaining recognition to practice in the capacity of an environmental health officer in Australia requires typically the completion of a professionally accredited qualification, membership to the professional body is voluntary. Additionally, the qualification is not formally tied to a professional certification scheme requiring renewal or reassessment of the qualification to practice (Tenkate & Smith, 2002). This position poses difficulties regarding the degree of power a professional body has over the standards of practice, particularly in relation to the conduct of the professionally qualified workforce. Arguably, legislative provisions in which a statutory authority or local government could be held liable for acting in negligence (which may also result in negative organisational impacts such as reputational risk) concerning the exercise of duties carried out by an environmental health professional as an employee (Environmental Health Standing Committee (enHealth), 2012; Reynolds, 2011) provide greater organisational, managerial control of the standards of the practice of environmental health than can be offered by a professional organisation.

Loss of standards associated with external regulation of professional education

The main critique with respect to a loss of control of technical and ethical standards of practice associated with external regulation of professional educational programs relates to those discussed in Chapter 3, which I argue are also applicable to this area of professional practice. That is the ability of universities to facilitate learning experiences that sufficiently support the attainment of required technical and ethical aspects of practice, as required by environmental health professional bodies. This includes sufficiently supporting the process of professional socialisation. As discussed in Section 4.3.2, current approaches to education for environmental health professional practice are aligned with those involving competency frameworks. As l have also argued in this thesis, such approaches provide insufficient preparation for professional practice. They do not sufficiently prepare practitioners for the complexities of practice, with environmental health a complex area of practice.

As described in this Chapter, environmental health is a complex area of practice, as not only are environmental health problems becoming increasingly complex, wicked and evolving in

nature but preventing and addressing such problems involves multiple perspectives. This includes engaging with other expert groups, government bodies and local citizens with different socio-economic and cultural backgrounds, all of whom may have an alternate understanding of preventing and addressing the problems. Responding to these problems by the environmental professional also involves trust, ethics, challenges to a practitioner's expertise, and the ability to interpret and evaluate the breadth of knowledge involved in addressing problems whilst operating in a resource strained environment. In some cases, this knowledge may conflict, change or be uncertain, as described when dealing with issues such as COVID-19. Thus, environmental health practice is complex and reflects what Barret (2000) describes as supercomplex, requiring educational approaches that can help deal with supercomplexity beyond those based on competency-based frameworks.

Another key challenge to the control over standards of practice associated with external regulation of environmental health professional educational programs relates to maintaining the ongoing viability of professionally accredited programs within the higher education sector. This has been a problem in Australia and other countries, with courses discontinued in several universities over previous decades (Cromar, 2006; Day, 2016; Knechtges & Kelley, 2015; Resnick, Zablotsky, & Burke, 2009; Tenkate, 2005). Whilst not systematically studied, challenges to course viability have been attributed to various issues faced by the environmental health profession. This includes a lack of understanding and valuing of this area of practice, which has implications for recruitment and retention to professionally accredited programs (Environmental Health Committee (enHealth), 2009; Whiley et al., 2019).

Additionally, as Tenkate (2005) outlines, the vocational orientation of environmental health programs, which require laboratory activities, field trips, and additional professional accreditation demands, may leave staff with less time to engage in research, also making environmental health programs vulnerable. He also associates viability of programs with changes to public sector funding, involving greater commercialisation of universities, a focus on student numbers and delivery costs, together with research outputs as the main measurement of achievement, with environmental health programs "not positioned well to weather such changes". This concern is echoed in countries elsewhere, with Knechtges & Kelley (2015) also highlighting the strain posed by complementary degrees such as those with majors in food science and safety, industrial hygiene, toxicology, epidemiology, general public health and

other related majors which act as rivals to environmental health academic programs and impact viability. This is an issue that I have also experienced firsthand and continue to experience in maintaining the viability of a professional qualifying program in the Australian context.

Despite the challenges associated with retaining and ensuring the viability of professionally accredited environmental health programs in the higher education sector, support for professional associations adopting this role in Australia and other countries appears to remain. For example, in the USA, Knechtges & Kelley (2015) highlight the importance of ensuring environmental health professionals are provided with sufficient underpinning theoretical knowledge and skills to deal with the increasing complexity of environmental health problems. This includes the ability to exercise independent judgement and offer innovative solutions to unprecedented problems, with professional bodies assisting in ensuring the quality and quantity of professionals through professional accreditation paramount to this process.

In Australia, Windsor (2012) also identified support for the professional accreditation of academic programs by various stakeholders. This support was associated with a range of benefits, including raising professional identity, improving professional standards and consistency and the convenience for employers to rely on a clearly defined qualification. Employers considered this latter aspect important for reducing costs associated with making their own assessment of qualifications and defending recruitment decisions, particularly in light of legal challenges related to public health decisions (Windsor, 2012).

4.5.4 The loss of power, authority and autonomy with respect to decision making

The ability of the environmental health profession to maintain power, authority and autonomy in decision making can be viewed from two aspects. Firstly, at the individual level, the literature reflects that practitioners maintain a certain level of professional autonomy regarding decision-making associated with their daily work practices. For example, Condon-Paoloni, Yeatman, and Grigonis-Deane, (2015, p. 84), viewing environmental health professionals through a lens of Lipsky's (1980) street-level bureaucrats (SLB), suggest environmental health practitioners experience a high level of autonomy over their work practices. These work practices, they contend, involve the ability to organise their daily workload, guided by their professional knowledge regarding risk prioritisation, without interference from supervisors or management. Departure from this daily autonomy was sometimes associated with external pressures from

the media or elected officials. A response to an issue raised by these parties may be prioritised due to other consequences rather than the matter presenting an immediate health threat (Condon-Paoloni et al., 2015). These findings also reflect other workforce studies in Australia focusing on the environmental health professional role (Environmental Health Committee (enHealth), 2009; Windsor and Associates 2005).

On the other hand, the literature reflects the ability of the environmental health profession to maintain power, authority and autonomy regarding decision making associated with the management and delivery of environmental health services has become increasingly challenged in Australia and other countries over the last 30 years. This appears to be associated with a complex range of interrelated problems, including the adoption of a neoliberal agenda by governments, and a lack of societal understanding, valuing and recognition of the professional role. These problems are further compounded by difficulties in establishing an evidence base to support environmental health initiatives which have implications for gaining resources to support this area of practice in the wider public health arena, as described in Chapter 1.

For example, the adoption of new managerialist practices by governments has led to the amalgamation, restructuring, rationalisation and increased privatisation of many governmental environmental health services as a measure to improve resource efficiency and service delivery in accordance with a neoliberal agenda (Battersby, 2016; Environmental Health Committee (enHealth), 2009; Plume et al., 2018; Whiley et al., 2019). This context has also resulted in environmental health portfolios becoming fragmented, outsourced or managed by those who do not necessarily have environmental health or public health backgrounds (Battersby, 2016; Bell, 2002; Burke, 2002; Thomas, 1998). In some cases, this has also resulted in environmental health services becoming increasingly framed by a desire to achieve a minimum level of legislative responsibilities, based on historical activity levels (Environmental Health Committee (enHealth), 2009; Whiley et al., 2019), with a focus on reaching pre-determined inspection or audit targets (Condon-Paoloni et al., 2015, Thomas, 1998).

The above factors have posed a range of challenges for the ability of the environmental health profession to maintain power, authority and autonomy for decision making associated with the management and delivery of environmental health services. In particular, the ability for the

professional area of practice to adopt more ecological, holistic or health-promoting responses to environmental health problems has been impacted, with this area of practice often referred to as 'being stuck in the delivery of a narrow environmental health agenda' aligned with more regulatory and technically based approaches (Burke et al., 2002; Dhesi & Lynch, 2016; Dhesi & Stewart, 2015; Environmental Health Committee (enHealth), 2009).

For example, workforce studies in Australia have suggested 60% of the environmental health practitioner role in some local areas was "devoted to reactive and regulatory functions of investigating complaints and conducting routine and follow up inspections" (Environmental Health Committee (enHealth) 2009, p. 31). In comparison, 6% (highest estimate) of the role was allocated to health education and promotion activities, with these broader strategies seen to hold the most promise for changing behaviour, addressing health inequalities and challenges associated with climate change (Environmental Health Committee (enHealth) 2009). This imbalance is also "at odd's" with the scope of environmental health activities reflected in the literature and what environmental health practitioners perceived would be their future role (Environmental Health Committee (enHealth) 2009, p.53).

Studies in a range of settings have also identified several constraints limiting the ability for environmental health practitioners to integrate health-promoting or 'upstream' approaches (Lin et al., 2016; Baum, 2016) within their practice, posing additional challenges to this area of practice. These challenges relate to the ability of practitioners to support people from socially disadvantaged backgrounds, including people or groups of low socioeconomic status, CALD groups or those who may be geographically disadvantaged (Rideout & Oickle, 2016). The constraints faced by practitioners include limited access to tools, e.g., interpreting services or collaborative systems to assist with referral to other agencies, particularly when problems are outside the ability or scope of the practitioner to manage (McKernan & Dunn, 2009; Rideout & Oickle, 2016). Lack of organisational policies supporting discretionary decisions based on equity considerations has also been identified as problematic (Rideout & Oickle, 2016).

Another key constraint for integrating health-promoting approaches in environmental health practice appears to relate to poor time allocation for practitioners to incorporate such strategies within their practice, such as sufficient time to build collaborative relationships amongst people or business operators subject to regulation. Building such relationships is perceived by

practitioners as crucial to not only help operators achieve compliance to ensure the health of the community is protected but to also help the business and the community itself (Buckley, 2016; Buckley, 2015; Meyer et al., 2017; Rideout & Oickle, 2016). For example, this may include helping business operators identify less expensive ways to meet regulatory requirements and reduce the business's financial burden (Buckley, 2015) or provide more time to gain compliance with a requirement by weighing up a range of factors. These factors may include an assessment of public health risk and the implications of losing a service to a community, which may result due to punitive action (Rideout & Oickle, 2016).

From the perspective of regulated businesses, having a collaborative relationship with environmental health practitioners (as the regulator) has also been identified as important (Buckley, 2016; Meyer et al., 2017). In particular, Myer et al. (2017) identified that some business operators valued drawing on the expertise of practitioners to support their operation whilst also expecting assistance from government regulators to help them achieve required standards. However, Papadopoulos et al. (2012) identified business operators experiencing a reduction in the time environmental health practitioners have to provide support and guidance due to high practitioner workloads and a focus on meeting inspection targets. These problems are also echoed in Australian environmental health workforce studies (Windsor and Associates, 2005). Arguably, these factors are reflective of those described in Chapter 3, where standardisation and target setting have eroded professional control of work practices (Evetts, 2006a, Scanlon, 2011). For the environmental health profession, these factors have implications for practitioners' ability to integrate more collaborative and health-promoting approaches within their practice, thus contributing to narrowing the environmental health agenda.

As described in Chapter 1, a narrow environmental health agenda has also been associated with poor visibility of the area related to the preventative nature of environmental health practice and difficulties associated with establishing an evidence base to enable the ability to undertake more proactive approaches. These approaches include those grounded in health promotion aimed at addressing the social determinants of health to reduce health inequalities and achieve improved health and environmental outcomes (Battersby, 2016; Dhesi and Lynch, 2015; Environmental Health Committee (enHealth), 2009; Reynolds, 2011; Whiley et al., 2019; Rehfuess & Bartram, 2014). Rehfuess and Bartram (2014) also argue that this problem is

compounded by the difficulties in gaining scientific evidence of the impacts of exposures to environmental contaminants due to the long latency periods associated with these impacts. With many environmental health services aimed at preventing problems occurring over long periods. Dhesi and Stewart (2015) also contend that variation in understanding, experience and perceptions regarding evidence-based practice amongst the environmental health professional community has also made it difficult for this practice area to compete for resources to support broader interventions against other allied health professionals more versed in this area.

The above complex and interrelated problems have raised concerns about the under-utilisation or de-skilling of the professionally qualified environmental health workforce, potentially jeopardising the professionalism of the practice area as it becomes perceived as a more technically focused role (Environmental Health Committee (enHealth) 2009). Some practitioners have also indicated that they felt "duped", as their undergraduate training prepared them for a much broader role, "suggesting whilst the role has become progressively professionalised, the job design has not kept pace" (Environmental Health Committee (enHealth) 2009, p.53).

It has also been widely documented that the flow-on effects of a narrow environmental health agenda include impacts on workforce morale, job satisfaction, retention and attraction to the professional area (Blake, 2007; Burke, 2002; Environmental Health Committee (enHealth), 2009, 2010; Morton Consulting Services, 2004; Tenkate, 2005). These impacts generally highlight concerns regarding the future of the environmental health profession, including the capacity to respond to future societal health and environmental challenges. These concerns are also within a context of a predicted increase in workforce shortages in this area in Australia and other countries associated with an ageing workforce (Burke, 2002; Environmental Health Committee (enHealth), 2009; Gerding et al., 2019; Marion & Murphy, 2016) and the ability to maintain the viability of professionally accredited environmental health tertiary programs, as described in Section 4.4.3.

In summary, the ability of the environmental health profession to retain power, authority and autonomy for decision making, particularly associated with the delivery of environmental services that encompass a modern or broader environmental health agenda, has been significantly challenged over the last 30 years. These challenges relate to a range of complex

and interrelated problems, including a focus on performance-based measures and a lack of societal understanding, valuing and recognition of the professional role. These aspects are further compounded by difficulties in establishing an evidence base to demonstrate the effectiveness of environmental health practice interventions, particularly to support the adoption of those grounded in health promotion.

4.5.5 Summarising the critiques to the traditional characteristics of the environmental health profession

In the preceding sections, I identified several challenges to the four characteristics associated with the traditional conceptualisation of the environmental health profession as a basis to critique why such descriptions are inadequate to deal with the complexities of current and future practice. These complexities, which I explored more broadly in relation to the professions in Chapter 2, I argue, are also applicable to the professional practice of environmental health, namely: the complexities associated with the changing and evolving context of environmental health practice relating to globalisation and governments' adoption of a neoliberal agenda. From an environmental health perspective, these factors are also coupled with the increasing societal burden associated with environmental health problems, with such problems becoming increasingly wicked in nature.

The complexities inherent in the professional practice of environmental health I refer to as those associated with the conceptual definition I have adopted to guide this thesis, namely: a socially constructed relational phenomenon and a form of doing, knowing, being and becoming. In adopting this practice lens, I also argue that current approaches to environmental health education that adopt a container view of practice provide an insufficient basis for improving professional practice. Collectively, I argue that these complexities have challenged the traditional characteristics used to describe the professional practice of environmental health and the ability for professionals to effectively deal with the complexities and uncertainties associated with current and future practice. These key critiques and challenges are summarised in Table 6.

Table 6: Summary of key critiques of the traditional characteristics of the environmental health profession

Characteristic	Critique Summary
The loss of institutional trust	The loss of trust in governments as an important determinant of citizen compliance with public and environmental health policies (Blair et al., 2017; Blythe et al., 2008; McKee & Coker, 2009) posing implications for trust in the environmental health profession. Key issues include public scepticism associated with motives of governments concerning public health advice, complicated by perceptions of morally corrupt governments or governments profiting from advice or through stifling civil liberties (McKee & Coker, 2009) or corrupt scientific advice (Blair et al.,2017). A better-educated society (Couch et al., 2016), the proliferation of professions, inconsistency in decision making, perception of overregulation (Meyer et al., 2017), poor visibility, lack of societal understanding of the environmental health profession also have implications for trust in environmental health professional advice (Briley et al., 2000)
The erosion of claim to exclusive expert knowledge and skill	The increased complexity and widening of the societal burden of environmental health problems now require multiple responses. No single group could lay claim to exclusivity of knowledge and skills to address such problems (Environmental Health Committee enHealth, 2009). The proliferation of the professions and the increased use of performance-based management techniques in the delivery of environmental health services has the potential for other groups to lay claim to environmental health knowledge (Thomas, 1998). Crisis in confidence in professional knowledge associated with well-informed public and conflicting professional advice about dealing with environmental health problems, e.g., COVID-19 pandemic (Dryhurst et al.,2020), also challenge the exclusivity of expert advice.
The loss of control over standards of practice	Key impacts to this aspect include adoption of new managerialist practices in the delivery of environmental health services raising concerns of potential loss of professional values (Plume, Page & Garelick 2018), de-professionalisation of workforce associated with appointments of EHTs (Environmental Health Committee (enHealth), 2009). Government involvement in the appointment of authorised officers to undertake environmental health activities promoting a context for loss of control of standards of practice. Limited power or degree of oversight of environmental health professional bodies over adherence to professional standards by practitioners with legislative provisions holding statutory authorities liable for negligence (Environmental Health Standing Committee (enHealth), 2012; Reynolds, 2011) posing

Characteristic	Critique Summary
	more managerial control. The ability of universities to facilitate learning experiences that sufficiently support the attainment of required technical and ethical aspects of practice associated with the adoption of competency-based frameworks. Maintaining the viability of professionally accredited programs (Cromar, 2006; Day, 2016; Knechtges & Kelley, 2015; Resnick, Zablotsky, & Burke, 2009; Tenkate, 2005), posing a threat to professional identity, quality and quantity of environmental health professionals (Windsor and Associates, 2012; Knechtges & Kelley, 2015).
Diminished power and authority	Diminished power and authority related to a strain on the decision-making ability concerning the management and delivery of environmental health services. This factor influenced by a neoliberal agenda (Battersby, 2016; Environmental Health Committee (enHealth), 2009; Plume et al., 2018; Whiley et al., 2019), posing implications for this area of practice becoming fixed in a narrow agenda (Battersby, 2016; Burke, 2002; Dhesi & Lynch, 2016; Environmental Health Committee (enHealth), 2009). Also, relates to a lack of understanding of the broader contribution this area of practice has in addressing the wider determinants of health. (Burke, 2002; Dhesi & Lynch, 2016; Dhesi & Stewart, 2015; Environmental Health Committee (enHealth), 2009). These issues have implications for workforce morale, job satisfaction and retention (Blake, 2007; Burke, 2002; Environmental Health Committee (enHealth), 2009, 2010; Morton Consulting Services, 2004; Tenkate, 2005).

Given the critiques and challenges facing the professional practice of environmental health as outlined in this section, as I explored in relation to the professions in Chapter 2, this also raises several key questions concerning this area of practice. Namely, what is the future of the professional practice of environmental health? Do we need this area of practice at all? I explore these questions further in the following section.

4.6 The future of the professional practice of environmental health

Irrespective of the challenges to the traditional characteristics of the professional practice of environmental health I have outlined, this area of practice continues to be identified as an important contributor to addressing and preventing current and future threats to human health and the environment in Australia and globally (Battersby, 2016; Day, 2016; Environmental Health Committee (enHealth), 2010; Frumkin, 2016; Gerding et al., 2019; Knechtges, 2018; Treser, 2018; Whiley et al., 2019). The Australian Government has acknowledged this

continued contribution as increasingly important as the societal burden of environmental health problems persist and expand, exacerbated by issues associated with climate change and resource depletion (Environmental Health Committee (enHealth), 2009).

The perceived key future benefits of the professional practice of environmental health relate to the critical services this group provides in responding to complex and multifaced environmental health threats in order to assist in preventing injury and related illness amongst the population (Gerding et al., 2019; Treser, 2018). As described in Chapter 1, this includes exposure to hazards associated with food, water, land, noise and the built environment, acts of bioterrorism and war (Battersby, 2016; Commonwealth Department of Health and Aged Care, 1999; Environmental Health Committee (enHealth), 2009; Frumkin, 2016; Knechtges, 2018). The effectiveness of this response is often associated with the multidisciplinary training underpinning the practice area, enabling practitioners to assess risk and develop solutions from a broad and holistic perspective (Battersby, 2016; Day, 2016; Morris & Robertson, 2003).

The broad and holistic perspective of environmental health practice also promotes a generalist specialist and practical problem-solving or 'doing' approach to solving environmental health problems (Couch et al., 2016; Dhesi & Lynch, 2016; Dunn et al., 2018; Knechtges, 2018). As Knechtges (2018) contends, the generalist specialist skill set is an important aspect of the profession, given environmental health problems are multidisciplinary in scope. The effectiveness of the environmental health professional response is often associated with several key characteristics or 'soft skills' underpinning the environmental health professional. These include the ability to influence, advocate, negotiate, show empathy, respond to unpredictable circumstances and deal with difficult and sometimes hostile responses to a practitioner's professional advice (Day, 2016; Environmental Health Committee (enHealth), 2010; Greenberg, 2020; Yassi, Kjellström, De Kok, & Guidotti, 2001).

The distribution of the professional environmental health workforce throughout local and state governments, with close ties to the community, including vulnerable groups (Oosthuizen, 2009b), has also been identified as having several advantages. These include the ability for environmental health practitioners to influence policy, generate resources to build community capacity, resilience and adaptability to respond to challenges associated with climate change such as bushfires, heatwaves and lifestyle diseases (Environmental Health Committee

(enHealth), 2009, 2010; Oosthuizen, 2009a). Other advantages relate to the ability of environmental health professionals to act as a central point for contact and coordination with other agencies, including acting as a referral service for other social support programs. This ability is important given the complexity of public and environmental health problems, which require "integrated partnerships which support holistic responses", with environmental health professionals identified as well placed to support this future agenda (Environmental Health Committee (enHealth), 2009, p.30).

Furthermore, as Knechtges (2018) highlights, even though the contribution of many different disciplines and professions strengthens the environmental health field, there still exists a need for a profession with "a broad perspective in environment and health who can coordinate and integrate public health services" (p.27). Treser (2018) further supports this perspective when he contends "environmental health professionals are the single most important practitioner when it comes to keeping the whole community safe" (p.2), given no other profession holds such a broad mandate of responsibility in ensuring this outcome. The ability to help the community and make a difference has also been identified as a key motivator for professionals involved in this area of practice (Environmental Health Committee (enHealth), 2010). In the broader public health arena, Lin et al. (2014) contend "new thinking" and "new thinkers" (p.245) are required to address the cross-sectional nature of health development. Future methods to achieve this include identifying disciplines and sectors to develop integrated responses to help bring about change and deal with uncertainty. This perspective further suggests that the environmental health professional workforce is well-positioned to contribute to this 'new thinking'.

Notwithstanding the perceived benefits of this area of practice, the range of interrelated and systemic problems I outlined in Chapter 1 (and explored more fully in relation to the critiques associated with the traditional characteristics underpinning the environmental health profession) continue to persist. I argue that these problems have implications for gaining improvements to this area of practice and pose a threat to the ongoing viability of the environmental health profession. To address these problems, governments, researchers, and commentators have proposed a range of strategies in Australia and more broadly. These strategies are often interrelated, involving recommendations or strategies at the societal, professional and educational level. I explore these areas further in the following sections.

4.6.1 Societal level

At the societal level, the need for greater social marketing and promotion of the societal benefits of the services provided by environmental health professionals is a common theme in the literature. This is considered important by the practice community to help gain greater recognition and support for resources for this area of practice (Blake, 2007; Environmental Health Committee (enHealth), 2009; Knechtges, 2018; Morton Consulting Services, 2004). For example, in the US, Knechtges (2018) highlights that the public often becomes confused between "environmental health and environmentalism" (p.27) and are not clear about the work in this area or the importance. As such, recent reports into this sector in the US have proposed that a "new narrative about environmental health that will help ordinary Americans understand its importance" is required (Knechtges, 2018, p. 27). These sentiments are also echoed by Morris and Robertson (2003), who argue with reference to the environmental health profession in Scotland, "a strong unified identity, which ought to be readily communicable to others and ought to capture as succinctly as possible the profession's contribution to public health" (p.78) is required to address future threats to the profession's viability. The need for clearer public messaging regarding the benefits of the societal role of the environmental health profession, particularly amongst senior organisational management, is also a common theme in the Australian context, together with the need to develop strategies to support workforce attraction (Environmental Health Committee (enHealth), 2009, 2010; Morton Consulting Services, 2004; Windsor & Associates 2005).

4.6.2 Professional level

At the professional level, strategies or recommendations to address the complex and interrelated problems impacting this area of practice in Australia and more broadly include the need to improve the ability of the workforce to engage in research and evidence-based practice (Couch, Barratt, Dhesi, Stewart, & Page, 2016; Day, 2016; Dhesi & Stewart, 2015; Smith, 2008). This includes linking academic research training with workplace practice (Dhesi & Lynch, 2016) and improving job design and workplace professional development to better utilise the professional skill base of practitioners whilst developing strategies to assist in workforce retention of this area of practice (Environmental Health Committee (enHealth), 2009, 2010; Morton Consulting Services, 2004; Windsor and Associates 2005).

In addition to the above, whilst Morris and Robertson (2003) argued that there is a need to "re-energise a beleaguered profession to propel it from its current dependent reactive state" whilst "rediscovering its effectiveness as a force for public health" (p.66), Day (2016) contends these objectives are yet to be realised. Strategies to address this problem include the need to develop stronger leadership within the practice community (Berg, 2007; Whiley et al., 2019; Windsor and Associates, 2005) whilst overcoming issues of modesty regarding the importance of the professional role (Day, 2016; Treser, 2018). This includes overcoming practitioners' "self-consciousness towards their professional knowledge and their skills, which cause them to see themselves as skilled technicians rather than health professionals" (Day, 2016, p.88), which as Day (2016) posits, is a detriment "to themselves and those who they serve" (p.88). As Gerding et al. (2019) also note, "the public health landscape is continuously changing and as emerging EH issues and concerns arise, EH professionals and their practice must evolve and adapt to meet the challenge" (p.2).

4.6.3 Educational level

At the educational level, a range of strategies have been proposed to address the problems of environmental health program viability in the tertiary sector and the need to enhance graduate work-readiness, as outlined in Section 4.3.2 With respect to improving program viability, in the Australian context, strategies include increasing environmental health research within universities, improving university delivery methods, such as program sharing and online delivery or distance education to increase regional and rural student participation, and greater involvement of the profession in program promotion and advocacy (Tenkate, 2005). Maintaining the viability of professionally accredited environmental health programs is an ongoing issue for the profession globally. It is a problem I continue to experience in my role as a Course Director of an environmental health program in Australia.

With respect to enhancing graduate work-readiness, strategies include increasing student exposure to practice-based experiences by improving the partnership between universities, professional bodies and broader stakeholders in this process (Dhesi & Lynch, 2016; Dunn et al., 2018). Additionally, the need to develop mentoring programs as a mechanism to overcome the disconnect between academia and practice, including developing greater synergises between academia and the practice community to encourage research and support evidence-

based practice, to assist practitioners in establishing an independent "critical voice" in order to advance this area of practice community, has also been raised (Dhesi & Lynch, 2016, p. 226).

In summary, notwithstanding the perceived benefits of the professional practice of environmental health, a range of interrelated and systemic problems continue to not only pose a challenge to gaining improvements to this area of practice but pose a threat to the future of the professional practice of environmental health in Australia and more broadly. A loss of this area of practice, I contend, poses a threat to the ability of society to deal with the complexities and uncertainties associated with human interaction with the environment, both now and in the future. This threat is due to the range of unique characteristics related to this area of practice, including the perceived ability of this group to foster integrated partnerships and support holistic responses to complex environmental health problems. I argue these characteristics are of importance in a societal context where responding to the complexities and uncertainties associated with an evolving range of environmental health problems requires multidisciplinary, coordinated and collaborative responses.

Additionally, given the inherently political nature of public health, the ability to maintain a group of practitioners who have an independent, critical voice that can address societal needs in altruistic, competent and moralistic ways is vital to ensuring equitable and sustainable health outcomes for all. Given the ongoing challenges faced by this area of practice, and the critiques I posed which challenged the traditional characteristics of the professional practice of environmental health, I argue that a new conceptualisation of professional practice is required.

4.7 A new conceptualisation of the professional practice of environmental health

To address the critiques and challenges associated with the professional practice of environmental health identified in this Chapter, I argue a new conceptualisation of the professional practice of environmental health is required. By investigating the professional practice of environmental health through a lens of variation theory, using a phenomenographic approach underpinned by the five key characteristics I proposed in Chapter 3, namely a description of practice:

- based on the lived experiences of environmental health professionals
- constituted from varying backgrounds, experiences and contexts of practice

- constituted from the critical variation in the ways of experiencing practice
- involving a detailed, holistic description of the different ways of experiencing practice
- which has high communicative validity.

In this thesis, I generate a holistic experiential description of practice (HEDP), representing the new conceptualisation of the professional practice of environmental health. I argue that this new description has the potential to act as a framework to assist in improving the professional practice of environmental health and education for professional practice. In so doing, also address the challenges associated with the complex interrelationship between society, the environmental health profession and education, while assisting to contemporise and reinvigorate the professional practice of environmental health for the 21st century.

To my knowledge, an investigation of environmental health practice from the perspective I have proposed in this thesis is yet to be undertaken. Additionally, there is a lack of empirical research investigating environmental health practitioners' experiences of their practice, with insight into this area of practice primarily informed by government workforce reports, discussion papers and commentaries as canvased in this review. Whilst not discounting the contribution of these insights, they do not provide a holistic description of practice based on the five characteristics I have argued are required to establish a new conceptualisation of the professional practice of environmental health. To establish an HEDP, an investigation into the variation in the ways environmental health professionals experience their practice is required. Thus, the key research questions underpinning this thesis are:

1. What are the variations in the ways environmental health professionals experience the practice of environmental health?
2. What are the critical variations between the ways environmental health professionals experience the practice of environmental health?

4.8 Conclusion

In this Chapter, I provided an overview of the key influences on current understandings of the professional practice of environmental health. I also critiqued current approaches to education for professional practice and the traditional characteristics used to describe the environmental health profession. Informed by the theoretical framework I established in the previous chapter,

I concluded this chapter by arguing that to address the challenges and critiques underpinning this area of practice, an investigation in the variation in ways environmental health professionals experience the practice of environmental health is required. This investigation is necessary to support the development of a new conceptualisation of the professional practice of environmental health, involving the development of a holistic description of practice. In the following chapters, I will describe the phenomenographic approach I used to gain this new description to support a new conceptualisation of the professional practice of environmental health.

Chapter 5: Phenomenography as a research approach

5.1 Introduction

In Chapter 4, I established variation theory as the appropriate theoretical framework to develop a new conceptualisation of the professional practice of environmental health. I also proposed that to gain this new conceptualisation, an investigation into the variation in the ways environmental health professionals experienced their practice was required. In Chapter 2, I also identified phenomenography as the research approach used to uncover the variations in ways of experiencing a phenomenon.

In this chapter, I review the phenomenographic research approach in further detail. I commence this chapter by providing a historical overview of phenomenography, followed by the key theoretical ideas underpinning a phenomenographic research approach. I also explore the distinguishing features of phenomenographic methods, including those relating to validity and reliability. The chapter concludes with a discussion regarding the generalisability of phenomenographic research outcomes. This chapter provides an important basis for informing the research design I adopted for this study and judgements made concerning the knowledge claims arising from this research. I detail how I applied phenomenography to investigate the research questions posed for this study in Chapter 6.

5.2 Phenomenography: an historical overview

Phenomenography is a relatively new field of research, arising from a series of empirical research studies undertaken by a group of educational researchers in Gothenburg during the 1970s (Åkerlind, 2018). These studies examined the experience of learning from a student's perspective to develop an understanding of why some students learn better than others (Bussey, Orgill, & Crippen 2013). The outcome of these studies identified that how students approached a learning task resulted in different understandings associated with these approaches. These approaches are now referred to in the educational literature as 'surface' and 'deep' approaches

to learning (Bussey et al., 2013; Åkerlind, 2018). The phenomenographic research approach was therefore developed based on a strong empirical rather than theoretical or philosophical basis through common-sense considerations of learning and teaching (Åkerlind, 2018). It was not until the theoretical basis, including the specification of methodological requirements for phenomenography, was more clearly developed in the late 1990s, through Marton and Booths'1997 landmark publication entitled *Learning and Awareness,* that a proposal for variation theory emerged (Åkerlind, 2018). Therefore, variation theory has been described as the 'new phenomenography, and 'variation theory of learning' (Marton & Tsui 2004; Pang 2003). Phenomenography is the research approach used to reveal variation in human experience and awareness and provide experiential descriptions of this variation. This variation forms the key knowledge interests of phenomenography (Yates, Partridge, & Bruce, 2012).

Several terms are also used interchangeably to represent the key knowledge interest of phenomenography. These include ways of experiencing, conceptions, ways of understanding or comprehending 'something' as 'something' (Yates et al., 2012; Marton & Booth 1997). Marton & Pang (1999) contend the rationale for using different synonyms is that one does not entirely correspond to what represents experience from a phenomenographic perspective. However, they point out these synonyms should be interpreted within the experiential sense and not in the psychological, cognitivist sense. I have adopted the term 'ways of experiencing' in this thesis due to the increasing use of this terminology in the phenomenographic literature.

Given the historical basis of phenomenographic research, phenomenography has been more typically associated with pedagogical focused studies (Collier-Reed & Ingerman, 2013; Yates et al., 2012; Barnard, McCosker & Gerber, 1999). However, phenomenography is recognised as "an approach to identifying, tackling and formulating all certain sorts of research questions" (Marton & Booth, 1997, p. 111). The approach has been increasingly applied, internationally valued and empirically tested, involving a range of concepts (Ashworth & Lucas, 2000). Examples include how ageing Australians experience health information literacy (Yates et al. 2012), how entrepreneurs understand success (Angel, Jenkins, & Stephens, 2018), nurses' conceptions of the critical pathway in caring for aortic patients (Bjurling-Sjöberg, Engstrom, Lyckner, & Rydlo, 2013), how certified financial planners experience professionalism (Bruce, Ahmed & Huntly, 2011), academics' conception of their own growth and development as a university teacher (Åkerlind, 2003), women's experiences of domestic violence during the

childbearing years (McCosker, Barnard, & Gerber, 2004), conceptions of the environment amongst university students (Loughland, Reid, & Petocz, 2002) and practitioners' ways of experiencing sustainable design in engineering (Mann,2007).

Furthermore, the findings of phenomenographic studies over the last 30 years are remarkably consistent in identifying a limited and finite number of different ways of experiencing a phenomenon (Collier- Reed 2008; Barnard et al., 1999). To my knowledge, phenomenographic studies investigating the practice of environmental health are yet to be undertaken. Clark (1999) reported using phenomenography to explore environmental health officers' perceptions of an Aboriginal training program. However, the objectives of the study, methods of analysis and reporting of results appear inconsistent with a phenomenographic research approach.

Phenomenography is also sometimes referred to as either being pure or developmental. Pure phenomenography aims to describe how people understand various aspects of the world, with the identification of these variations a legitimate outcome in their own right (Marton & Booth, 1997; Mann 2007). In contrast, the outcomes of developmental phenomenography aim to inform and improve practice (Bowden, 2005). In this thesis, I have used a developmental phenomenographic approach, given that the interest of this research is to inform and improve the professional practice of environmental health.

5.3 Key theoretical ideas underpinning phenomenography

As variation theory has emerged from phenomenography, phenomenography shares the same theoretical assumptions of variation theory. Namely, phenomenography adopts a non-dualist, relational view or constitutional epistemology (Yates et al., 2012; Åkerlind, 2018).

One of the key theoretical ideas underpinning phenomenography relates to the nature of an experience. Marton & Booth (1997) put forward the idea that human experience has a referential aspect and structural aspect, which occur simultaneously and are dialectically intertwined. The referential structure refers to a particular meaning or label assigned to an experience. The structural aspect of an experience is the "combination of features discerned and focused on by the subject" (Marton & Pong, 2005, p.336) when experiencing a phenomenon in a particular way. The structure of experience is also comprised of two elements referred to as the external horizon and the internal horizon. The external horizon refers to what

is in the background of the experience. The internal horizon refers to what is thematised, or in focus, the internal relationship of the phenomenon's parts to each other and as a cohesive whole (Marton & Booth, 1997; Yates et al., 2012). Collectively these aspects are referred to as the anatomy of an experience (Marton & Booth 1997, Yates et al., 2012) or the structure of awareness (Cope, 2002). These aspects provide the theoretical framework for revealing variation in human experience and awareness and providing experiential descriptions of this variation (Cope, 2002; Yates et al., 2012)[2].

Other key theoretical aspects underpinning phenomenography relates to the adoption of a second-order perspective, a key tenet and distinguishing feature of phenomenography (Yates et al., 2012). A second-order perspective refers to the researcher's orientation towards investigating and describing the phenomenon under investigation through the participants' experience rather than that of themselves (Åkerlind, 2018; Yates et al., 2012; Bowden, 2005; Marton & Pong, 2005). Marton and Booth (1997) describe the first-order perspective as being concerned with how something really is, the second-order perspective concerned with how something is conceived. The former with interest in the process of thought and perception, from the "outside" associated with cognitive processes and the latter a focus on the variation in the content of thinking, from the "inside" (Marton, 1981, p. 177).

To explain the above further, adapting the example proposed by Yates et al. (2012) a first-order research perspective, would aim to investigate 'Why do environmental health professionals experience variation in the practice of environmental health?' as opposed to a second-order perspective which would aim to investigate 'How do environmental health professionals experience the practice of environmental health? or 'What are the variations in the way environmental health professionals experience the practice of environmental health?'

From a methodological perspective, adopting a second-order approach requires that the researcher's ways of seeing the phenomenon do not unduly affect data collection or analysis. (Bowden, 2005). Additionally, any experience described by a participant of a phenomenon is considered valid due to the underlying relational epistemology of phenomenography. Thus, phenomenographic research aims not to judge the interpretation of a phenomenon but to

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[2] See Cope (2002) and Yates, et al., (2012) for further description of this theoretical framework.

represent the phenomenon as faithfully as possible to how the phenomenon was experienced by those in the study (Stoodley, 2012). Additionally, a relational view also posits that a person's ways of experiencing a phenomenon, as the unit of analysis in phenomenographic research, is also strongly influenced by their intentions or purposes together with the context in which the phenomenon is embedded (Sin, 2010; Bowden, 2005). From a methodological point of view, uncovering these intentions or the ''intentional attitude'' (Bowden, 2005 p.80) or ''intentional meaning'' (Alvegård, 2010, p, 288) is an important aspect of phenomenographic research when identifying the meanings associated with a person's way of experiencing a phenomenon (Bowden, 2005). This is important in order to distinguish between linguistic differences of what people have said from differences in the conceptual or underlying meanings of the phenomenon of interest (Bowden, 2005).

5.4 Outcomes of phenomenography

The phenomenographic research outcomes are developed from the researcher's analysis and interpretations of the collective experience of the participant's ways of experiencing a phenomenon as derived from the data (Bowden, 2005). Data is typically gathered through a semi-structured interview process (Åkerlind, 2005). The findings are presented as categories of description and as an outcome space (Marton, 1981; Marton & Booth, 1997; Bowden, 2000). I explore these aspects further in the next section.

5.4.1 Categories of description

Categories of description are empirically interpreted categories of the different ways a phenomenon is experienced (Barnard et al.,1999; Bowden, 2000). Categories of description are not equivalent in nature to ways of experiencing a phenomenon held by individuals but represent multiple or collective ways of experiencing, based on the distinctive features that differentiate one way of experiencing a phenomenon from another (Yates et al., 2012, Bowden 2000, Sandberg 1997). Thus, categories of description cannot be attributed to any one individual, and each individual may hold more than one way of experiencing a phenomenon. An individual's ways of experiencing, if interviewed in another time or context, may also change depending on the experiences they hold in their awareness at that particular time (Marton & Booth, 1997). It should be noted that there is no absolute number associated with

respect to the number of categories, but an expectation, based on hundreds of empirical studies, that it ranges from 2- 9 (Marton & Booth, 1997).

Categories of description also have a referential and structural aspect. The referential aspect is the overall meaning of the category. For example, in this study, it represents *what* the practice of environmental health was about for participants as identified for the respective category. The structural aspect represents *what* aspects were in focus when experiencing practice in that way and *how* these aspects relate in order to experience practice in the respective category of description (Bowden, 2005). Methodologically, categories of description should be fully described and adequately illustrated with quotes (Bowden, 2000).

5.4.2 Outcome space

As Yates et al. (2012, p.106) explain, the outcome space "represents both the phenomenon as well as the various ways in which it can be experienced". The outcome space is a hypothetical representation of a limited number of qualitatively different ways of experiencing the object of study at any point in time for the population represented by the sample group (Åkerlind, 2002). It provides a way of looking at the phenomenon holistically whilst acknowledging "that it may be experienced differently by different individuals, and by the same individual at different points in time and context" (Åkerlind, 2002, p.10). The 'limited number' is based on the theoretical assumptions I discussed in Section 3.7 in relation to variation theory. As I also discussed in Section 3.7, the outcome space is considered the space of variation. The structuring of the outcome space is formed by identifying the critical variation between the different ways of experiencing. In this study, the outcome space represents the holistic experiential description of practice (HEDP).

Methodologically, the outcome space represents the *structure* of the variation in ways of experiencing, i.e., *how* the categories of description relate to each other (Marton & Booth 1997). There should also be a logical and empirical relationship between categories, as logically, they depict parts of the same whole, indicating that the participant's attention and subsequent reflections are in relation to the same object of study (Mann, 2007). This relationship is often in the form of a structural hierarchy of inclusiveness, with some ways of experiencing more complex than others. Thus, the more complex ways include aspects from the less complex ways, making some ways of experiencing both more complex and complete

than others (Bowden,2005). Empirically, the relationships between categories should be identified and described using illustrative quotes from the data. The outcome space can also be depicted in several ways, such as a table, Venn diagram, or prose (Stoodley, 2012). It is also important to not interpret these ways of experiencing as value judgements, for example, from better to worse, or as an exhaustive representation of the phenomenon of interest, but as being complete for the experiences of the individuals at the time of the investigation (Mann 2007, Åkerlind 2002).

In summary, Marton and Booth propose three main qualities for judging the quality of the outcome space:

(1) the categories of description stand in a clear relationship to the phenomenon and represent something distinct about a way of experiencing the phenomenon under investigation

(2) the categories have a logical relationship with each other

(3) the system is parsimonious, meaning few categories should be explicated which is as feasible and reasonable as possible, for capturing variation in the data (1997, p.125).

5.5 Phenomenography and other interpretative approaches

Phenomenography is a research approach situated within an interpretive epistemological orientation, involving qualitative techniques with a focus on variation in how a phenomenon is experienced by a group of individuals (Collier-Reed & Ingerman, 2013). Phenomenography contrasts with other interpretative approaches also aimed at describing individuals' experiences by seeking to understand the different ways one might experience a phenomenon and understand the breadth of variety of human experience. Consequently, the primary experience is not the focus of the study (Mardis, Hoffman, & Rich, 2014).

To explain the above concepts further, an individual perspective of an experience can be described as a case or life history using a narrative methodology where the aim is to describe a single person's experience in order to identify and understand larger meanings, which may also reveal broader insights about many people's experiences (Mardis, Hoffman, & Rich, 2014) Alternatively, an individual perspective of experience using a phenomenological approach

involves a close examination of individual experience, aiming to identify the key similarities of how a phenomenon is experienced and describe the essence of the shared experience (Starks, 2007). Individual experience may also be examined to gain an understanding of the most frequent meaning or key differences in meaning by using a relational questionnaire and content analysis (Trigwell, 2000). Phenomenographic research aims to examine the critical variation between the different ways of experiencing the same phenomenon and the logical relationship between these different ways, distinguishing this approach from other qualitative methodologies (Trigwell, 2000).

5.6 Phenomenographic methods

Phenomenography can also be distinguished from other qualitative research approaches by the use of the methods which generally involve:

- the selection of a small sample of participants (15-25) aimed at achieving variation in the ways of experiencing a phenomenon.
- a single semi-structured face to face interview with selected participants, recorded and transcribed, with a focus on the participant's relationship with the phenomenon
- data analysis, focusing on identifying critical variations in meanings whilst maintaining the breadth of variation and the essence of individual meanings
- data reporting involving the presentation of results in categories of description and an outcome space.

However, phenomenographic research has also been subject to criticism "due to the variation in the range of methods and techniques adopted by researchers" (Åkerlind, 2012, p. 119). The variation in methods has been attributed to a lack of methodological clarity regarding phenomenographic research, particularly due to the evolving nature of the research approach (Åkerlind, 2012; Ashworth & Lucas, 2000; Yates et al., 2012). As the theoretical basis for phenomenographic research has been more fully understood, there has been a greater discussion in the literature regarding the range of methods, tools and strategies which are methodologically appropriate for a phenomenographic investigation. In the following sections, I examine these areas further.

5.6.1 Participant selection and sample size

A purposeful sample strategy (Patton, 2005) is commonly recognised as an appropriate method for the selection and recruitment of participants in phenomenographic research (Bowden, 2005; Yates et al., 2012). The key aim is to select participants who have had experience with the phenomenon under investigation and uncover maximum variation regarding ways of experiencing the phenomenon. Strategies used to select participants using a purposeful sampling strategy to identify this variation are less explicit in the literature. Criteria may be developed such as varying age, cultural backgrounds, gender and levels of experience in a discipline field (Åkerlind, 2005; Åkerlind, 2002; Bowden, 2005; Mann, 2007). This range of criteria is generated for heterogeneity to increase the likelihood of uncovering variation rather than representativeness. It is also highlighted that pre-supposition about the nature of the conceptions held by the participants or types of individuals who may hold a particular conception should be avoided, with "common sense" precautions used to avoid this (Ashworth & Lucas, 2000, p. 30).

There is no prescribed sample size for the number of participants required to be selected for a phenomenographic study. The number selected is aimed at ensuring sufficient variation in the meaning of phenomenon is uncovered, together with considerations with respect to data management, given the large amounts of data generated (Åkerlind, 2005; Yates et al., 2012). As Åkerlind (2005) discusses, the aim is to explore the range of meanings within a sample as a group and not isolated from others but as a set, which presents challenges. The key challenge relates to holding all possible aspects in "one's mind at one time" (p. 65) when dealing with large numbers of transcripts. The sample size should also be influenced by saturation point when the researcher considers no additional aspects of the phenomenon are discerned (Yates et al., 2012).

As phenomenographic research falls within an interpretive paradigm, producing qualitative findings, generalizability to a wider population is not applicable. However, the range of meanings within the sample group is considered to be representative of the range of meanings within the population. The meanings and dimensions of variation that emerge from the study should be relevant to similar population groups (Åkerlind, 2005).

5.6.2 Data collection

As previously described, face to face, semi-structured interviews are the most common method used in phenomenographic studies (Ashworth & Lucas, 2000; Yates et al., 2012). Drawings, focus groups and observation of the interaction between groups have also been used (Edwards, 2007; Marton & Booth, 1997).

Overall phenomenographic data collection methods aim to uncover the participant's relationship with the phenomenon of interest and how the participant experiences the phenomenon. Given this aim and the theoretical assumptions underpinning phenomenography previously described, several specific practices are required to be observed. These practices also separate phenomenography from other qualitative approaches (Yates et al., 2012). They are vital as the interviews are the only source of data and should be rigorous (Green, 2009), meaning that they reflect the phenomenographic criteria for quality (Sin, 2010), as the quality of the data collected during the interview process will impact the quality of the research outcomes. With respect to the semi-structured interview, the method used in this study, there are several important considerations. These include:

- focus on exploring variation in how the participant experiences or understands the phenomenon of interest, as a relation between the participant and the phenomenon of interest (Yates et al., 2012)
- open-ended questions which aim to explore depths of thinking, by orientating rather than leading the participant to the phenomenon of interest, encourages reflection and enables the participant to remain true to their own thought process (Åkerlind, 2002; Bowden, 2005)
- use of a specific number of questions and unstructured probes to further investigate the participant responses, with an imperative that the researcher does not introduce any ideas into the interview which the interviewee has not raised, refraining from making judgemental comments, either positive or negative, during the interview (Mann, 2007; Bowden, 2005)
- bracketing of presuppositions during the interview process, such as importing earlier research findings, assuming particular interpretations or imposing interviewer's own

personal beliefs, focusing on revealing the participants' experience, not the researcher's expectations (Ashworth & Lucas, 2000)

- adopting a position of empathy and engaging with the lifeworld described by the participant through following up meanings associated with the participants' experiences and not marginalising experiences that may seem erroneous to the researcher (Ashworth & Lucas, 2000).

The description of an experience by the participant is important as it is less likely to reflect the standard 'theory' of what the phenomenon is about. It also provides insight into how participants see the phenomenon and aims to create a non-threatening environment. The focus is on the participants' experience rather than appearing to test the participants' knowledge. Additionally, adopting an intentional-expressive approach, where the researcher aims to obtain the meanings from the interviewee's perspectives through the use of follow up questions, is important to the interview process, particularly in addressing issues of reflexivity (Sin, 2010). Reflexivity is also referred to as interpretative awareness in phenomenographic research (Sin, 2010), which I discuss further in Section 5.7.

Specific follow up questions used in the interview may either be neutral, i.e., "Can you tell me more about that what you mean by x", relate to a particular issue raised in the interview, to either seek clarification or explore contradictions, e.g., "You mentioned X, what did you mean by that?" or invite reflection, e.g., "Why was it important that you did that?" (Åkerlind, Bowden & Green, 2005). Åkerlind et al. (2005) also suggest that follow up questions based on phrases used by the participants can become more important than the protocol itself. Conducting a pilot interview is also crucial in phenomenographic research. As Bowden (2000) contends, this is necessary to ensure the interview skills of the researcher are reflective of phenomenographic techniques. These techniques include ensuring planned and unplanned questions elicit sufficient reflection on the intended phenomenon by the participant. When to stop an interview is also a key consideration in phenomenographic research. Bowden (2005) describes this moment as arriving when the interviewer feels satisfied that they have elicited an underlying meaning or a sense of how the interviewee is experiencing the phenomenon, even though they could not "possibly verbalise it" (p.66). Additionally, as Bowden (2005) highlights, it is not possible to describe the meanings encountered by individuals at this point, as each transcript only takes on meanings in relation to each other.

5.6.3 Data analysis

Phenomenographic data analysis aims to reveal variation in the ways a phenomenon is experienced. The process is one of discovery, as results are not known in advance and must emerge from the evidence obtained only from data based on the interview transcripts, transcribed verbatim (Walsh, 2000). This process is iterative, with the discovery and construction of results considered to take place simultaneously (Yates et al., 2012). The process is also inductive, in relation to the identification of variation of meanings amongst the sample group, and deductive, where the researcher 'hypothesises' the structural relationships between these variations (Walsh, 2000).

The methods used to uncover this variation have been subject to criticism due to the "array of approaches" (Yates et al., 2012, p. 98) reported in the literature associated with the developing nature of phenomenographic research. These differing approaches also appear to be attributed to the position adopted by the researcher. Stoodley (2012) suggests this relates to either the objectivist or interpretivist positioning of the researcher. Cope (2002) suggests it also relates to the nature of the engagement by the researcher with the theoretical framework underpinning phenomenography involving the structure of awareness described in Section 5.3

For example, earlier phenomenographic studies applied analytical methods involving inter-judgement reliability, which have since been argued as being more consistent with an objectivist rather than an interpretative research approach (Ashworth & Lucas 2000; Cope, 2002). Cope (2002) argues that the data analysis should be underpinned by the structure of awareness as an analytical framework, particularly to enhance the validity of the research process. Similarly, Åkerlind et al. (2005) suggest the analysis process should be looking beyond the words to the "intentional attitude" (p.87) in alignment with a what/how framework. This involves continually questioning the transcripts to determine what aspects were in focus, how these aspects fit together and what the overall meaning was in relation to experiencing a phenomenon in a particular way.

Åkerlind (2012) also identifies that approaches to data analysis are commonly underpinned by several differing considerations, one of which is, how much of each transcript is considered during the analysis process, either as a decontextualized "pool of meanings approach" or a "whole transcript approach" (Åkerlind, 2012, p. 121.). As Åkerlind (2012) further points out,

those in favour of the pool of meanings approach, argue that there is a danger of focusing on the individual interview rather than meanings being considered as a "pool of collective meanings" (p,121) if the whole transcript approach is applied to discover similarities and differences. Forster (2013) also contends this approach may potentially result in not being able to develop any clear interpretation as "the meaning phenomena holds for an individual may vary during the course of the interview" (p.31). Åkerlind (2012) further describes those in favour of the whole transcript approach argue that "the whole transcript should be seen and treated as a set of interrelated meanings, which can best be understood in relation to each other" (p.8). The consideration of the whole transcript is also argued by Forster (2013) to provide a greater ability to uncover the complexity of the relationship of the participant with the phenomena being described. Alternatively, using a pool of meaning approach presents a danger that the researcher may be at risk of "cherry-picking" (Forster, 2013, p.32) what seems to be relevant, replacing the participants' experiences with those of the researchers.

In both instances, whether taking a whole transcript approach, or pool of meaning approach, the role of context is of importance as statements made should be interpreted within the context of the section of the particular transcript, the whole transcript and against the backdrop of all other transcripts (Daniel, 2016). This is to ensure that the meanings interpreted by the researcher associated with statements or utterances of participants are not changed by removal from the context in which they were made (Åkerlind, 2005). Strategies to manage this become an important part of the analysis process. Additionally, when using the whole transcript approach, consideration of the role of the collaboration during the constitution of the outcome space is of importance. Åkerlind (2012) contends some researchers argue that bringing in additional researchers encourages "greater open-mindedness and awareness of alternative views" (p.118), which may improve the outcome space. However, as Åkerlind (2012) further highlights, outcome spaces are only partial hypothetical representations of the phenomenon. An individual researcher can still make a substantial contribution to the understanding of the phenomena. Working at an individual level does not mean right or wrong outcome spaces; it may only mean more or less complete outcome spaces.

Other considerations concerning data analysis include ways of managing data, including the emphasis on different foci used to help illuminate aspects of category of description and subsequent further clarification of 'the whole'. This may include focusing on what/how

aspects, referential or structural components, differences and similarities, or starting with a preliminary sample of transcripts which are then considered in light of other transcripts (Åkerlind, 2012). When to start the analysis is also discussed in the literature, with Bowden (2005) advocating that analyses should not commence until all interviews are complete to avoid influencing subsequent interviews with impressions from previous interviews. Yates et al. (2012) also identify differences in how the processes are applied during data analysis. This includes different descriptions of processes applied during a range of phases (from four to seven), with some researchers describing these processes as either sequential or iterative.

An additional consideration with respect to data analysis involves the constitution of a logical structure in relation to the different ways of experiencing the phenomenon. Key arguments relate to the degree of influence the researcher has concerning the formation of the structure of the outcome space, including the degree the outcome spaces emerge directly from the data and searching for structural relationships too early in the data. Ashworth & Lucas (2000) argued that searching for relationships too early is to potentially ignore other aspects of the data. Åkerlind (2012) defends this by suggesting that the final outcome inevitably reflects both the data and the researcher's judgement regarding the data, with the formation of structural relationships, not a matter of ignoring the data, because those aspects can be included and reported as non-critical variations. She also highlights the danger of not considering structure until too late in the process, "given that structure and meaning are supposed to be co-constituted in phenomenographic analysis" (Åkerlind, 2012, p. 119).

Irrespective of these differences and due to the theoretical assumptions underpinning phenomenographic research, many commonplace understandings exist in relation to data analysis. Yates et al. (2012) summarise these to include:

- the setting aside or limiting of any predetermined views or drawing conclusions too quickly about the nature of the categories of description
- ensuring a focus on the collective experience is maintained by viewing the transcripts and the emerging categories of description as a set (instead of individual transcripts and categories of description)
- a search for meaning or variation in meaning across interview transcripts, and the structural relationships between these meanings.

It is also widely acknowledged that the analysis is a time consuming and challenging process (Sin, 2010). Åkerlind (2012) also points out that the process is strongly iterative and comparative, involving "continual sorting and resorting of data, plus ongoing comparisons between the data and the developing categories of description, as well as between the categories themselves", (p118), requiring the continual reading and re-reading of transcripts. The constitution of categories of description importantly involves a search for key similarities and differences, based on quotes that indicate different aspects of experiencing the phenomenon and on varying criteria that must emerge from the data. Interpretations of meanings cannot go beyond what is in the data. This process may take a number of attempts until the "whole system of meanings is stabilized" (Marton, 1986, p. 42).

The structural relationship between the categories should also be described using illustrative quotes. This description is inclusive of the dimensions of variations or themes of expanding awareness. Themes of expanding awareness refer to further identifying the increasing breadth of awareness associated with each dimension of variation identified in each category, from less to more complex ways of experiencing, as described in Chapter 3. This process results in what Forster (2016, p.307) describes as an "experience framework". The experience framework, underpinned by variation theory, provides the opportunity to apply the findings in an educational context (Ling & Marton, 2011; Lo, 2012). The final system is then presented in an outcome space which depicts the less to more comprehensive ways of experiencing the phenomenon (Åkerlind, 2005).

Overall, I would argue that the important aspect of data analysis and all other aspects of phenomenographic research is to ensure that the methods adopted also consider issues of quality associated with this qualitative research approach.

5.7 Quality in phenomenographic research

As with many qualitative research traditions, issues of quality are important considerations, as any knowledge claims arising from this research will be judged according to a range of quality outcomes. For this study, the term 'quality' has been adopted due to the varying and sometimes confusing use and application of terminology applied to judging research, particularly qualitative research (Creswell, 2013; Sin, 2010). For example, when discussing issues relating to judging qualitative research, including phenomenographic research methods, concepts such

as quality and rigour, plausibility and credibility, validity and reliability, trustworthiness, reflexivity, transferability and defensibility are often raised (Åkerlind, 2012; Collier-Reed & Ingerman, 2013; Creswell, 2013; Sin, 2010; Green, 2005). Sin (2010) also argues that qualitative research paradigms are quite diverse, bringing different methodological considerations, plus methods and criteria for judging quality, adding to the confusion. In phenomenographic research, two key criteria commonly used for judging quality relate to validity and reliability issues. These considerations have formed an essential component throughout this study, with some aspects already highlighted in this Chapter. I explore these aspects further.

5.7.1 Validity

Validity is a term often associated with the extent a study can demonstrate what it aims to investigate or to what degree the findings reflect the phenomenon under investigation that it is set out to measure (Collier-Reed & Ingerman, 2013). There is debate in the literature regarding the use of this term in interpretative research. This is due to an association with positivistic notions of validity; however, Åkerlind (2002, 2012) argues that validity is a concept applicable to phenomenographic research but requires reframing to align with the assumptions underpinning a phenomenographic research approach, including the development of appropriate practices. These practices include providing evidence and a detailed explanation in each step of the research process (Åkerlind, 2012). In phenomenographic research, the common issues of validity that require evidence and explanation relate to communicative and pragmatic validity (Åkerlind, 2002, 2012).

Communicative validity relates to the defensibility of the researcher's interpretation of the phenomenon, given that the interpretative process can never be objective. As such, there is an emphasis on demonstrating how well the research outcomes reflect the human experience of the phenomenon (Åkerlind, 2002). There are several practices commonly applied to achieve communicative validity in phenomenographic research. These are described by Åkerlind (2002, 2012) and Mann (2007) to include:

- establishing a dialogue rather than question answer response during the interview process to assist in uncovering how participants experience the phenomenon
- gaining coherent interpretations of the phenomenon by interpreting parts of the individual transcripts in relation to the whole transcript
- gaining feedback on research methods and findings with the relevant research community and intended audience; seeking individual feedback from interviewees regarding interpretations of individual transcripts as a validity check is not considered appropriate due to the focus on phenomenographic analysis at the collective, not individual level. However, seeking feedback regarding the final outcome space and categories of descriptions from interviewees is appropriate.

Pragmatic validity refers to the usefulness of the findings. This includes to what extent they are meaningful to the intended audience and useful in providing insight into "more effective ways to operate in the world" (Åkerlind, 2012, p. 120). In this study, it may include how useful the findings are in preparing the graduates for professional practice or the ability for practitioners to operate in more effective ways.

5.7.2 Reliability

Reliability in qualitative research involves a reflection of the application of appropriate methodological procedures for ensuring "the quality and consistency in data interpretations" (Åkerlind, 2012 p. 125). Åkerlind (2012) describes approaches such as coder and dialogic reliability checks, advocated for by some phenomenographic researchers, as a means to ensure reliability, particularly during data analysis. These approaches have been challenged due to the association with positivistic notions of repeatability of findings, thus considered inappropriate for interpretative research approaches such as phenomenography (Sandberg, 1997;2005). Additionally, as the focus in phenomenographic research is on identifying variation in the collective rather than individual meanings, there is also an expectation that researchers would also experience variation in the way they investigate a phenomenon, also making replication of findings inappropriate (Cope, 2002).

However, as mentioned previously, phenomenographic methods should be rigorous. Interpretive awareness, a process where the researcher, throughout the research process, details the steps taken to ensure their own experiences and subsequent interpretations of the

phenomena do not influence the entire research process is considered more appropriate (Sandberg, 2005; Åkerlind et al. 2005). Sin (2010) also describes this as reflexivity, involving the researcher identifying their own preconceptions from the outset of the research and deliberately taking measures to minimise this influence and document accordingly systematically.

5.7.3 Transferability rather than generalisability

Generalisability generally refers to the extent to which the research findings obtained from a specific sample are representative of the population group (Sin, 2010). In general, generalisability is not possible in qualitative research due to the context-specific nature of meanings (Sin, 2010). In phenomenographic research, the aim is to investigate variation in experience, with samples chosen for heterogeneity rather than representativeness in terms of a particular distribution of characteristics (Åkerlind, 2002). Therefore, findings from the sample group to the population represented by the group "are not representative of the population group in the usual sense of the term" (Åkerlind, 2002, p. 12).

In phenomenographic research, as with other qualitative research approaches, Sin (2010) proposes that generalisability as a measure of quality is better replaced with a measure of transferability. Transferability refers to whether the findings apply to other contexts. In phenomenographic research, it is expected that the range of variations in the sample would reflect the range of variations in a population with similar characteristics and experiences of the sample group (Sin, 2010). However, the distribution of people amongst the categories may be different, or experiences may be less complete (Åkerlind 2002). Judgements regarding this applicability of findings then relate to those wishing to use the findings making this decision based on the characteristics and experiences of the sample group. This requires the researcher, as an issue of quality, to ensure these details are described. Additionally, if the intention is to make the findings transferable to a range of contexts, then measure to address this need to be taken into consideration during the study design (Sin, 2010).

5.8 Conclusion

This chapter has presented a discussion regarding the application of phenomenographic methods. The chapter has detailed the various techniques used in phenomenographic research, including participant selection, data collection and analysis, and discussed issues relating to quality in phenomenographic research. This chapter provides an essential basis for informing the research design adopted to investigate the variation in the ways environmental health professionals experienced their practice which I will describe in the next chapter.

Chapter 6: Research Design

6.1 Introduction

The research design I adopted for this study was exploratory, descriptive and analysed through interpretative phenomenographic qualitative methods. This design was adopted in order to answer the research questions posed for this study: What are the variations in the ways environmental health professionals experience the practice of environmental health? And, what are the critical variations between the ways environmental health professionals experience the practice of environmental health? These questions were selected as they supported establishing a new conceptualisation of the professional practice of environmental health involving the development of a holistic experiential description of practice (HEPD).

The purpose of this chapter is to provide a detailed description of the study's design to facilitate judgements regarding the research findings. I commence by giving the background to the formation of the study design, followed by a description of the strategies adopted for each element of the research processes. This description includes participant recruitment and selection, data analysis and ethical considerations. I conclude this chapter by discussing the quality of the research outcomes arising from the study.

6.2 Background to the formation of the research design

Central to the research design adopted for this study was the selection of an appropriate research approach and methods to answer the research questions. The development of the research questions was underpinned by my personal motivations for the study, as described in Chapter 1. The formation of the research design also involved a reflection on my own teaching and research expertise and interests, epistemological view about the nature of knowledge with respect to practice and my ability to manage a project whilst working in a full-time academic position. The decision to investigate the variation in the experience of practice from a practitioner's point of view, to support the development of the HEDP, subsequently requiring an explorative, descriptive research design using phenomenographic methods, arose after consideration of these factors. I would describe this process as being continually iterative,

particularly in the earlier stages of the project and dynamic in practice, as choices arose during the study, which required consideration of any methodological implications of adopting a phenomenographic research approach, as I discussed in Chapters 5.

The design of the project was also underpinned by the theoretical understandings of the practice of environmental health in relation to both current understandings of practice and approaches to education and qualification in this area, as described in Chapter 4. This assisted in participant recruitment and selection for the study, refining the project purpose and providing a basis for the project findings' communicative and pragmatic validity. The project's design was also underpinned by practice theory (Reckwitz, 2002; Schatzki, 2012; Shove et al., 2012) and variation theory (Bussey et al., 2013; Åkerlind, 2018).

6.3 Overview of the phenomenographic research process

The phenomenographic research processes adopted for the project were based on the description provided by Bowden (2005). This process involved considering the project purpose and developing strategies throughout the process to ensure this purpose was met. It included an acknowledgement of my background and experience in environmental health practice, including reflecting on the benefits and disadvantages of conducting 'insider research', as I considered myself a member of the environmental health practice community (Dwyer & Buckle, 2009). For example, reflecting on the potential benefits of participants being more open and providing in-depth responses during the interview process due to our shared identity, which may enhance the richness of the findings (Dwyer & Buckle, 2009). Conversely, reflecting on the need to ensure that any interpretations of the phenomenon were representative of the participants and not mine, to enhance the validity and reliability of the findings (Sin, 2010). As such, strategies associated with validity and reliability, as described in Chapter 4, formed an important part of each stage of the research process. Consideration of the ethical issues and incorporation of these into the study design also took place. The methods adopted and strategies employed for each stage of the research are described in the following sections.

6.4 Participant selection and recruitment an overview

The key considerations of this element of the process were:

- the key purpose of the study: to investigate variation in the ways environmental health professionals experienced the practice of environmental health
- selection of participants based on characteristics that indicated the diversity of experiences rather than representativeness of who practices environmental health in a population group whilst achieving an appropriate gender balance
- my interpretive awareness in relation to my own preconceived ideas of who may represent a diversity of experiences of practice or what practice should be
- practicalities associated with recruiting and interviewing participants
- enhancing the pragmatic validity or usefulness of the findings
- considerations relating to the transferability or applicability of the results to other contexts.

A purposeful sampling strategy aimed at maximising variation in practice experience was applied in this study to gain the most complete or comprehensive description of the professional practice of environmental health (Bowden, 2005; Åkerlind, 2002; Marton & Booth, 1997). Given the key aim of the study was to investigate environmental health professionals experience of their practice, the selection of practitioners was confined to practitioners who were professionally qualified to practise. The selection was also confined to those who identified as an environmental health practitioner and as practising in an environmental health practitioner role. The criterion of currently practising was to ensure currency in gaining descriptions of practice which could inform current and future practice. Conversely, including participants who may have recognised themselves as environmental health practitioners but were not qualified to practice (given the broad range of disciplines considered to contribute to achieving environmental health outcomes as discussed in Chapters 1 and 4), I deemed presented a different study focus.

Given my academic position as Course Coordinator for a professionally accredited qualifying program in environmental health in Victoria, plus my other research and practice experience, a considerable number of practitioners eligible for the study within the geographical location of Victoria were known to me. The decision to confine selection and recruitment to Victoria was a practical and resource decision. Due to the cost and timing of interviewing practitioners, I needed to limit my sample to those within a reasonable geographical area where I would be able to conduct a face to face interview.

Given my broad familiarity with practitioners within Victoria, I considered that this presented a potential issue with respect to the formulation of my own preconceived ideas about the nature of participants' experiences or selecting participants based on what I thought practice was, presenting issues with respect to the reliability of the research outcomes (Mann, 2007; Åkerlind, 2012; Sin, 2010). My familiarity with practitioners also presented practicalities of efficiently recruiting and selecting participants as a means to obtain the maximum variation of experience, with approximately 350 qualified practitioners working within local and state government positions in Victoria, with numbers in the private industry less known (Windsor and Associates, 2005). To address these issues and to assist in gaining the most complete or comprehensive description of practice whilst enhancing the richness of findings by ensuring variation in experience, I developed an electronic online screening survey instrument. This instrument was used as a tool to assist in the recruitment of participants and the selection process. The details of the survey instrument are discussed in the following sections.

6.4.1 Online screening survey instrument

I developed the online screening survey instrument (which I will refer to as an online survey from now on) based on a criterion aimed to gain maximum variation in experiences amongst professionally qualified practitioners. I also developed the online survey to support the reliability of the findings by addressing issues associated with my own interpretative awareness (Sin, 2010). The online survey instrument also aimed to enhance the pragmatic validity of the results by developing a range of diversity criteria to assist in the usefulness and transferability of the findings to other contexts (Åkerlind, 2012). The diversity criterion applied was based on a range of participant characteristics. These characteristics included age, gender, country of birth, qualification to practise, additional qualifications, current employment status, and whether practising environmental health was the first job in a participant's career. It also included the number of years practising, geographical areas that participants had practised within (local, state, or international), experience in regulatory compliance, and any other specialist activities associated with this area of practice.

I considered characteristics such as personal demographic information, length of time as a practitioner, including current position and geographical areas of practice may have influenced the variation in the way participants may have experienced the world, particularly in relation to any influences associated with gender, age, cultural or specific conditions experienced in

rural/ regional or international contexts. For example, age and length of practice may reflect a range of varied experiences that may have changed the way participants had viewed practice over time. Alternatively, if new to the practice, practitioners may have experienced practice differently from those who have been practising for many years. Although the recruitment of participants for the study was at representing a specific population group, given the key focus of this study is on the variation of experience, approximately 45% of environmental health practitioners in Victoria are women. A general feminisation of the workforce has also been reported in Victoria and other states in Australia (Windsor and Associates, 2005). As such, recruitment aimed to select a balanced ratio of gender to assist in obtaining variation of experiences.

In addition, the environmental health-specific characteristics in the online survey instrument included:

- the type of qualification held by practitioners to practice (Diploma, undergraduate degree, post-graduate Diploma or Master's degree)
- any additional qualifications
- current title and organisational position (local or state government, private industry)
- previous positions held.

and aimed to reflect the diversity of practitioners' characteristics and gain maximum variation in the way practice is experienced amongst participants. For example, recruitment of practitioners who had a prior career path such as chef or nursing background or had worked as a consultant, which is relatively commonplace in this sector, was considered to potentially result in variation in the way practice had been experienced.

Questions included in the online survey instrument directed at other environmental health-specific characteristics, such as areas of experience in regulatory compliance or other specialist activities, also aimed to identify variation in experiences. These two questions were developed based on the type of activities generally associated with the practice role, as determined by the literature in the field, rather than my impressions of what these experiences should be (Environmental Health Australia, 2014; Environmental Health Committee (enHealth) 2009;

Windsor and Associates, 2005). A question was also included asking practitioners to specify 'other' areas they considered relevant to environmental health practice.

Consultation with two professionally qualified environmental health practitioners regarding the development of the online survey also took place. These practitioners also participated in a pilot of the survey together with my supervisory team, an academic and PhD student (both professionally qualified environmental health practitioners). This resulted in the refinement of a few questions for clarity before distribution. A copy of the online survey developed is in Appendix A.

6.4.2 Recruitment and selection

The online survey was distributed in November 2014 in accordance with the ethical requirements of the project. This involved the electronic distribution of the survey by the Environmental Health Professional Association (EHPA) and the researcher to professional contacts and networks already held, which included professional networks based in Queensland. The rationale for including Queensland was an opportunistic one and provided the opportunity to further maximise the diversity of the sample, as previously described.

Between the period of November 2014 to March 2015, 107 responses to the online survey were received. Most of the responses were obtained in November 2014. From the 107 responses, 8 participants indicated that they did not hold a professional qualification to practice, 22 indicated that they were not employed in an environmental health-related position, and 79 indicated that they were willing to participate in an interview. From the 79 respondents, two were ineligible to participate (due to non-completion of a recognised qualification to practice), leaving a pool of 77 potential interviewees, 38 females and 39 males.

Based on the variation of the characteristics described earlier, an initial list of 22 participants was selected, guided by literature relating to data management and potential saturation point regarding discerning aspects of variation (Bowden, 2005; Åkerlind, 2002). I also kept the names of the respondents separate from this process as a form of interpretative awareness.
In total, I conducted 19 interviews with practitioners currently practising in a range of organisational settings, namely: four practitioners practising in a State Government setting, eight in a Metropolitan Local Government setting, one in a University setting, five in a Rural

and Regional Local Government settings and two who identified as practising in a range of settings, due to their role as either a private contractor or consultant. The majority of participants (14) obtained their qualification to practice in Victoria. Three obtained their qualification from South Australia, one from Queensland and one from a country other than Australia. Table 7 provides a summary of the participant characteristics in the order that I interviewed the participants.

Table 7: Description of study participants

Order	Name	Gender	Age	Years of practice	Professional qualification to practice	Current Practice Position	First job in career
1	Elizabeth	Female	31-39	1 to < 5	Postgraduate Diploma	Senior Health Protection Officer	No
2	Annie	Female	31-39	15-20	Degree	Environmental Health Officer	Yes
3	Kelvin	Male	26-30	5 to < 10	Degree	Environmental Health Officer	Yes
4	Simon	Male	31-39	15 to < 20	Degree	Director Health Services	Yes
5	Nathan	Male	50-59	20 >	Diploma	Project worker	Yes
6	Pamela	Female	50-59	5 to < 10	Degree	Environmental Health Officer	No
7	Colin	Male	40-49	20 >	Degree	Manager Private Contractor	Yes
8	Ted	Male	50-59	20 >	Diploma	Manager	No
9	Trisha	Female	26-30	1 to < 5	Degree	Environmental Health Policy Officer	No
10	Martin	Male	31-39	10 to < 15	Degree	Team Leader Environmental Health	Yes
11	Susan	Female	40-49	15 to < 20	Degree	Educator	Yes

Order	Name	Gender	Age	Years of practice	Professional qualification to practice	Current Practice Position	First job in career
12	Natalie	Female	31-39	15 to < 20	Degree	Project Officer	Yes
13	Maxwell	Male	26-30	1 to < 5	Degree	Environmental Health Officer	No
14	Paul	Male	60+	20 >	Diploma	Environmental Health Officer	No
15	Sally	Female	50-59	10 to < 15	Degree	Environmental Health Officer	No
16	Wayne	Male	50-59	20 >	Diploma	Manager	Yes
17	Carmel	Female	40-49	10 to < 15	Degree	Private contractor /consultant	Yes
18	Graham	Male	26-30	1 to < 5	Degree	Environmental Health Officer	Yes
19	Mandy	Female	< 25	Less than one year	Degree	Environmental Health Officer	Yes

Male n=10, Female n = 9

In the earlier stages of the interview process, I selected the order of participants from my initial pool of 22 participants based on the potential to provide varying contrasts of characteristics. This strategy was used to establish whether the selection process I had adopted resulted in aspects of variation in the way practice was experienced by participants. As the project progressed, the order of selection of participants for interviews was also influenced by their geographical location, as interviewing some participants involved travelling to regional areas in Victoria. After the 16th interview, I undertook a further reflection on the characteristics of participants interviewed so far, together with a review of the remaining participants from the initial pool of 22 selected. I then selected participants who had more recently commenced practice, as several of the applicants interviewed so far had more than five years of experience in the field. After the 19th interview and discussion with my supervisory team, I felt that I reached a point where I was no longer discerning additional variation (Bowden, 2005; Åkerlind 2005), resulting in no further selection and interviewing of participants.

6.5 Collection of data

Key considerations for this element of the process were:
- ensuring the interview design was focused on variations in practitioners' experience of practice and meanings associated with these experiences and not on those of the researchers
- issues of interpretive awareness related to my own pre-conceived ideas of practice
- piloting, familiarisation and consideration of the practicalities related to conducting phenomenographic interviews.

The interview design and process I undertook was underpinned by the theoretical assumptions of phenomenographic research outlined in Chapter 5. A semi-structured interview was used as the data collection technique in this study. I selected this approach as it is the predominant method used in phenomenographic research and due to the general functionality of this form of data collection in the field, considering resource implications such as time and the suitability for practising environmental health practitioners.

All interviews were guided by an interview protocol (Appendix B). The protocol included a brief explanation of the project, the interview format and signing of the consent form before

commencement of the interview. An explanation of the interview format I considered was important to enable participants to understand the general method behind the interview and how I would be responding during the interview. For example, I explained to participants there were no right or wrong answers to the questions, and I would be focusing on their practice experiences. I also explained that I would be refraining from discussing or offering my own view but was seeking to understand and clarify how they experienced practice. I also explained that I was not testing their knowledge, so if I asked to clarify what was meant by certain concepts, it was to ensure I was gaining their interpretation of the experience. Overall, I found this to work well. I felt that it set the scene for the interview and helped both the participants and me feel more comfortable and relaxed during the interview process.

The interview schedule I developed was based on the approaches described by Ashwood and Lucas (2000), Åkerlind (2005), Bowden (2005) and Mann (2007). It encompassed asking a core series of questions to encourage reflection on the phenomenon and provide a basis for me to ask further questions. This approach was adopted to explore the meanings associated with how the participant experienced their practice whilst also create a dialogue to assist in communicative validity (Åkerlind, 2005). Early questions in the interview schedule aimed to gain a description of a practice experience, with follow up questions clarifying meanings, relevancy and importance to the practice of environmental health associated with particular actions. Later questions included, "*What is the practice of environmental health about for you?*" whether the participant thought the practice of environmental health had changed over time, with the final question in the interview schedule asking if there was anything else they would like to add. I refrained from asking participants, "*What is the practice of environmental health about for you?*" until later in the interview schedule, as I aimed to gain a more reflective view of practice, grounded in their experiences, rather than a 'textbook' answer which may have resulted if asked earlier on (Mann, 2007). In many instances, the last questions proved useful in exploring other aspects of experiences of practice that had not been previously raised during the interview by the participant.

Before the commencement of the interviews for the study, I undertook three pilot interviews. The first interview involved one of my supervisors interviewing me. Although I had previous experience conducting semi-structured interviews and focus groups, I considered this would enable me to become familiar with phenomenographic interview techniques. The two further

pilot interviews involved a currently practising and recently retired environmental health practitioner in my office at Swinburne University of Technology. After completing the pilot interviews, I adjusted the opening statement by rewording it to ask participants to describe the different things that they do. This rewording was a slight alteration from the original opening statement, in which I had asked the participant to describe their role. This original question seemed to result in a detailed explanation of the participants organisational setting rather than a description of what they did as a practitioner. I also added the word 'recent' experience, prompted by 'something that sticks in your mind?'.

The addition of the above word and prompt I found helpful in subsequent interviews as it seemed to give practitioners a starting point to select an example that illustrated how they experienced practice. It was also a reminder to me that the actual experience itself was not as relevant, but what was more important was *how* the practitioner talked about their experience. It also reminded me to concentrate on using follow up questions that would probe the awareness and structure of their experience, including the how and what of their experience (as described in Chapter 5), for example, why they did something a particular way and how it related to the practice of environmental health. Another adjustment I made to the interview schedule pertained to the timing of the questions. This adjustment involved placing prompts to remind me to pause after asking a question to enable sufficient time for the participant to reflect on the question before responding.

Interviews for the study commenced in November 2014. Immediately after each interview, I prepared a brief summary of my initial impression of what the practice of environmental health was about for each participant. This included an impression of the aspects participants talked about in the interviews, such as what seemed important to them and what practice was about for them. I also made notes based on my general reflections of the interview. For example, what I had found worked well or had been difficult and reflected on whether there was a sense of variation in the way participants talked about practice. This reflection informed decisions regarding the need to make any further adjustments to the interview schedule, my interview technique or participant selection.

For example, although I had practised and undertaken a few pilot interviews, I realised that after conducting the first and second interviews, the interview process was more challenging

than I had anticipated. This was due to my focus on ensuring I was adopting the appropriate phenomenographic techniques, such as not introducing any information that was not offered by participants when selecting the next relevant question and remaining neutral during this process (Bowden, 2005). This was coupled with trying to maintain an interview-style that was relaxed to provide a comfortable atmosphere for the interviewee (Ashwood & Lucas 2000; Kvale, 2006). I identified with Kvale's (2006) analogy of interviewing: trying to appear as a duck sailing across the water whilst furiously pedalling beneath the water in contemplation of the next question.

After the third participant interview, I undertook a review of this interview in conjunction with one of my supervisors. This review involved listening to an audio recording of the interview. It resulted in a 'confidence boost' with respect to my interview technique and did not result in any adjustments to the interview schedule. However, it was a reminder to focus on asking participants to describe an actual experience rather than just talk about what they generally do.

The participant interviews took place over 12 months, concluding in November 2015. This length of time was required as I could only conduct the interviews during semester teaching breaks and small windows of opportunity within semesters due to my full-time teaching position. From the 19 interviews, 16 participants requested the interview take place at their workplace location and one in their home environment, as they were on annual leave. Two participants preferred to be interviewed at my workplace location at Swinburne University of Technology. Seventeen of the interviews were held in Victoria, in either rural, regional or metropolitan locations, with two taking place in Queensland. The later interviews arose due to the response to the survey and provided the opportunity to maximise the sample's diversity further. All interviews were digitally recorded and transcribed *verbatim* (Åkerlind, 2002)*.*

6.6 Data Analysis

Key considerations of this process included:
- preparation, commencement and conclusion of the analysis
- selection of an appropriate approach, i.e., 'whole transcript', 'pool of meaning' individual vs collaborative analysis by researcher

- emphasis on foci, i.e., what/how, referential/ structural frameworks, similarities and differences, individual vs collective transcripts, search for variation in meaning within and across transcripts.
- constitution of logical structure
- my interpretative awareness; limiting pre-determined views, differing aspects of the phenomena emerging from the data only, based on quotes in context
- practicalities in managing data and my experience in phenomenographic analysis.

The process adopted for data analysis involved several phases. These phases reflect my developing understanding of phenomenographic analysis, including how to 'go about it' in practice and are described as follows.

The ***first phase*** involved preparation for analysis. After each interview had been transcribed *verbatim,* I checked the data against the audio file and de-identified the transcripts by removing names of places, organisations and people and replacing identifiers with a general term in a square bracket. I also provided each participant with a pseudonym. This process also enabled me to begin to develop familiarity with the data contained within and across the transcripts. A part of a sample interview can be viewed in Appendix C.

A brief description of each participant's characteristics and summary of the initial impression of what the practice of environmental health was about (which was taken immediately after the interviews as described in Section 6.4 for each participant) was also attached to the respective transcript (Appendix D).

The ***second phase*** involved, in conjunction with one of my supervisors, a tentative grouping of transcripts guided by the initial impressions of what appeared similar based on themes or key aspects of what practice was about for each participant in the interview (Table 8).

Table 8: First impression of groupings of transcripts

Key aspects	Grouping of participants
The community can protect themselves and the environment, Empowerment	Susan
Planning healthy future Succession / Advocacy / Political Policy and professional development	Natalie, Martin, Ted, Simon
Protecting Community/ Adaptable/ Education	Graham Trisha, Nathan, Colin
Self	Maxwell, Sally, Kelvin
Building relationships/ Contextual	Carmel, Annie
Within standards	Mandy, Elizabeth
Procedural	Wayne, Paul
Continual Professional Development	Pamela

Although the analysis process began to identify some similarities and differences between the transcripts, I felt that I needed to become more familiar with the data before using this grouping of transcripts for further comparisons. This need was particularly due to a six-month break between undertaking the interviews and forming these initial impressions. I was also concerned whether my initial impression of the similarities and differences between the transcripts was grounded in the data or influenced by what I may have emphasised based on my practice experiences. Additionally, after re-reading a few transcripts several times, the length of the transcripts (interviews ranging from 54 minutes to 77 minutes and 7,500 - 12,200-word count) together with the detailed level of participants' utterances I found made it difficult to get a handle on what the overall meanings of the practice of environmental health were for participants based on the interview transcript. I felt I needed a systematic way to become more familiar with the data, which formed the next phase of data analysis.

The ***third phase*** involved setting aside these initial groupings and entering all the transcripts into NVivo 12. I then randomly selected a transcript, read it several times, and highlighted

quotes that I considered important descriptions of a particular way a participant described their experience of practice. To guide this process, I also made specific notes about what each participant said with regards to:

- what practice was about for them
- for what purpose (or what appeared to be their motivations)
- how they did it
- what else seemed to be part of their awareness

The above method provided me with a way to become much more familiar with the data and what practice was about for that transcript, and how each participant was describing the practice of environmental health. It also provided a method that enabled me to focus on a transcript and, once completed, move on to the following transcript. This method was beneficial as I tried to fit in analysis during the semester break, and it provided a systematic way of becoming familiar with each transcript. I also used NVivo 12 to annotate transcripts and highlight statements that seemed important to the way the participant experienced practice. As a form of interpretative awareness, I also found this process useful. Although whilst reading the transcriptions, I found myself identifying with some of the experiences of practitioners, by focusing on what they said they did, how and why, I found myself becoming immersed in the practitioners' experiences rather than my own. A sample of notes I developed for each participant based on this process is in Appendix E.

The *fourth phase* involved, in conjunction with my supervisor, revisiting the grouping of whole transcripts. At this point, I was able to more clearly articulate the key aspects of similarities and differences based on statements in the transcripts identified in the previous stage in relation to each other. This included being able to argue and debate what I thought was the overall meanings (referential aspect) associated with the grouping of transcripts and what seemed to contribute to these meanings, i.e., what was simultaneously in the awareness, the parts of the experience (structural aspects/ internal horizon) the general context (external horizon) for these transcripts, based on key statements in the transcripts. This process involved a focus on capturing the range of meanings within the group of transcripts rather than the meanings for individual understandings of practice.

For example, Wayne described practice as being about:

> What are the risks to our community? So that's what we're trying to do, is protect our community from known or perceived health risks… But it's about risk mitigation. So how do I reduce the risks? (Wayne p12)

Wayne and Paul also described experiences that indicated an awareness of following processes, maintaining professional standards and the liabilities associated with "not doing your job". This indicated a sense of protection and process, framed by boundaries related to the ability or capacity for a practitioner to act in a certain way. Alternatively, Carmel described practice as:

> For me it's about having a healthy community, so I look at it from that aspect in terms of what we do and the benefits the community gain from that. So, yes, we have the very much certain regulatory environments that control what we do, but I think there's a lot of potential to spruik about the fact that we do those things, the community are much healthier and better for it (Carmel p15).

Elizabeth and Carmel further described experiences that indicated a focus on helping the community, sharing information, building relationships, changing perceptions of practice whilst understanding the frameworks or boundaries practice. Appendix F contains a sample of notes I developed from this process.

This phase resulted in the further grouping of transcripts into four initial categories of description and the drafting of a sentence describing the overall meaning for each of these initial categories. I also selected a representative quote from the transcripts to support these initial categories. At this point, a few transcripts were sitting on the border between categories, meaning, it was not clear if the transcript belonged to a designated category (i.e., protecting or helping), the next category or whether there were critical differences in these transcripts, which would justify the development of another category.

The four sentences below and Table 9 represents this phase of the analysis.

- *Environmental health practice is protecting people (communities) to prevent harm within given boundaries*
- *Environmental health practice is helping people (communities) to create a healthy community by crossing boundaries*
- *Environmental health practice is collaborating with partners to achieve health outcomes by removing boundaries*
- *Environmental health practice is leading and innovating for our future without boundarie*s

Table 9: Initial formation of the categories of description

Category	Transcripts	Representative quote
Protecting	Paul, Wayne ** Mandy Pamela*	What are the risks to our community? So that's what we're trying to do, is protect our community from known or perceived health risks…But it's about risk mitigation. So how do I reduce the risks? (Wayne p12).
Helping (and protecting)	Kelvin, Elizabeth Graham Maxwell, Trisha, Sally Mandy, *Carmel, *Annie*Susan	What we do effectively creates a healthy community in a number of ways, shapes and forms. So, yeah, I probably look at it in a bit different light than some others, but yeah, that's just how I've seen it. (Carmel p15)
Collaborating	Natalie *Ted, *Nathan	The more people sitting around identifying issues and opportunities or different ways to address things, you just get a better outcome. I've always found that when I go out there and I know what's best and because I know what's best trust me often with the government it doesn't work. But when I go out there in partnership with the industry and say we've identified this issue. We've undertaken this process to identify what the problem is and in partnership we believe this is the appropriate way to address this problem. (Ted p7)

Category	Transcripts	Representative quote
Leading and innovating	Colin, Simon, Martin	Need something that was a 21st century solution to manage the work that environmental health does across the spectrum. (Simon p4)

* Border of category grouping

The ***fifth phase*** involved using the above four initial sentences (representing categories of description) together with the transcripts grouped into each of these categories as a guide to further compare similarities and differences within these grouping of transcripts. For example, I started with the 'helping' category, selected a transcript assigned to this category (e.g., Graham), re-read the transcript a few times, and then made a short summary page. This page included what the key aspects of practice in focus for Graham were and how these aspects appeared to fit together (or the parts that make up the whole, internal structure of experience, thematic field), the context of this experience (external horizon) and what the overall meaning of practice (referential aspect) appeared to be for that transcript. I also selected statements that supported these descriptions.

During this process, I also reflected on Graham's statements in the context of the 'whole transcript' or how he described practice in previous or further paragraphs in the transcript to gain coherent interpretations. This process included identifying whether Graham talked about practice as 'helping' in a greater number of parts in the transcript than other aspects such as 'protecting'. In doing so, I would interpret whether there were any aspects or features of Graham's description of practice, which appeared important or critical to the way Graham experienced practice, which would also suggest an alternate meaning or category to a 'helping' category. I then randomly selected another transcript from the helping category (Susan) and repeated this process.

Susan's transcript was then compared to Graham's transcript to identify similarities and differences in the ways they were describing practice. For example, where there any aspects or features in Susan's description of practice, which appeared important or critical to the way she experienced practice, which were not in Graham's transcript. I further reflected on whether any of these differences may also suggest an alternate meaning to the way Susan experienced

165

practice to Graham's transcript. I then added another transcript to these groupings (Carmel) and repeated this process for all transcripts in this category. Adopting this approach enabled me to compare the different ways of understanding the practice of environmental health across the practitioners within the category.

I then repeated this process for transcripts that had been grouped into the other categories and the six transcripts which had previously been placed on the border of the category groupings, as indicated in Table 9. For example, Nathan's transcript, which had been grouped in the 'collaborating' category, was further reviewed based on similarities and differences in the way he described practice to Natalie and Ted and in the context of statements made within his 'whole transcript'. In Nathans' transcript, quotes such as the one provided below and the way he described practice indicated a more comprehensive understanding of practice, aligning more with the leading category. His transcript was then further compared to those transcripts forming the leading category, with adjustments made accordingly to the category based on this addition to the grouping.

> So, my approach has changed a hell of a lot, probably more visionary that way too, try and see the vision of how you want things to look and how do you get to that point? So, my whole approach professionally has changed around environmental health. (Nathan, p 10)

The above process meant that in some cases, the initial sentences for the categories were modified or adjusted. For example, the initial description of 'crossing boundaries' in the 'helping' category was replaced with 'changing boundaries'. This adjustment was due to descriptions of practitioners' experiences within this grouping I interpreted as aligning more suitably with this meaning than the former. A short statement for the 'collective' transcripts for each of these categories was also developed, and quotes were identified to support this.

The similarities and differences between transcripts also began to point towards the structure of variation between the categories. For example, similar to Wayne and Paul, Carmel and Trisha described experiences that indicated their awareness of protecting from harm, but they also described practice as having wider positive outcomes for the community, beyond those of only preventing the negative consequences associated with protection from harm. This

difference indicated a variation in the way practitioners experienced the *outcomes* of practice. Transcripts such as Carmel's and Trisha's also suggested more than one conception of practice was experienced, protecting and helping, pointing toward a more comprehensive view of practice.

I also developed a 'mind map' to help illustrate how the parts of the experiences in each of the categories were related to each other. I kept asking myself, 'What is in a practitioners' simultaneous awareness or what are the combination of features or elements focused upon when experiencing practice in this way? and 'How do they relate to form meaning (referential aspect) for this category?'. I also kept asking myself 'Are these aspects critical features which contribute to experiencing practice in this way?' I continued to make notes to support, build and adjust the short statements for each category during this process. This process was continually iterative rather than developing several distinct 'new set of statements' for each category and continued until the overall meanings and combination of features or aspects of awareness for each of the categories appeared to stabilise. Appendix G sample notes summarising aspects of the 'helping' category of description.

The above process provided the basis for writing detailed descriptions of categories (Chapter 7). This involved describing the meaning of each aspect of the category, including what was in the practitioner's awareness, supported by quotes. I focused on the meanings 'behind the words' used by practitioners and, where appropriate, used these words to describe the meanings associated with the aspects of the experience, to keep the descriptions as "faithful to the data" as possible (Bowden 2005, p. 87). During the analysis process, I also found that participants in more comprehensive categories would also describe experiences that were reflective of the focus of the less comprehensive categories. Given the hierarchical relationship of the categories of description, it is argued that these descriptions are to be expected. As such, where appropriate, quotations from participants in more comprehensive categories were used to support the aspects of variation in the categories of descriptions in lower categories.

The final four categories of description representing the qualitatively different ways participants experienced the professional practice of environmental health, resulting from this process, provided the basis for the next phase of the analysis. A short description of the final

four categories and the transcripts associated with each category is represented in Table 10. The detailed findings are presented in Chapter 7.

Table 10: Final four categories of description with participant transcript

Category number	Category of description name	Short description	Participant transcript
1	Protecting	Environmental Health practice is protecting people to prevent harm within given boundaries.	Paul, Wayne
2	Helping	Environmental Health practice is helping stakeholders to create a sustainable healthy community by changing boundaries.	Kelvin, Elizabeth, Graham, Maxwell, Trisha, Sally, Mandy, Carmel, Annie, Susan, Pamela
3	Collaborating	Environmental Health practice is collaborating with partners to achieve optimal health outcomes for the community by connecting boundaries.	Natalie, Ted
4	Leading and Innovating	Environmental Health practice is leading communities and innovating practice to create our future without boundaries.	Colin, Simon, Martin, Nathan

It is also highlighted that assigning a participant's transcript to a category does not represent the only way a particular participant experiences practice or suggest that they should always be in this category. A participant may also experience practice or identify with some aspects of the practice of environmental health described in other categories. The transcripts were used to identify the differences in experiences between participants rather than represent a particular participant's way of experiencing practice.

The *sixth phase* in the analysis process focused on interpreting the logical relationship between categories, including the dimensions of variation or themes of expanding awareness linking and separating the categories of description. In the preceding phases in the analysis, a logical relationship between several aspects in the categories had emerged, as described earlier. This phase involved further identifying and describing the *critical variation* between these

categories, i.e., what are the critical aspects or features of the experience that vary *between* the different ways of experiencing practice, which would indicate a more comprehensive way of experiencing practice? The critical features of awareness and the aspects of variation associated with the experiences of practice, as a dimension of variation across the transcripts, were further analysed. For example, the difference in the combination of aspects focused upon between *people,* in Category 1 and *stakeholders* in Category 2, based on experiences described in the transcripts of practice, indicated a theme of expanding awareness relating to how practitioners conceptualised *those impacted by practice.* This process identified five key themes of expanding awareness: 'outcome', 'impact', 'approach', 'agency' and 'role'. Appendix H contains a table developed to help support this process. These themes supported the hierarchical relationship of the categories from less comprehensive 'protecting' to more comprehensive 'leading and innovating' ways of experiencing. These findings are presented in Chapter 8.

In summary, the analysis process took place over 18 months, which I found challenging but ultimately rewarding. The steps adopted during the analysis were guided by the review of literature highlighted in the previous chapters and influenced by my developing experience in phenomenographic analysis. Ensuring validity and reliability concerning the findings arising from this aspect of the research process was supported by my supervisors, one an experienced phenomenographic researcher and discussed further discussed in Section 6.7.

6.7 Ethical considerations

The project gained ethical clearance from the Swinburne University Human Research Ethics Committee (SUHREC) Project-2014/108 and was conducted in accordance with the requirements of this clearance. The main ethical considerations included obtaining informed consent of the participants for both the online survey and interview, ensuring confidentiality and de-identification of participants throughout data storage, handling, and reporting of the results. Other considerations included ensuring participants were informed that they could withdraw from the study at any time or withdraw any statements made during the research if they chose to do without any judgement or prejudice. This aspect was particularly important due to a potential power relationship between myself and participants due to my role as a course coordinator of an environmental health program. It was also a requirement of this clearance that the benefits of the study to the participant were explained, and they were provided with

the opportunity to gain a copy of the research results. These considerations were addressed in the appropriate phases of the investigation, including administering the online recruitment survey and conducting the semi-structured interview. The ethics documentation used to support this process is in Appendix I and J.

In summary, participants who were selected and agreed to be interviewed did not withdraw at any stage or request to withdraw any statements made during the interview. Those who participated in the online survey and chose not to be interviewed were still provided with the option to gain a copy of the research findings.

Other ethical considerations pertinent to the study related to the research design, such as ensuring an appropriate gender balance and my experience in qualitative research, in particular phenomenographic research. Achieving an appropriate gender balance was addressed in 5.2.3, with the project supervised by two experienced qualitative researchers, one with expertise in phenomenographic research.

6.8 Quality of the research outcomes

The quality of the research outcomes of the phenomenographic investigation I undertook in this thesis relates to addressing issues concerning validity and reliability, together with a discussion of transferability of the findings rather than generalisability. In the following sections, I present my arguments to support the quality judgements regarding the phenomenographic results of the investigation I undertook in this thesis.

6.8.1 Validity

As discussed in Chapter 5, issues of validity in phenomenographic research are often discussed with respect to two aspects. The first aspect relates to communicative validity, the defensibility of the researcher's interpretation of the phenomenon, including how well the outcomes reflect the human experience of the phenomenon (Åkerlind, 2012). The second aspect relates to pragmatic validity, namely, to what extent the findings are meaningful and useful to the intended audience, including "providing more effective ways to operate in the world" (Åkerlind, 2012, p. 120). In the next section, I first discuss the findings' communicative validity, followed by a discussion regarding the pragmatic validity of the findings of the phenomenographic investigation undertaken in this thesis.

Communicative validity

During the research process, I adopted a range of practices at three key points of the phenomenographic investigation to support the communicative validity of the findings, reflective of the literature in this area (Sin 2010, Åkerlind, 2002, 2012). The first key point involved focusing on how I communicated with the participants before and during the interview process (Sandberg 2005). For example, before the commencement of the interview, I communicated to the participant that I was interested in gaining their experiences of the practice of environmental health, and there were no right or wrong answers to the interview questions. I also explained I would be refraining from offering my view of practice and guiding participants to reflect on their practice experience. These aspects were important to ensure a joint understanding of what was to be discussed in the interview was established (Mann 2007, Bowden 2000, Sandberg 1997, 2005).

Other steps used in the study involved using an interview protocol consisting of open-ended questions to create a dialogue to enable the exploration and clarification of participants' experiences (Bowden 2000, Sandberg 2005). I also practised, piloted, and refined the interview to support ensuring participants reflected on their experiences of environmental health practice, rather than describe what it should look like. This was to support gaining a relational view of practice, a key theoretical underpinning of phenomenographic research (Sandberg 2005). These practices were also described more fully in Section 6.4.

The second key point involved a focus on how I analysed the data arising from the interviews with practitioners, in particular ensuring that I achieved coherence and consistency in the interpretation of meanings whilst capturing the range of understandings of the practice of environmental health within the group of participants. This focus involved continual reference to the 'parts and wholes' of practitioners' statements within the transcripts, between and across groupings of transcripts (Sandberg 2005, Åkerlind, 2002; 2012). This was achieved by interpreting each of the interview transcripts in relation to each other through the process outlined in Section 6.5.

The third key point involved a focus on "ensuring the research methods and the final interpretation are regarded as appropriate by the relevant research community" (Åkerlind, 2012, p. 124). In the initial stages, feedback was gained from the phenomenographic research

and environmental health practitioner community, inclusive of academics in the field, with respect to the overall study design at various forums. During this process, informal positive feedback was received regarding the study design. In addition, I undertook consultation with my supervisory team during the project (one experienced in phenomenographic research) involving a continual focus on the evidence to support the emerging categories. This was coupled with reflection and questioning as to whether the categories appeared to 'make sense' with respect to the professional practice of environmental health. This aspect also involved informal consultation with practitioners in the field regarding the immerging categories to gauge if they 'made sense' from an environmental health practice perspective, of which positive affirmation was received.

In the later stages of the study, further communicative validity was sought by asking the environmental health practitioner community for a 'show of hands' at three different forums to ascertain whether they identified with the findings. In each of these forums (comprising collectively of approximately 225 practitioners, predominantly from Australia with a small number of international delegates), there appeared to be 'unanimous' support by the attendees for the findings presented.

Pragmatic validity

From a pragmatic validity perspective, the initial presentation of the research at various forums described previously indicated the potential of the findings to be useful for environmental health tertiary education and the general practice community. In the initial stages of the research, I also contacted the Australian Commonwealth Government enHealth Standing Committee, as a key government body involved in developing environmental health policy. The key purpose was to gauge interest in the study by the committee, including how they perceived the findings could be used to support gaining improvements to this area of practice and seek financial support. Although the request for financial support was not successful due to funding constraints, the feedback received from the enHealth committee and other stakeholders during the initial phases of the research was very positive. The environmental health practice community expressed strong interest in gaining access to the findings. These aspects were also reflected in response to the online survey I used to recruit participants for the study, described in Section 6.3.1, of which 90 respondents (from a pool of 107) requested a copy of the study's overall findings when available.

Furthermore, informal feedback was received from the practice community during the latter part of the research. For instance, several practitioners indicated that they considered the findings would be useful to change 'narrow' perceptions about this area of practice, particularly amongst senior management within local government settings. From an educational perspective, strong interest in incorporating the findings in teaching and learning programs was also received. Although I acknowledge, this feedback is informal, with measures of pragmatic validity established through applying the outcomes of the research and identifying whether they have achieved change or improved and informed practice (Åkerlind, 2012) this feedback indicated that the environmental health practice community identified with how the results could be applied to their practice to effect change. I have also since developed a unit of study: 'Becoming an Environmental Health Professional', which is being delivered in the Graduate Diploma of Environmental Health Practice at the university where I am employed. The findings of this research have guided this unit. Environmental Health Australia has professionally accredited the Graduate Diploma.

6.8.2 Reliability

As discussed in Chapter 5, reliability in this study was achieved through maintaining a focus of my interpretive awareness throughout the research process and ensuring the adoption of the appropriate methods based on the methodological considerations of phenomenographic research. The strategies used to achieve reliability and establish rigour included those proposed by Sandberg (1997, 2005), Sin (2010) and Åkerlind et al. (2005) and have been highlighted in the previous sections of this chapter. These strategies are summarised in Table 11 on the following page.

Table 11: Key strategies used to establish the reliability of the study

Research step	Strategy
Study planning	Research questions developed requiring a descriptive rather than explanatory question. Acknowledgment of my study motivations, purpose, experience and background in environmental health practice, including the implications of myself as an insider researcher, together with a recognition that the meaning of practice may be quite different amongst practitioners.
Participant selection and recruitment	Development of an online electronic survey to assist in selecting and recruiting participants based on a range of criteria reflected in the literature, rather than what I thought practice should be. Initial separation of names of practitioners during the selection process to avoid my pre-conceived ideas about what practice might be for a participant.
Collection of data	Design and piloting of interview protocol to ensure a focus on practitioner's experience of practice, not mine, including asking the participant to select their own experience of practice, rather than suggest a particular focus. Use of open-ended questions to enable clarification and exploration of meanings as experienced by practitioners, based on words used by the interviewee, refraining from offering my view of practice or introducing concepts not raised during the interview by the interviewee.
Data Analysis	Adherence to the data from the transcripts involving taking detailed notes focusing on what practitioners said they did, how, why and what seemed important to them, supported by quotes. Arguing and debating with my supervisor the overall meanings associated with each of the transcripts, subsequent groupings and ordering of the outcome space, with constant referral to key statements and evidence in the transcripts
Data Reporting	Presentation of the findings (Chapter 7 & 8) as categories of description and an outcome space, with the findings, derived only from the data in the transcripts and supported by illustrative quotes as a measure of my interpretations.

6.9 Conclusion

This chapter provided an overview of the research design and a detailed description of each stage of the phenomenographic research process adopted for this study. In doing so, it aimed to facilitate judgements regarding the knowledge claims arising from this research by highlighting strategies used to address issues of validity and reliability. The following chapters present the results of the study.

Chapter 7: Ways of experiencing the professional practice of environmental health

7.1 Introduction

In this chapter, I present the four qualitatively different ways the professional practice of environmental health was experienced by a group of nineteen practitioners based on the phenomenographic analysis of interview data. These different ways of experiencing are represented as categories of description, namely: 'protecting', 'helping', 'collaborating', 'leading and innovating'. These represent the variations in the ways environmental health professionals experience the practice of environmental health and address the first research question in this thesis.

Firstly, I present the four qualitatively different ways of experiencing the professional practice of environmental health diagrammatically as an outcome space (Figure 1). The outcome space depicts the four categories of description and the structural relationships between the categories, from less comprehensive 'protecting' to more comprehensive 'leading and innovating' ways of experiencing. The outcome space also depicts the dimensions of variation which were grouped into five themes of expanding awareness, which help to support and describe the logical relationship between categories. This diagram also represents the holistic experiential description of practice (HEDP) and the new conceptualisation of the professional practice of environmental health.

Following the initial presentation of the outcome space, I provide a summary of the categories of description followed by a more detailed account of each of the categories. Chapter 8 presents and explores the critical variations between the ways environmental health professionals experience the practice of environmental health, including describing the dimensions of variation that flowed through each of the categories. This addresses the second question of this

thesis: What are the critical variations between the ways environmental health professionals experience environmental health practice?

Chapters 7 and 8 report the main findings of this thesis.

7.2 Outcome space of the professional practice of environmental health

The outcome space is diagrammatically presented in Figure 1. This diagram succinctly depicts the four qualitatively different ways environmental health practice was experienced by the practitioners interviewed for this study and how they relate to form a holistic experiential description of practice (HEDP). These four different ways represent the referential or meaning aspect of practice, the focus or 'what' practice is collectively about for participants in this study. As Figure 1 illustrates, Category 1 'protecting' is at the core of this diagram, as this is experienced as the fundamental purpose of the professional practice of environmental health. Moving from Category 1 to 4, each category encompasses the previous category, which is logically linked from less to more comprehensive ways of experiencing the professional practice of environmental health. Five themes of expanding awareness were identified which helped to support and describe this relationship: 'outcome' (outcome of practice), 'impact' (those impacted by practice), 'approach' (approach to practice), 'agency' (the agency of the practitioner), 'role' (role of the practitioner). This hierarchy represents the structural relationship between the categories or 'how' they fit together to form the whole. I provide a more detailed description and support for the hierarchical nature of the categories and the themes of expanding awareness in Chapter 8.

The Professional Practice of Environmental Health

Holistic Experiential Description of Practice (HEDP)

Figure 1. Diagrammatic representation of the outcome space: The Professional Practice of Environmental Health as a holistic experiential description of practice (HEDP) and a new conceptualisation of the professional practice of environmental health

7.3 Categories of description of the professional practice of environmental health

Table 12 presents a summary of the key focus of each of the four categories of description, representing the four qualitatively different ways of experiencing the practice of environmental health, in hierarchical order from least to most comprehensive ways of experiencing.

Table 12: Summary of the four categories of description

Category number	Category of description name	Short description
1	Protecting	Environmental Health practice is protecting people to prevent harm within given boundaries.
2	Helping	Environmental Health practice is helping stakeholders to create a sustainable healthy community by changing boundaries.
3	Collaborating	Environmental Health practice is collaborating with partners to achieve optimal health outcomes for the community by connecting boundaries.
4	Leading and Innovating	Environmental Health practice is leading communities and innovating practice to create our future without boundaries.

The categories of descriptions are elaborated on further in the following sections. The description includes the aspects focused on when experiencing practice is that way for the respective category (elements and themes in the thematic field), which are the structural aspects of the category (internal horizon) and how they relate to form the overall meaning or focus for that category. It is important to highlight that the categories do not represent an individual participant's experiences of practice but experiences of practice at the collective level, which have been categorised based on similarities and differences in ways of experiencing.

The approach selected for writing the categories of description has been to present the descriptions with a sufficient level of detail to enable the intended audience to interpret and make judgements regarding the findings and present in a manner that is useful and meaningful

forms of both communicative and pragmatic validity. The intended audience is inclusive of educators, environmental health practitioners, policymakers and the wider community. I also acknowledge that the descriptions of categories are lengthier than descriptions commonly associated with phenomenographic research. However, I would argue that this reflects an interpretive methodology and the complexity of the professional practice of environmental health as experienced by practitioners in this study.

The following is a presentation of the detailed descriptions of the categories. A short descriptive introductory summary supports each category. Where appropriate, due to the complexity of some of the categories, I have also included sub-headings to guide the description. Each category also concludes with a summary of the critical aspects of awareness associated with the respective category.

I commence with the first category in the hierarchical order of the four categories of description, the least comprehensive category, 'protecting'.

7.4 Protecting: Environmental Health practice is protecting people to prevent harm within given boundaries

> *Environmental health practice is protecting people to prevent harm and experienced as the fundamental purpose of practice. Without this protection and prevention from harm, the health and well-being of the community is seen to be at risk. The given boundaries are experienced by practitioners as the boundaries which practice must function within.*

When experiencing practice in this way, protecting is conceptualised as applying expertise within given boundaries to prevent or control hazards in the environment that pose a risk of causing a negative or detrimental impact to human health or the environment, potentially resulting in harm to people and collectively the community. The environment is experienced by practitioners as being inclusive of where people as individuals or collective entities work, live or interact. Impacts on health include hazards that pose a risk to the physical and psychological well-being of human health. These risks include those perceived, real or known or unknown. Some of these aspects are captured in the below quotes from Wayne and Elizabeth when they described what the practice of environmental health was about for them:

What are the risks to our community? So that's what we're trying to do, is protect our community from known or perceived health risks…But it's about risk mitigation. So how do I reduce the risks? (Wayne p12)

For me I suppose for the [location], it's protecting the health of anyone who lives, works, plays, whatever, within the [location], but also, the rest of the state as well, but predominantly, in that area. (Elizabeth p9)

The given boundaries are the boundaries that practice functions within and has two aspects. The first aspect relates to the boundaries by which practice operates as given by the legislative framework, organisational policies and a practitioner's professional training. Practitioners understand these given boundaries as the parameters for determining what constitutes a hazard, the rationale for why hazards need to be controlled, how this is to be achieved and by whom as a means to protect people from harm. These boundaries may also include the geographical boundaries of practice. Paul illustrates some of these aspects when describing what the practice of environmental health is about for him:

For me it's basic, keep it basic. We've been trained on the basics of what needs to be done as far as food science is concerned. We've been trained on the basics of what needs to be done as far as waste, liquid waste, septic tanks are concerned. We should know how to handle nuisance complaints. It's about-- and from the council perspective, it's about serving the needs of the ratepayers…So, it's in a council, in local government, it's just about using your delegated authority under the various acts and regulations to monitor, administer and to control what you can within your powers. (Paul p10)

When experiencing practice in this way, there is awareness of the potential liabilities from both a legal and reputational perspective for the practitioner, the organisation and the profession they represent, which can occur if these given boundaries of practice are not observed. This includes failing to maintain professional currency with these given boundaries. These aspects are experienced as particularly concerning by practitioners if the outcome of operating outside these boundaries results in a loss of protection to people and the community, subsequently causing harm to human health or the environment. Graham particularly describes these aspects

when reflecting on an experience involving a serious incident. Elizabeth also illustrates this aspect when describing why ongoing professional development was important to her practice.

> That was a real interesting experience, just to see how that whole process works and what the liabilities are of council because coroners were grilling officers and grilling directors about why didn't council act quick enough. Why didn't they do this, why didn't they do that? Obviously, it wasn't the council's fault, it was ultimately the facility's, but the fact that you're not immune to getting grilled by the Coroner's Court and you could also be liable as well if found during the investigation that council didn't move quick enough and then someone died, it can be a huge issue. (Graham p9)

> You're not probably going to keep your job if you don't continue to learn and understand what changes are happening, you're not going to be able to keep up with your job, basically. You're going to be doing the wrong thing, looking at legislation, when it changes, if you don't keep up with those changes, then you're not going to be able to perform your job properly, and I suppose one thing will lead to another. (Elizabeth p15)

The second aspect of the given boundaries is the boundaries given to people or collectively the community, which are according to the practitioners' given boundaries of practice. This aspect commonly includes identifying and mitigating risks through surveillance based on evidence, giving expert advice in the form of education and/or implementing an enforcement regime. Education is experienced as providing people with the opportunity to change or act within the required behaviours in accordance with the given expert advice of the practitioner. If the educative process is seen[3] to be ineffective or if such behaviours have resulted or likely to result in harm, an enforcement regime may be adopted in accordance with the given process. The outcomes of this process are conceived as stopping or controlling hazards, with a focus on

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[3] I use the term 'seen' to represent a practitioner' way of experiencing practice in this study

protecting people to prevent harm, within the given boundaries of practice. Wayne depicts these aspects when describing what environmental practice was about for him:

> so when you say environmental health, very simply, it's saying that educative role about environmental and/or public health. People mix the two words up a fair bit. About preventing the risk through an education program followed by an enforcement regime. (Wayne p2)

In this way of experiencing practice, there is an emphasis on following the given processes associated with preventing harm in accordance with the statutory obligations and professional responsibilities of practice, with some of these aspects captured by Elizabeth:

> As an EHO, we are professionals, we've got the scientific background as well as the other backgrounds we might have. To be able to investigate thoroughly, based on legislation, often things go to court, you need to ensure that you've investigated thoroughly you've collected all the information, you've documented it properly as well, so thorough investigation is not just making sure you've asked all the right questions, but it's actually, have you asked all the right questions? Have you documented them correctly as well? So ensuring that you're doing all of that because if something goes to court, you need to be prepared, you need to be able to show how you've gotten to that conclusion often as well without just jumping to a conclusion based on minimal evidence, particularly if it's a complaint, or for example, if you've gone in to a food premises, and next thing you know, you're issuing PINs [penalty infringement notice] whatever and you've taken them to court, you need to ensure that you've done everything correctly, I think. (Elizabeth p15)

The risk of harm both physically and psychologically also extends to the practitioner and may be experienced when people or entities express reluctance to operate within the given boundaries of practice. Graham illustrates this aspect:

> I've had chefs play around with their knives or start carrying it because they're getting really angry at me advising them about certain things that they need to do. So, I've had to learn quickly about how to identify risks and dangers in the workplace, in terms of their behaviour. (Graham p7)

When experiencing practice in this category, there is a sense of concern amongst practitioners about the recognition of the importance of the practice of environmental health within the general community. This appears to be commonly attributed to a perceived invisibility or the hidden nature of this area of practice and a poor understanding of the term 'environmental health'. Practitioners often drew parallels between the benefits of practice being more immediately evident amongst less developed countries than developed countries where the immediate effects of practice are more difficult to see. Graham, Simon and Colin respectively capture these aspects:

> That's how I feel like our industry is where we patch up all the cracks so that people don't get sick, but if we don't patch those cracks and then they get bigger, you get a massive outbreak or you get - if we're not around to control that - I don't know, I don't know how to explain it. I know our role in society in terms of trying to prevent people getting hurt, it's just people don't see it. We're in the background working away. And then when people don't see it - well, they only see it when there's something bad that happens and then they realise, "Oh, yeah. Those guys there, inspectors are there, to do that job." It's not something that's commonly known about or seen. (Graham p10)

> If we went over to a third world country, it's a lot more visible. You're seeing the disease, you're seeing the poor sanitation, the lack of clean drinking water and toilet facilities, poor food handling, poor public health infrastructure. All the things that we take for granted here, they definitely don't take for granted over there, and environmental health has a very visible role to play because the connection between the essential item, water, and illness is clear. You drink the dirty water; the person gets sick. We just don't see that here. People don't see the connection as often as what you would see in a third world or developing country. (Simon p16)

> Because quite often you get that question about "well what's environmental health, what do you do?" People don't understand environmental health just by that term… but in my view there seems to be some confusion in a broader context about what actually is environmental health. People don't immediately associate environmental health to actually what we do. Again, like I said, the environmental word tends to

mislead people or make them immediately think about an environmental officer and what they do in terms of weed management or environmental type aspects, but they don't easily understand the link between the public health aspects of what we do very easily. (Colin p5)

The perceived invisibility of practice experience by practitioners is also associated with a lack of sufficient evidence or indicators which demonstrate the benefits of practice. This is experienced as impacting on attracting resources and support for the practice area, placing pressure on the given boundaries of practice to subsequently protect people to prevent harm. Graham captures this aspect when reflecting on an experience which he felt had the potential to escalate into a serious problem:

I think that's one of the things that I've had to wrap my head around, where in our line of work it's very much a preventative thing, that's really hard to quantify. It's not like we're locking up criminals and you reduce the amount of crime out there. It's like preventing people getting sick and preventing disease spreading and it's how do you count that? You can't. It's like you just do it and then - It's hard. Until something blows up, then they start putting those measures in place to really be on top of it. But that's just something I've learnt with council. (Graham p10)

In this category, there is also a perceived reluctance for the support of legal proceedings as a means to protect people from harm. This is seen to be associated with the economic costs for facilitating such action and what was described as 'the culture' of the organisation. These factors led to a sense of concern regarding the ability practice has in protecting people to prevent harm, within the given boundaries of practice. Paul illustrated these aspects:

…some councils will just not prosecute, and this is one council that-- we don't even have a budget for legal expenses. So, you have that taken away from you, it's not part of the culture of this council. And I think if you were to go to a lot of smaller councils, you would find that's the case. It costs $25,000 to get a court case to the door of the court house, that's the latest estimation. (Paul p8)

185

What was I trying to achieve? I was trying to achieve a prosecution for selling food that was unfit to eat. The mother was there with the child in the café and he gagged on the plastic, piece of plastic. It's a serious offence and it shouldn't have happened. And that's if-- if that's not what we're all about then I don't know, perhaps council could do without us. That's the way I felt at the time. (Paul p8)

Despite the challenges associated with this category, in this way of experiencing practice there is a strong sense of the importance practice has in protecting people from harm, particularly as a service to the community. There is also a concern for the potential risk to the health and well-being of the community if this protection did not take place, with Paul and Maxwell illustrating these aspects:

The work we do is important. We know it's important. We have these instances where if we weren't there, I dread to think what would happen…Septic tanks… I dread to think what some people would do with effluent disposal if we weren't there to monitor that. People come to us with some very strange ideas as to what they want to do with the waste water from the septic tank. Pump it on the vegetables, pump it on the fruit trees, put it on the lawn where the dogs and the kids can run through it. If we weren't there to monitor that, that would be a source of infectious disease. So, the work that we do is important. I've always thought of it as being highly important. (Paul p9)

You know, outbreak investigations definitely get your attention when you realise that you're working in an environment that only six hours ago, twenty odd children got quite serious food poisoning and trying to define what that was and discovering it was – and we all knew it was going to be [food product]. But looking at it and thinking well it is that important, you know. You've got 40 kids that are going on school camp to [location] and half of them are down and out with quite severe stomach cramps and vomiting and you sort of think well actually what I am doing does really affect how other people experience their lives. Like, if I wasn't monitoring the [food product] across my shire, how many people would get food poisoning? And that sort of stuff you do pay attention to. (Maxwell p9)

In summary, when experiencing practice 'as protecting people to prevent harm within given boundaries', the critical aspects of this category included:

- an awareness of the boundaries that practice operates within and the need to maintain currency with these operational boundaries. These operational boundaries were influenced by the legislative framework, organisational policies underpinned by a practitioner's professional training
- a focus on following processes, assessing risk, documenting and collecting evidence, giving expert advice in the form of education
- an awareness of the enforcement role being a fundamental aspect of a practitioner's role when protecting the community from harm
- challenges posed by the poor visibility and lack of societal understanding of this area of practice, including the implications this may have for the ability of the practitioner to protect the community from harm.

This category has described the focus on protecting the community to prevent harm within given boundaries. The following presents a description of the second category in the hierarchical order of the four categories of description, 'helping'.

7.5 Helping: Environmental Health practice is helping stakeholders to create a sustainable healthy community by changing boundaries.

Environmental health practice is helping stakeholders to create a sustainable healthy community and experienced as a key approach to practice. Changing boundaries reflects a practitioner's focus on changing and adapting practice whilst not compromising the core statutory responsibilities or boundaries of practice as a practitioner.

In this way of experiencing practice, helping is conceptualised as sharing a practitioner's expertise with stakeholders to create a sustainable healthy community. Helping is often experienced as assisting stakeholders in developing an understanding of the hazards that pose a threat to human health and the environment. It is also experienced as providing advice or negotiating solutions to prevent, manage, or mitigate risks according to the severity of risks to

human health and the environment. This approach is frequently coupled with an emphasis on promoting or selling the benefits and importance of achieving these outcomes to the community's social, environmental, and economic viability. Carmel and Ted reflect on these aspects when describing what the practice of environmental health is about for them:

> So, for me, environmental health practice is about, I'm trying to think how I can word this because I tend to go like that. But fundamentally for me it's about having a healthy community, so I look at it from that aspect in terms of what we do and the benefits the community gain from that…What we do effectively creates a healthy community in a number of ways, shapes and forms. So, yeah, I probably look at it in a bit different light than some others, but yeah, that's just how I've seen it. (Carmel p15)

> I suppose from my point of view it's as an environmental health practitioner I'm in the job to help make [location] a better place to live and to help [location] be healthier. (Ted p12)

Stakeholders are conceptualised as either individual or collective entities which practitioners see as having a stake in creating a sustainable healthy community or, as sometimes described by practitioners, as 'doing the right thing'. These entities may include businesses, ratepayers, community or other organisations, including the organisation practitioners are representing.

A sustainable healthy community is understood as one which is economically viable, socially just and environmentally healthy. Practitioners predominately express this as a place where people feel safe, where business can flourish or a place where people want to live, visit and relax, and can continue to enjoy their homes, way of life, the environment, and the surrounding amenities. Trisha and Mandy illustrate these aspects when describing what the practice of environmental health is about for them:

> It's about basically preventing any negative outcomes from our registered businesses and preventing and helping people with things that they feel are affecting their health or are affecting their way of life, their enjoyment of their environment…But just I think - just to be mindful of the fact that ultimately people want to come into the municipality you're in, to their home and their area and feel like they can go and eat

and relax and that everything's safe there. Ultimately, it's satisfaction of the community. (Trisha p10)

it's about improving businesses, allowing businesses to grow and to try new things and being flexible in that, as well. It's about providing education and helping people resolve issues that they haven't been able to resolve themselves (Mandy p9)

'Creating' reflects practitioners' perception of their unique contribution practice has in achieving a healthy, sustainable community. This unique contribution appears attributed to a generalist, 'jack of all trades master of none' skill set. This skill set is seen to be gained through the many varied experiences of practice, providing practitioners with various skills, knowledge and practical expertise that can be applied in a range of contexts. These contexts are sometimes experienced as extending beyond those associated with the traditional regulatory functions of practice to areas where the expertise of practice is perceived to contribute to the health of the community more widely. Natalie illustrates this aspect when describing how emergency management relates to the practice of environmental health:

It's really interesting because I always say that environmental health officers are a jack of all trades and masters of none, and I think that we just get such a broad range of skills in our role. I've always said that, and I think it just allows us to become involved in other things that aren't necessarily what people would put under the environmental health umbrella. In relation to emergency management, I think you would probably find across Victoria, a lot of people in this recovery management position would be environmental health team leaders--like they've just--I don't know how it relates to environmental health, I think it relates to the people and the skills that they've got, and being able to be flexible and adaptable in different situations, so you kind of find yourself in things that aren't what you would call 'your job'. (Natalie p9)

Educators before enforcers, building positive relationships and the implications of social disadvantage

In this way of experiencing practice, practitioners see themselves as educators before enforcers, with forming positive relationships with stakeholders a critical aspect of practice. Building positive relationships are experienced important in order to support educative approaches aimed at gaining compliance with legislation. Educative approaches are also experienced important to support the ability of stakeholders to self-manage risks, in order to help prevent the negative impacts from human interaction with the environment. There is also an awareness of the challenges associated with the negative views held by some community sectors regarding the role of councils and those of practitioner's as regulators, having implications for the ability to build positive relationships with stakeholders. As such, there is an emphasis on using people skills, such as communication and building a good rapport to help support gaining compliance with legislation and the ability of stakeholders to self-manage risks. Mandy, Susan and Kelvin capture these aspects.

> so, it's more about developing a good relationship with the proprietors as well, because I find that's more effective in them achieving compliance because they're more willing to do something because they've been educated on why and also because we have a good rapport, as well. (Mandy p10)

> yeah, I think that's [education] more important than enforcement. I mean, for me personally, the only prosecutions I have been involved in are clear cut, unregistered businesses. I have gone through – I have always sort of gone down the path of education, giving them the opportunity, and I always find I get the outcome now. If they don't take that opportunity there, then I wouldn't hesitate to prosecute. But I always think fundamentally we are educators before we are enforcers. (Kelvin p9)

> you know, like I started working with a guy who didn't like council at all, had no respect for council, and I ended up being one of three people that he did deal with, you know? And I think, you know, it was just about all of it was about people skills and working with business and, you know, being able to get people to work with you

and showing them that you genuinely respect and care about them and that they would respond in a really positive way. (Susan p13)

Well, my approach is, as I said, a bit more educational rather than enforcement. So, I would be flexible, say for example, a new premise, for them to suggest different ways of doing things and I would look into that and see what the risks are, what implications that might have for other new businesses coming in if we allow that for one business. But I try to just be flexible and not so black-and-white in my approach. (Mandy p10)

Building positive relationships and adopting an educative approach to practice is also associated with an awareness of several changing and evolving complex economic, social and environmental factors challenging the ability to create a sustainable healthy community. An awareness of social disadvantage involving experiences describing economic pressures impacting a stakeholder's ability to achieve compliance with legislation or self-manage risk, to prevent, manage or mitigate risks to human health and the environment are prominent in this category, particularly amongst low socio-economic population groups and in rural and remote areas. An awareness of impacts such as loss of services or industries if compliance cannot be satisfactorily reached due to these factors and the subsequent effects on the community is emphasised. Achieving continuous improvement without comprising the risks to human health and the environment is seen as more beneficial to the community than initiating enforcement action. Sally and Maxwell particularly highlight these aspects when describing why it was important that they approached practice in a particular way:

I think it's really important, especially my approach with food businesses, because again, you're taking into consideration their economic place, where they are economically; little shops that don't have much to spare- and a lot of these buildings, as you know, they're old, a lot of these historic old cottages that- some of them are almost impossible to completely pest-proof, and they have historic overlays, too, of things that they can't do. So, you just point out the risks and then you point out the solutions to them, the various solutions and approaches they might be able to take to get things working better. (Sally p8)

191

A lot of the time in a rural environment, if you do close a shop down overnight to fix something up, they won't have their customer base in the morning – it's too small a community – and if you lose one shop, all of a sudden you've got, you know, 30 kilometres square worth of people who are now travelling to a different geographical location to shop. They can't go to the same place because there is only one shop in a town. So it can quite significantly affect a local economy. You can't be lenient, but there has to be a different way of approaching it from...so it is much more of a negotiation system. You need to be a little bit more capable of problem-solving, I think, which frankly tends to keep it more interesting, I believe. It certainly suits me. (Maxwell p4)

Adopting a holistic approach and the non-black and white nature of practice

Other issues such as individual behaviours associated with social disadvantages, including low language and literacy, economic pressures, differing cultural norms and attitudes in which enforcement action is perceived as unlikely to result in addressing risks to human health or the environment, are also prominent in this category. Changes to technology that challenge understandings regarding how risks should be managed and the availability of supportive policies also influence practice decisions in this category. Some of these aspects are captured by Trisha:

At Council, we have the discretion to issue certain infringements or not to issue them. It's not a matter of if you find this you must issue this, or if this is not complied with within seven days, we must issue. So officers are allowed to have that discretion and with different levels of understanding from proprietors. If you believe the proprietor did not understand you initially or had difficulty understanding you, and then in comparison to a proprietor who understood yet didn't comply, I think that was one example where we had to weigh up, was it fair to issue the infringement to them. They definitely weren't compliant, and we had the evidence to show that they weren't compliant with numerous issues but was it fair to issue at that stage or was more education going to be more effective. Because they needed to input money into the

business to gain compliance, and perhaps education would be a better way to gain compliance without putting that business under severe financial pressure. (Trisha p5)

In this category, there is also an awareness that decisions regarding solutions to managing risks or solving problems, as well as gaining compliance with legislation by stakeholders, are a required outcome of practice. However, achieving this outcome is often experienced as rarely black and white, requiring practitioners to look at what is often described as the 'whole situation' or adopt a 'holistic perspective' to help make practice decisions. These aspects may include assessing the urgency of the problem or risk to health, the nature of the stakeholders involved, potential liabilities to the council, budgets limits or restrictions and departmental priorities. Both Kelvin's and Graham's quotes reflect this range of elements when describing why it was important that they approached practice in a particular way:

> So, we do have to give people a chance to comply and to prove to us they know what they are doing. Our job, it's never black and white, it's rarely black and white. A person could have a hand wash basin obstructed, but they mightn't be preparing food at that moment in time, so where is the risk? So, yes, there's a non-compliance, but, you know, we have to look at it from a holistic perspective. (Kelvin p9)

> I think it's really looking at the whole situation on what you're investigating and trying to prioritise the best option to utilise to fix the problem because there's a whole range of complaints that we receive and some need immediate attention and some can wait several weeks. But in this case, it was a priority for me because his sleep was getting disturbed and he's quite old, and it's a reoccurring thing every single day…And so, trying to balance out the best option is really, really challenging and, I guess, the best thing a council could do is have really strict policies and procedures in place that the unit and the department have agreed on so that you follow set process and it's all documented and that if anything does blow up, then you fall back to that and say, "This is the agreed process. This is why the timeframe has taken this long." But a lot of times councils don't have that strict framework and particularly with different complaints that you deal with, sometimes you have to go around it and you have to get other departments involved, particularly with illegal, clandestine labs as well, like meth labs, that we get involved with, police are involved. Aged care,

sometimes a hospital, because it's a mental health issue. Yeah, that's another thing that we do with hoarders as well. Yeah, it's really difficult to try and balance out everything. And I don't know if that's answered your question but it's just there are so many factors to consider that you have to take a little bit from everything and make that informed decision about what is the best way to move forward. And you really need to keep your priorities straight in terms of helping these residents out and what the main core issue is and not get caught up with everything else that's influencing it. … It's just liability of council as well as the priorities of the department, the budgeting limits and restrictions. So, it's hard, it's really hard. (Graham p5)

Managing expectations and the human side of practice

There is also an awareness of the need to manage expectations to support practice decisions in this category. Managing expectations include those involving organisational policy, which may call for either 'hard line' enforcement or education, described as a 'delicate balancing act'. This balancing act may also have implications for the ability to adopt more proactive approaches to environmental health practice. Managing expectations also include the communities' expectations regarding what practice can achieve within the limits of the regulatory powers and resources. Martin and Pamela described these aspects:

and we've had councils in the past as well for example, that have a priority being environment and education and so particularly for us as environmental health officers that changes our work completely and then we look for extra opportunities, how can we run proactive educational programs, how can we provide high levels of education during our inspections? We'll also take into consideration we need to [pause] do enforcement but yeah, how can we do that effectively and utilise our resources, and then on vice versa where other councillors have been in place and had a harder line of enforcement saying protecting the community and the environment are crucial at the end of the day, that's where we've had to look okay, what's our enforcement options for businesses that blatantly keep on offending and I guess affecting our community. (Martin p12)

194

When you say that to people, they say, "what's environmental health?" You say, "Okay well we deal with noise, anything you ingest, anything you inhale, anything that can be rubbed on your body, anything that can cause damage, cause problems, cause issues." All of those things are my job and it's a delicate balancing act that enforcer versus educator. (Pamela p13)

In this category, there is often an awareness of a practitioner's own vulnerabilities or, as some practitioners describe their 'human side', which can be tested when dealing with stakeholders who may be facing hardship. This includes an awareness of the influence their human side can have on practice decisions when helping stakeholders to achieve legislative compliance, requiring practitioners to be mindful that this influence must not compromise public health. Trisha and Sally reflect these aspects:

I think your human side and your emotional side will sometimes be affected by the fact that these business owners are obviously under pressure and - I find that will always weigh on you in some way but it's trying to find - I think to say that the shouldn't be a consideration at all is perhaps unreasonable in cases and ultimately the goal is to gain compliance. So, if that financial penalty is going to prevent compliance rather than gain it then you have to weigh that up. But ultimately, we're there to protect the public and we need to use the tools available to us to do that. So, I think sometimes it is weighing up certain factors rather than specifically looking at compliant or non-compliant. (Trisha p5)

yes, I tread that line often in this profession. I think my colleague, [person], for instance, is much better at actually just sticking with legislation, being quite sort of hard-nosed about 'this is just what the legislation says and this is what you must do'. I do kind of see the human element and do get a little bit involved in their other issues, take into consideration other aspects of where they might be at. (Sally p9)

The benefits and complexities of helping

Although practitioners experience several complexities in helping stakeholders, helping is also experienced as having several benefits. These benefits include building capacity and a sense of

empowerment amongst stakeholders to self-manage risks, ultimately limiting or eliminating the need for enforcement or regulation, seen necessary in a climate of government deregulation and diminishing regulative resourcing. However, there is also recognition that achieving this outcome is unlikely to result, without sufficient time or resources available to the practitioners to help stakeholders develop the required skills, in order for stakeholders to self-manage risks, particularly amongst culturally diverse groups. There is also concern of the potential of promoting a sense of reliance on practitioners' advice rather than increasing the ability for stakeholders to self-manage risks. Some of these aspects are captured by Susan:

> So, there is the decreasing reliance or acceptance of regulation, but everybody wants safe food. So, we've got this sort of, you know, don't regulate businesses but ensure food safety and then there is decreasing government budgets and regulators as environmental health professionals as regulators and regulation isn't seen like, you know, the current government system is all about economy, growth, supporting businesses, et cetera. So, when you look at government, the political arena, just the fact that the government, you know, the community expectations on government services now far exceeds what the government can deliver in a meaningful way, so they have got to work in the smartest way possible. And so when you look at all of those sort of factors combined and the scope of the environmental health is continually growing, you look at it and you go, well, if you are reliant on regulators to constantly be telling businesses what to do, that is unsustainable because you haven't got the actual environmental workforce, you've got increasing workloads, decreasing workforce, et cetera. So, the only way to actually get safe food safety and other environmental health standards in the community is actually to empower the actual business with knowledge, understanding and actually help them appreciate the importance of things. Because if they essentially become able to make the right decisions for their business that actually protect the community, then that is good for their business but it's also good for the community and it is good for the government because that then makes them less reliant on regulators to protect the community all the time. (Susan p6)

Helping stakeholders by changing boundaries reflects a practitioner's focus on changing and adapting practice whilst not compromising the core statutory responsibilities or boundaries of

practice. The ability to change and adapt practice is experienced necessary due a range of changing and evolving complex socioeconomic and environmental factors. These factors are considered to impact the sustainability of a healthy community, requiring practitioners to remain relevant or not left behind to help respond to these challenges.

Sharing, networking, researching and ongoing professional development, achieving consistency and efficiencies in practice

In this way of experiencing practice, practitioners place importance on sharing, networking and researching practice decisions both informally and formally amongst relevant stakeholders. There is also an emphasis on ongoing professional development. These aspects are experienced as necessary to inform which practice boundaries need to be changed or how things should be done differently to help contribute to the creation of a sustainable healthy community. These aspects were captured by Elizabeth when describing why ongoing professional development was important to her practice and further by Trisha when explaining why sharing practice experiences with other practitioners were important to her practice:

> There are a lot of different things that you do to continue to learn and understand, particularly because things change as well, so legislation changes, you've got emerging issues, so what you do in your undergrad is only the start of your learning for the rest of your career. You are going to continue to learn. As an EHO, things will always change, and if you don't continue to undertake professional development, you're going to be left behind, without a doubt. Just in the last year or so, with the changes to the Public Health and Wellbeing Act around immunisation, to the changes in the Tobacco Act as well, you need to keep up with all of this. So it's not just a matter of you just getting on and doing the work, you've got to make sure that you're reading the information that's coming out, you're discussing with your team members the changes to legislation, you're discussing with them emerging issues and finding out what's going on within the state, within the country, even within the world the changes that are happening. So there's that continual development of your understanding of I suppose your role and the expectations and whatever else is changing in your environment or in your community or in the world or wherever, state, whatever it might be. (Elizabeth p15)

I think it's good just to share what you're doing with others because when you're working independently, you can become focused on your immediate tasks rather than the holistic view of Council and of the field businesses within Council. So just to share with them and then also to hear in regard to what their approach in that situation would be and too, if they want to share experiences. If they have had a similar experience and they got results through a certain approach or a certain type of education that they carried out with somebody, then you've been willing to try an approach that might not necessarily be your first stop or your first instinct to go to, but to try it if it's worked for somebody else...I think it's an important thing for the continuous improvement as well that when you're working independently that you do come back to the office, download and share. (Trisha p6)

The boundaries which are changed are those predominately considered to help improve the way hazards are identified and how risks associated with these hazards are managed. This has two aspects. The first aspect relates to a focus on achieving better customer service through continuous improvement with an emphasis on gaining consistencies regarding decisions and processes associated with how to manage risks and efficiencies regarding the implementation of these processes.

Consistency, particularly involving regulatory decision making, is seen to promote fairness, equity and clarity amongst stakeholders leading to improved relationships with stakeholders. The improved relationships are perceived to lead to more stakeholder willingness to change behaviours, resulting in overall better health outcomes for the community. Although for some practitioners, achieving consistencies in 'day to day' regulative practice decisions is experienced as problematic. This is due to the varying complex factors surrounding practice problems, including individual subjectivity. In this case, achieving consistency in practice decisions that reflect an organisation's core values is experienced as more achievable. Sharing practice decisions as a team to improve consistency is also experienced as important in this category. Some of these aspects are captured by Trisha and Graham when reflecting on gaining consistency in environmental health practice:

So I think if somebody's perception of risk is slightly more risk averse than another officer that there should be means by which that is managed by the team. So within themselves that they share their view on risk and share why they put weight in things and that can then affect another officer's perception and hopefully lead to a consistent approach which would then benefit the business owners and benefit the Council as a whole because businesses will be more likely to come to [location] if it's a consistent, fair, reasonable approach to our practice and ultimately make it easier for officers, so that that negative side of enforcement and of trying to gain compliance within is taken away. (Trisha p4)

I'm lucky with our department; we have regular meetings, we call technical meetings, to bring up anything that we've learnt and that we want to discuss as a team and to have a consistent approach throughout the unit, so that if anyone else has that issue this is things that you need to look out for, this is advice that should take, this is the department that you should talk to, this is the officer that you should speak with because he's had that experience as well. And also, possibly change our policy or procedure to incorporate those learnings just so that, obviously, everything works more efficiently and a lot quicker, you don't spend too much time waiting and trying to figure out things. Yeah, you just learn from different experiences. (Graham p11)

Efficiencies regarding the implementation of processes associated with risk management are seen to lead to more effective resourcing, including freeing up time to use toward initiatives such as research, health-promoting activities, or practitioners' own professional development. Achieving efficiencies is also seen to assist in developing better ways to help stakeholders by improving practitioners' abilities and keeping the job interesting. As Trisha described:

I think that to keep my interest levels up I need to find ways to continually improve to keep me interested and also then the more ways I try to improve, the more efficient I will be with my time which I think is something that officers have to be very conscious of. Unfortunately, because of resources and we're public servants and we have to be responsible and accountable for our time and the more avenues you look at to improve your skills onsite will make your time spent there more effective and efficient and I think then that can lead back towards allowing extra time for research

or just general studies. So, you get extra time back in the office to allow you to read up on potential changes to the Food Standards Code, for example, or read some new studies in regards to genetically modified food. …I think it's important for the businesses that we do that with the ever-changing processes and they want to soak up our expertise and if they are an interested business operator they want to take from us as much we can. (Trisha p7)

Whilst there is a focus on helping stakeholders to self-manage risk in this category, it is also recognised that inefficiencies may be created if too many opportunities are given to rectify non-compliances through the lens of helping, rather than escalating to enforcement action to gain compliance with legislation. This is seen to place a potential drain on operational resources or place stakeholders at risk if a continued non-compliance resulted in a serious risk to health. Mechanisms to address this are seen as important within this category, particularly as a means to avoid risks to the community and associated liabilities to the organisation and the practitioner. Colin describes these aspects:

So what happens as a result is that there's over-servicing, so if there's a non-compliance with a food premises at the initial inspection it's identified there's these issues with the premises, and then they set timeframes for it to be done. The officer will go back within those timeframes, it still hasn't been done, so instead of taking it to the next level an extension or further time might be given, and then that might happen three or four times just because the officer doesn't want to move into the next level, which generally would be enforcement of a section 19 notice or infringement or whatever. So to me, that's over-servicing, that's spending way too much time with the premises to resolve an issue. I guess there's multiple issues with that, there's the over-servicing, so the officer spending too much time working with that premises, the other aspect is the risk that it poses to the officer and the council. (Colin p11)

Addressing the challenges of poor visibility, lack of societal valuing and understanding of the professional practice of environmental health

The second aspect concerning the boundaries that are changed in this category relates to changing negative perceptions of practice which may be held by stakeholders. In particular,

this involves changing perceptions of stakeholders who view the professional area of practice as an imposed regulatory function and a tick box exercise, by promoting practice as beneficial to the community, underpinned by expert training based on scientific principles. Susan reflects these aspects when describing what being an environmental health professional meant to her:

> So, for me the environmental health profession is essentially, of it being professional,…essentially as a collective group, being our best and showing that as a group we are as capable as other professional groups and that we do our job well and that we are not just a bunch of monkeys filling in an inspection proforma, that we are scientists in a real setting, applying microbiology, chemistry, et cetera, in food businesses and actually undertaking on the spot risk assessments and incorporating our legal knowledge and our communication skills to actually get the best outcome for the community (Susan p14).

In this way of experiencing practice, practitioners place emphasis on promoting the environmental health professional area. This promotion includes, 'translating up' to management the benefits of the professional expertise of practice by linking environmental health practice to broader strategic plans or exposing senior managers to the complexity of the role. This also involves a focus on promoting practice as a beneficial rather than an obligatory service to the community. These aspects are experienced by practitioners as necessary to assist in gaining support and resources for this area of practice. There is also an awareness of the difficulties associated with the terms 'environmental health' and its connection to 'public health', experienced as problematic in gaining broader recognition of the benefits of this area of practice. Carmel and Natalie captured these aspects:

> There's been a lack of understanding around what it is an environmental health officer does and why do we go out and inspect food shops, like what's the reason for that, and trying to link it back to the Municipal Public Health and Wellbeing Plan, but also the Municipal Strategic Statement at that higher level, so the organisation at that executive level has a bit of understanding of the core values of public health, and why it's important for their community. (Carmel p8)

So, I think in terms of longer term and keeping our name up there around the types of things that we do, I think those sorts of briefings are really important. Recently I did one around the changes to the Tobacco Act--that would have been the year before last around smoking in playgrounds and stuff--and I kind of think it also shows what our broad range of roles is because I think there's a feeling that we're either just responding to noise complaints, or inspecting food premises and that's kind of where the external knowledge lies about what our role is, so I think those kind of briefings about heatwave planning, or tobacco, or sales to minors, or changes to legislation on outdoor smoking or waste water management, kind of really are a good way of improving everybody else's knowledge about what we do. (Natalie p10)

Promoting the environmental health professional area also involves encouraging stakeholders, particularly businesses subject to regulation, to view practitioners as a resource rather than a potential threat that can help, rather than hinder, their operation. In this way of experiencing practice, there is an emphasis on turning the practice of environmental health from the invisible to the visible and from the negative to the positive. This approach is also seen to contribute to improved job satisfaction through creating a stronger sense of practice helping to make a positive difference to the community. Mandy, Trisha and Carmel illustrated these aspects:

I think a more positive view of us from the community and from businesses So, I try to help them a lot along the way and from that I find that they're happy to call me anytime and ask me any questions that they might have. (Mandy p10)

That's ultimately to help the community because if you get a negative interaction quite a lot it can be difficult, but I find it hugely satisfying then when you do provide someone with some education that changes a practise within their business. (Trisha p10)

I think engaging, in our industry, is effectively how you build a relationship and how you work with a proprietor. They're in a really tough situation too, they're trying to run a business, they've got a whole bunch of things going on, not just one point in time….So it's just about trying to make them feel comfortable, trying to give them an

understanding why you're there, the benefits of why you're there and that you're trying to help them. (Carmel p6)

In summary when experiencing practice as 'helping stakeholders to create a sustainable healthy community by changing boundaries', the critical aspects of this category included:

- an awareness of the impacts practice can have on the social, environmental, and economic viability of the community
- a focus on the educative role of the practitioner and the importance of building positive relationships with stakeholders to assist in gaining compliance with legislative measures and the ability for the community to self-manage risks
- the adoption of a holistic approach to deal with the 'non-black and white' nature of practice, including dealing with issues associated with social disadvantage, interfaced with an awareness of the influence of practitioners' human side in decision making, and the need to manage expectations amongst various stakeholders with respect to what can be achieved within the limits of a practitioner's regulatory powers and resources
- an awareness of the changing and evolving complex socioeconomic and environmental factors having implications for sustaining the health of the community requiring practitioners to adapt their practice whilst not compromising their core responsibilities of practice
- a focus on sharing, networking, researching and ongoing professional development to help support which boundaries of practice can be changed, including helping to achieve more consistent and efficient responses to environmental health problems and ensure practitioners remain relevant or not left behind in helping to respond to the changing context of practice
- a focus on addressing the challenges of poor visibility, lack of societal valuing and understanding of the professional practice of environmental health by promoting the benefits practice amongst stakeholders to gain support and resources for this area of practice.

This category has described the focus on helping stakeholders to create a sustainable healthy community by changing boundaries. The following section presents a description of the third category in the hierarchical order of the four categories of description, 'collaborating'.

7.6 Collaborating: Environmental Health practice is collaborating with partners to achieve optimal health outcomes for the community by connecting boundaries.

Environmental health practice is collaborating with partners to achieve optimal health outcomes for the community and experienced as an important process. Connecting boundaries reflects an understanding by practitioners that in order to achieve optimal health outcomes, people or organisations connected to the problem and the solution need to be engaged in a collaborative process in order to achieve this goal.

In this way of experiencing practice, collaborating with partners is experienced as a process. This process is seen to involve bringing together people or organisations that have the expertise to contribute to solutions or may be impacted by solutions to problems to collaboratively address hazards and mitigate risks to human health and the environment of the community. It is also experienced as involving the establishment of an agreed pathway to identify problems and consider the options, including an appropriate authorising environment to auspice the process. These aspects are particularly captured by Ted when he described how he approached dealing with an environmental health problem:

> What we try to use is firstly developing good governance arrangements. Ensuring that we've got the authorising environment through a board of control. So high-level positions like Deputy Secretaries for example, from the key stakeholder groups providing a board, an authorising environment. Establishing a project team to do the work. Having a multi-skilled project team typically including purchasing skills, technical skills from a risk management point of view. Industry skills or subject matter skills. Put together a project plan which is clear on the end gain that we want to achieve. Setting milestones and I suppose, indicators for success for milestones and end gains. Timeframes, typically the first thing that we would do would be to benchmark and do evidence gathering to establish what others do in other jurisdictions with similar issues. Look at the literature; do a literature review to establish what the literature says as far as level of risk etc. Come up with a discussion type paper which describes a number of options to be considered. Come up with a

preferred position to go back to the governance board, I suppose and then move on from there. (Ted p3)

A complex systems environment

Collaborating with partners also reflects an understanding by practitioners of the complex environment which surrounds environmental health problems, requiring a multidisciplinary approach to gain the best outcomes. The key aim is to generate shared ownership for the process or the solutions developed, which is considered 'right' for the context. This approach is experienced to more likely result in those being impacted by any changes becoming advocates for that change, with Ted further describing these aspects:

> The nature of our work needs a number of skills or typically, we're looking at risk in environmental health. In my area, there's engineering issues so there's asset and infrastructure issues. There's microbiological issues. There's toxicology issues. There's the continuum of public health from legislative administration through to health promotion to achieve the behaviour change you might want to achieve. It's complex. It's multidiscipline. The more people sitting around identifying issues and opportunities or different ways to address things, you just get a better outcome. I've always found that when I go out there and I know what's best and because I know what's best trust me often with the government it doesn't work. But when I go out there in partnership with the industry and say we've identified this issue. We've undertaken this process to identify what the problem is, and in partnership we believe this is the appropriate way to address this problem. The risk is understood in a context that's right for that group. When we write up a guideline or a direction or advice, it's basically written in a way that the industry understands in their language. Probably most if not every time they'll go out and be the number one advocates to achieve that change. (Ted p7)

Collaborating with partners is also underpinned by an awareness that, in reality, there is no such thing as 'zero risk', only 'acceptable risk'. Decisions about 'acceptable risk' and the solutions to achieve this are conceptualised through a lens of a complex systems environment. In such an environment, problems and solutions are seen to be influenced by many interacting

and competing political, environmental, economic and social variables. This is experienced as requiring consideration of the consequences or impacts of solutions on each of these variables as a whole system. This includes recognising that each partner may have its own biases regarding the best solutions based on their own expertise, experience and interest, particularly in terms of what is conceived as an acceptable risk. Ted further illustrates some of these aspects:

> But our job is about population health and it's about identifying what's an acceptable level of risk? Of course, no government or no Chief Health Officer is going to accept the situation when a population is at risk of being ill or dying. But the reality of it is there's no such thing as zero risk, so what's acceptable? A lot of the time we do deal with an unjustified perception of risk based on the media wanting a good story that might not necessarily be based on fact. So, our job is to work with the masters of all these things. Work out what is the perfect solution and then understand how far back you can come to an acceptable level that doesn't compromise public health. (Ted p11)

Given the complexities associated with determining 'acceptable risk' and the solutions required to address risks to the community, practice is conceptualised as working towards solutions based on evidence from the 'masters', that is, those with specific expertise about the problem to first determine the perfect solution. The role of practice is then conceptualised as modifying this perfect solution in partnership with the masters, as perfect solutions are experienced as unachievable in a complex system environment. The jack of all trades master of none skills set of the practitioner is experienced as valuable in this process, to help assist in gaining a satisfactory resolution to problems, through a lens of acceptable risk. Acceptable risk is experienced as a risk that does not compromise the health of the community. A satisfactory resolution to problems involves the promotion of practical and affordable solutions that can be achieved within a complex system environment. Ted further captures these aspects:

> Once again, I think that's where environmental health practitioners are good. They have that ability to understand what the evidence is to protect public health and they know how far back they can come from the perfect position, the ideal position to get a satisfactory resolution. We do typically so much as environmental health practitioners – environmental health practitioners in my eyes are sort of jack of all trades, masters of none. So, we need to be working with masters to understand the issues. Masters

206

want to achieve perfect practice. So, if you're a master in microbiology or a master in engineering, you want to achieve world best practice. You want a 99.99 percent solution to absolutely minimise level of risk. The difference between a 99.99 percent intervention and a 80 percent intervention might be marginal on the actual population health impact and the practicality, affordability to achieve the 99.99 percent solution is always unachievable. The practicality and affordability to achieve a 95 98 80 percent solution wherever that line might be, that's going to actually allow for a change is the reality of life. (Ted p12)

Achieving optimal health outcomes

Achieving optimal health outcomes reflects a focus on aiming to achieve the 'best and safest outcomes' for all within a context underpinned by the challenges imposed by a complex systems environment. In such an environment, consideration of the influence of the many interacting and competing political, environmental, economic and social variables are also experienced as essential in achieving optimal health outcomes. Ted further captures these aspects:

It's a complex environment. So, for example in my world at the moment the literature would say that to achieve the best quality drinking water we should have a set of treatment systems in place to achieve that outcome. But the set of treatment systems that largely is established practice in [location] is well below what is best practice. So, if I was going to be highly principled as the drinking water regulator, I might go off and be requiring water businesses to invest two or three million dollars in each of their drinking water systems to achieve best practice. Now from an environmental health and public health perspective that's going to achieve the best and safest outcome but the consequences of that is that all our water bills might go up by $100 or $200 a year to pay for that treatment. While quality of the water might be better, it's a marginal safety improvement. But access to drinking water is fundamental for public health and putting the price of water up definitely would have consequences on the potability of drinking water. The consequences from a political point of view are obvious. Nobody wants their utility bills to go up at all. Also, consequences from a public health point of view, if people can't afford drinking water they're probably

going to access less quality water which would have greater consequences on the burden of disease. (Ted p3)

Connecting boundaries reflects a practitioner's understanding that to achieve optimal health outcomes, people or organisations connected to the problem and the solution need to be engaged in a collaborative process to achieve this goal. In doing so, developing an understanding of what the boundaries are for each partner and how these boundaries can be connected to achieve optimal health outcomes is emphasised as important. This is also reflective of an understanding by practitioners that there are many different paths or options available that can be selected to achieve optimal health outcomes. Natalie illustrates some of these aspects when reflecting on how she has dealt with environmental health problems:

In other cases I've had all the agencies around the table and we've done a planning session and we've talked through what everybody's priorities are, where they link together and all that sort of stuff, and sometimes that's a better outcome. It depends. I did that for the bushfire recovery plan and that's a better outcome because everybody knows what everybody else's priorities are and how they can actually work together rather than compete for the same things. (Natalie p4)

we've often had to invite people to like a planning meeting or a heatwave/influenza or pandemic meeting, saying 'These are all the things that we need to cover'. We need to be clear on what everybody does in these situations because often it's an introduction into what other agencies do, you might never have worked with them before. And also about what we can, as a council--who has this legislative framework whether it's in emergency management or environmental health, so we have this ultimate responsibility, being clear on the abilities of these agencies. So, can [organisation] actually provide food and water and relief services? Do they have enough volunteers in [location]? What are we better off to get some other agency to help out with? And that's good for the other agencies to learn that too, I think. (Natalie p5)

In summary, when experiencing practice as 'collaborating with partners to achieve optimal health outcomes for the community by connecting boundaries' critical aspects of this category included:

- a focus on generating shared ownership for identifying issues and developing solutions to environmental health problems in partnership with those impacted, by ensuring an appropriate authorising environment and the required processes are in place to achieve this outcome
- an awareness that there is no such thing as 'zero risk' with decisions and solutions made regarding 'acceptable risk' achieved through a lens of complex a systems environment
- the 'jack of all trades masters of non-skill set' of the practitioner experienced as an important aspect in helping to achieve practical, affordable solutions that do not compromise public health, but are 'right for the context'
- a focus on understanding what the boundaries are for each partner and how these boundaries can be connected in order to achieve optimal outcomes for the community.

This category has described the focus on collaborating with partners to achieve optimal health outcomes for the community by connecting boundaries.

The following presents a description of the final category in the hierarchical order of the four categories of description, representing the most comprehensive category of description, 'leading and innovating'.

7.7 Leading and innovating: Environmental Health practice is leading communities and innovating practice to create our future without boundaries

Environmental Health practice is leading communities and innovating practice to create our future. Leading is experienced as an important action of practice and innovating is experienced as a process and an outcome of leading. Both aspects are perceived to have benefits for the practice of environmental health and our future. Without boundaries reflects an understanding by practitioners that there are no boundaries to the practice of environmental health.

In this way of experiencing practice, leading communities has two aspects. The first aspect involves practitioners focusing on leading the professional development of other practitioners, who are conceptualised as being part of an organisational community and the broader environmental health professional community. The second aspect involves a focus on applying the expertise of practice to influence or change situations or circumstances considered relevant to the practice of environmental health. Practitioners view both aspects as contributing to the creation of our societal future.

Leading the professional development of the practitioner community

When focusing on the first aspect in this category, the professional development of other practitioners, there is a focus on influencing the professional development of practitioners who are conceptualised as part of the organisational community in which they are employed. The key action involves creating a supportive environment or 'safe places', seen as non-judgemental, trusting environments which allow for individual and team capacity building. There is also an emphasis on being 'available' as a leader. These actions are experienced by practitioners as necessary to help develop resilience and manage stress amongst the practice community, particularly due to negative experiences which are seen to be associated with the practice role. They are also aimed at encouraging reflective practice, ongoing learning, freeing up 'space' for creative thinking and promoting a sense of being valued. These factors are experienced as important in facilitating and developing solutions to environmental health problems. This includes providing more efficient and resource-effective responses to practice problems, supporting workforce development and retention. In so doing, there is a focus on being able to provide better experiences or outcomes for both the practitioner community and the community they are serving. Martin describes these aspects below when reflecting on the relationship between supporting environmental health staff and how this relates to the practice of environmental health:

> In order to get tasks done and get them done effectively, people need to feel like they're valued, and not only just feel it but actually understand that they are. So I'm becoming a very firm believer that constantly liaising with staff members particularly in the environmental health field just due to the amount of pressures that we do get, it's essential to make sure staff members have a health mindset, that they're not

feeling like I guess they're feeling overwhelmed with stress from too many investigations or really difficult things. (Martin p9)

that's where I think it's important to provide them with safe spaces for them to bring forward any creativity. And then one thing I do is regularly, probably about every three months I have a blank page meeting with a staff member and just call them a catch up meeting and I go in there deliberately with a blank page showing them saying "Nothing's on the agenda, half an hour for you to talk, this is an opportunity where you can tell me about your personal life if you want to, you know, what you're doing on the weekends, how your work-life balance is going, opportunity for you to talk about any of your investigations, if you've got any problems or solutions to things" or even if a staff member's got some creative ideas that they would like to implement in the team. I think those meetings have proven really beneficial where it takes everyone out of the picture, it's a safe environment. (Martin p10)

Succession planning was also associated with the first aspect. Succession planning is seen as taking responsibility and providing opportunities for peer mentoring or linking with universities to support the training of future practitioners through the provision of work placements or other activities such as guest lecturing. Martin in particular describes these aspects when reflecting on why it was important to his practice that he is involved in supporting the training of his staff:

the staff are the key at the end of the day and really we need to invest in them but not only I guess the staff members but future staff members. So one thing we've done is we've – [organisation] City Council, we always were a very pro [proactive] in taking on work experience students and volunteers but, you know, it might've been two or three a year but this last year I'm proud to say we actually took on seven different work experience students across the year. And what we do is we make sure any opportunities we're given by the universities, whether it's to go do guest talks, sit on their consultation committees, take on work experience students, we always do try to make sure we accommodate them and try to prioritise them the same as we would like a regional technical group, realising that they're the future supply of our

environmental health officers. So if they're, for example, not providing a great program and we're not providing feedback, we're shooting ourselves in the foot unfortunately and so it's important that we are constantly talking to them, making sure their programs are relevant to us and giving them practical examples and documents that they can use. (Martin p18)

The conceptualisation of practitioners as part of the broader environmental health professional community is important in this category, as leading the development of practitioners within the organisational community is seen to contribute to promoting the area of practice as a leading professional group amongst the general community. This is as experienced necessary to attract greater recognition and support for the practice area. When experiencing practice in this way, practitioners are commonly motivated by a passion for environmental health, where practice is seen as essential to the community's future health. It is also sometimes motivated by concerns regarding the perceived invisible and 'non-sexy' nature of practice, seen to potentially jeopardise the future of the practice area, together with a need to compete for resources with other departments within an organisational setting to secure this future. There is also a sense of frustration relating to experiences where practitioners have felt that the practice area has been unfairly or less favourably perceived amongst others outside and sometimes inside the professional area. These perceptions are experienced as impacting the professional standing of the practice of environmental health in the community. Colin depicts some of these aspects below:

For me, because I'm quite passionate about environmental health and I'm quite passionate about trying to improve its standing within local government and trying to improve its standing within state government as well; within local government specifically, and within state government to a certain extent that environmental health is not viewed very well; it's almost sort of one of those things that you have to have but rather it's sort of not sexy, so to speak, for particularly councillors and senior management. So what I like to try and do is put ourselves up there in lights and say we're innovative, we're bringing in new ways of doing things, we're leaders in what we do, not just within environmental health and City of [organisation], I mean environmental health in the broader scheme of local government that we're…willing to and we're leaders within local government, more so than planning or building or

recreation. We are setting a standard in terms of how local government should operate as a department. So for me it's a broader aspect and it's something that I sort of want to try to do, to say "yeah, environmental health officers are pretty good, they're pretty innovative, they're pretty forward thinking about approaches to how they manage their work". (Colin p7)

Applying the expertise of practice to influence or change situations or circumstances considered relevant to the practice of environmental health

When focusing on the second aspect in this category, applying the expertise of practice to influence or change situations or circumstances considered relevant to the practice of environmental health, there is a focus on the individual qualities and characteristics required by a practitioner to achieve this. Practitioners emphasise maintaining a high level of environmental health expertise, having trust, the ability to listen and communicate, make quick reasoned decisions, look forward or have a vision, and a willingness to adapt to change. These aspects are captured by Simon when he described how his role as a manager relates to the practice of environmental health and further by Nathan when he reflects on whether the practice of environmental health has changed:

> Well, my role as the manager is providing the ultimate leadership and strategic direction for environmental health within the City of [location]. So it's critical that I'm linked in with the practice, that I am up-to-date with the practice of environmental health to be able to guide and to ultimately lead the environmental health functions here. A number of very complex issues happen on a regular basis that I'll be specifically asked the question from the CEO or the mayor will call and say, "Simon, this is the issue. What's the answer?" And they need the answer right then and there, so having a link to practice and understanding current practice is extremely important. (Simon p2)

> so one thing to be a manager, the other thing is to be a leader. And I think I'd like to see myself as a leader. A leader is someone that people look to, aspire to and, particularly for the health team, someone that they know they can trust, someone that

213

they know is up-to-date with the latest. And when a decision is made, they know that all of those factors have been considered in the decision. (Simon p6)

So my approach has changed a hell of a lot, yeah. It's probably more of a reactive versus proactive now, so much more proactive the way I want to do things. Visions, probably more visionary that way too, try and see the vision of how you want things to look and how do you get to that point? So my whole approach professionally has changed around environmental health and the powers are there now to do it, be it information tools and communication. (Nathan p 10)

The second aspect of this category, applying the expertise of practice to influence or change situations or circumstances considered relevant to environmental health practice, is also associated with an awareness of a continually changing and evolving world. Practitioners experience these factors as requiring a focus on the impacts of advances in technology and challenges surrounding the evolution of disease on the practice of environmental health. In particular, the need for practice to keep abreast with communication via information sharing technologies and social media platforms together with the technology involved in generating evidence to advance the detection, surveillance and prevention of disease are highlighted. Involvement in professional organisations, networking, linking with universities and ongoing formal training are also described in this category as an important factor in maintaining a high level of expertise to lead communities. These communities are seen to include the environmental health professional community or other relevant professional or non-professional groups or people. Simon captures these aspects when reflecting on whether the way he thinks about practice has changed over time:

I think that's really important, that the practice evolves with time. The world around us, whether it's a microbial world or technology, anything that is around us in the world is continuing to evolve and so we must evolve with it. We need to keep up with the technology that makes us maybe more efficient, but it may also help us to make better decisions, quicker decisions. So it might be to do with analysing food samples; you might be able to do it on site. Food businesses, instead of having to send it off to a lab and taking three to five days to get a result back, there might be changes there

or, as I said, the microbial world, the diseases are continuing to evolve, continuing to challenge us and we're only ever that close to the next pandemic outbreak of influenza or the next major disease, whether it's like we're seeing with Ebola or bat lyssavirus or something like that, could cause significant morbidity, mortality locally and/or around the world. (Simon p13)

Improving the professional practice of environmental health through leadership and innovation

Innovating practice is conceptualised as a process. Practitioners describe it as requiring engagement with stakeholders with a focus on enhancing strategic responses to environmental health problems or improving organisational, operational standards. Descriptions of the innovation of organisational, operational standards include ways to capture and disseminate information. This is seen as important to avoid 'reinventing the wheel' and to build capacity amongst practitioners by providing an evidence base to assist in practice decisions, such as developing a database that can be shared amongst other practitioners. Innovation is seen to enhance the efficiency and productivity of environmental health practice and promote industry leadership, with a focus on improving health outcomes. These aspects were captured by Simon and Colin:

> You need good engagement from across the board to look at new and innovative ways to be able to engage with people who are not likely to know how to manage themselves, manage their health in heat. And some of the things that we've been looking at, I'd have to say, are things that I think have come out of this process this year. So we're looking at a project with a community not for profit where they will train volunteers to work with the vulnerable in the community in preparation for heatwave. We're looking at initiatives around even simple things like the provision of drinking water. Is there enough drinking fountains across the municipality? (Simon p3)

> certainly looking at innovation technology aspects of environmental health practice, so that's data management systems, that's content-based systems, and because we're moving into sort of field-based technology and mobility in your local government,

215

playing a role in developing systems that assist environmental health practitioners with regards to access to data, content and information in a mobile environment to facilitate environment health practitioners with their role (Colin p3)

we need to be demonstrating to council value for money, and we need to show that to council's that they get bang for their buck, so to speak, so we try to bring in technology innovation to make our officers as efficient and as productive as we possibly can. (Colin p7)

In this category, innovation is experienced as an outcome of leading communities, as leadership is perceived to encourage opportunities for innovation. This aspect is seen as important to advance the practice of environmental health, focusing on ensuring practice remains productive, efficient, and relevant in improving the health of the community, seen necessary in a changing evolving world. These aspects were described by Simon when describing why improving efficiency is important to the practice of environmental health:

Whereas with the other side of freeing officers up to be able to do policy and strategy in this space, it's allowing them to be innovative, creative. It's allowing them to not be bound necessarily by legislation, by any real rules. It's allowing them to think outside the box and to find ways to ultimately improve the health of the community. (Simon p9)

Creating our future reflects an understanding by practitioners that environmental health practice must be prepared to respond to the challenges posed by an evolving and changing world. In particular, there is a focus on taking responsibility for contributing to future workforce development by engaging with educational institutions, particularly in recognition of an ageing workforce and a potential loss of environmental health practice knowledge, due to workforce attrition. Engagement with educational institutions is seen as important to empower new and future practitioners with the ability to practise environmental health in a way that reflects industry needs, including the ability to achieve 'good outcomes'. It also reflects an understanding that without this contribution, practice is in jeopardy of not being able to sufficiently protect the health of future generations, with some of these aspects captured by Martin:

environmental health is changing, our workforce is changing, particularly here we've actually got quite a young team and a lot of leadership potential but that's where for example council itself says I think it's 40% of our workforce is unfortunately about to retire in the next ten years and so recognising that because we have such an ageing population we need to – we're about to lose a lot of information, a lot of really relevant history of what happened in the past. So that's where for me I personally believe it's really important that we're responsible for creating our future, you know, the next generation we need to be leading them to show them how to actually get good outcomes, how to be empowered to make changes. In particular I believe the key is through not empowering the existing staff members but looking at our future staff members as well and ensuring that, yeah the unis [universities]have everything that they need to feel that they're empowered to actually understand what environmental health is about and that they're actually current and relevant to the industry because unfortunately in 10-20 years' time if I'm not here other people aren't here and if we haven't actually developed the next people to come through, environmental health will take a couple of steps back unfortunately from protecting the community and which therefore will be my own health if I'm retiring too so…
(Martin p19)

There is also an awareness of the role of evidence as an important component of creating our future, as described by Nathan:

Evidence then becomes quite important to then structure the future. So you should always be collecting evidence, not just relying on the rules of today and the request of today but if you gather evidence then you can say "Okay, we need to probably do this in the future or this in the future and that in the future". So the power of evidence, it needs to inform you of what you're going to ask tomorrow and the next day and the next day, or what you're doing. (Nathan)

In this category, leading communities without boundaries reflects the perception that the practice of environmental health can be applied amongst local, state, regional, national or international communities and in private, public or political contexts. It is also seen to involve the leading of individual or collective entities, with professional or non-professional

backgrounds with no limitations as to when leading can take place. This suggests that there are no boundaries to the application of the practice of environmental health. Some of these aspects are captured by Colin when reflecting on an environmental health experience in an international setting and Simon when describing an incident where he adopted a leadership role relating to the practice of environmental health:

> I guess it's more so that we have so much knowledge and experience, and I guess in Australia with a regard to environmental health we'd be considered as a country leader with environmental health as regards to system we've got in place and legislation; the knowledge, the expertise, in a broad range of environmental health areas...and we felt that with that level of expertise and knowledge and capacity that we had the ability, I guess, to assist and make a change with regards to environmental health, public health in (under developed country location). (Colin p4)

> the main thing that I took leadership on getting there was it was clear that there was very little, if any, coordination between the three levels of government in the health space when I got there. So you've got local government doing what they thought they needed to do, state government that I was representing needing to know information probably more so than anything to inform decision making, but state needing to know what local were doing. But also the defence force were there representing commonwealth, so we also needed to know what commonwealth were doing and what their tasks were and how all three could come together for the common purpose. So the main thing that I spent the first few days doing was actually bringing those three groups together to form a common view about how we would tackle the various environmental health issues that were being raised. We didn't want the local government doing things that the commonwealth were doing or vice versa. We wanted them to be working together. (Simon p7)

Innovating practice without boundaries has two aspects. The first aspect reflects a perception that innovation comes from creativity and opportunities for practitioners to not be bound necessarily by legislation, by any real rules to be able to think 'outside the box' as described earlier by Simon. The second aspect reflects a perception that innovating practice does not have an endpoint. Practitioners must be proactive in order to continue to lead. As such, there is a

218

focus on the continuous improvement of organisational, operational standards, including enhancing strategic responses to environmental health problems. Simon and Nathan capture these aspects:

> We've got to be setting the bar as far as practice is concerned, so whether it's like we're working on at the moment with mobile technologies in the field, whether it's inspections of businesses or going out to investigate complaints, that is the gold standard now. That's where the best health teams are at the moment and we're not far behind, but we're saying, "Well, that's the gold standard. How do we get beyond that? What's next? What else can we do to make environmental health within [organisation] the industry leader?" The only way you can do that is through innovation. (Simon p10)

> A good way to do it is we're probably good at waiting for things to come to us, there's that traditional type approach. So a food complaint comes in or we run a program that we've got to run because the commonwealth government's funded it; I just think my approach now is more about being proactive in taking something and saying "How can we do this better, how can we do that better?" There's very much if it ain't broke don't fix it approach. My approach is pretty much if it ain't broke break it and rebuild it and that's part of the fun. So my approach has changed a hell of a lot, yeah. It's probably more of a reactive versus proactive now, so much more proactive the way I want to do things. (Nathan p12)

In summary, when experiencing practice as 'leading communities and innovating practice to create out future without boundaries', the critical aspects of this category included:

- a focus on leading the professional development of practitioners to assist in achieving more efficient and effective responses to environmental health problems
- a focus on supporting the retention of the environmental health workforce and helping to facilitate environmental health as a leading professional group within the broader community

- awareness of the individual characteristics and qualities required to be a leader to influence and affect change relevant to environmental health. This is associated with an awareness of a continually evolving and changing world, requiring ongoing professional development to maintain a high level of expertise to be an effective leader

- improving professional practice through leadership and innovation, by creating opportunities for innovation amongst the practitioner community, with a focus on developing ways to enhance strategic responses to environmental health problems or improve operational standards, to ensure this area of practice remains productive, efficient and relevant in improving the health of the community, underpinned by the understanding that there are no boundaries to the practice of environmental health

- taking responsibility for contributing to future workforce development, associated with an awareness of the implications of an ageing workforce, workforce attrition and the impacts these factors may have on the capacity of this area of practice to sufficiently protect the health of future generations.

This category has described the focus on leading communities and innovating practice to create our future without boundaries, the fourth and final category of description for the qualitatively different ways of experiencing the practice of environmental health.

7.8 Conclusion

In this chapter, I presented the four qualitatively different ways environmental health professional practice was experienced by a group of nineteen environmental health professionals based on the phenomenographic analysis of interview data collected from this cohort. These findings were first presented diagrammatically as an outcome space, depicting the four categories of description in a hierarchical order, abbreviated as 'protecting', 'helping', 'collaborating', 'leading and innovating', together with the five themes of expanding awareness. I then presented a detailed description of these four categories. The diagram, together with the detailed descriptions, represent the holistic experiential description of practice (HEDP) and the new conceptualisation of the professional practice of environmental health. The four qualitatively different ways practice was experienced also represent the variations in

the ways of experiencing the practice of environmental health and the findings of the first research question in this thesis.

In the next chapter, I explore and describe in more detail the critical variation between the categories, including the themes of expanding awareness that resulted from the interview analysis. This represents the findings to the second research question posed in this thesis.

Chapter 8: Critical variations between the ways of experiencing the professional practice of environmental health

8.1 Introduction

In this chapter, I describe in detail the three critical variations between the ways of experiencing the practice of environmental health: Category 1 to 2 (*protecting to helping),* Category 2 to 3*, (helping to collaborating)* and Category 3 to 4 (*collaborating* to *leading and innovating)*. The three critical variations between each of the categories are described by the phrases *sustainable community outcomes, systems-based solutions* and *future generational outcomes.*

I also describe the dimensions of variation, identified as five themes of expanding awareness, 'outcome' (outcome of practice), 'impact' (those impacted by practice), 'approach' (approach to practice), 'agency' (the agency of the practitioner), 'role' (role of the practitioner). These themes appear in each of the categories and help describe how the categories logically link to form the outcome space, from less comprehensive to more comprehensive ways of experiencing the practice of environmental health.

The chapter concludes by outlining the distribution of participants across categories indicating the successful identification of the qualitatively different ways of experiencing the practice of environmental health. The chapter commences by clarifying the key concepts, critical variations and themes of expanding awareness and outlining these findings.

8.2 Critical variations and themes of expanding awareness

Identifying the critical variation between the categories of description involved an analysis of the similarities and differences of the critical aspects or features of awareness between these

categories, based on evidence from the transcripts. The critical variations between the categories of description relate to a description of the critical features, which are key variants contributing to a shift in the focus of awareness from one category to the next. Collectively these key variants account for the three critical variations between the categories. The three critical variations between the categories are described by the phrases *sustainable community outcomes; systems-based solutions,* and *future generational outcomes*. These phrases have been used to describe the critical variation between the ways practice was experienced by environmental health practitioners between Category 1 (protecting) to Category 2 (helping), Category 2 (helping) to Category 3 (collaborating), Category 3(collaborating) to Category 4 (leading and innovating) and described further in the table below.

Table 13: Description of the critical variation between the four categories of description

Category critical variation	Critical variation description
Category 1 (protecting) to Category 2 (helping) *Sustainable community outcomes*	Outcomes of practice are experienced as having positive impacts on the community's sustainability rather than only meeting the required processes to prevent harm.
Category 2 (helping) to Category 3 (collaborating) *System-based solutions*	Practice solutions are conceptualised through a complex systems environment rather than only focusing on meeting individual stakeholder needs.
Category 3 (collaborating) to Category 4 (leading and innovating) *Future generational outcomes*	Outcomes of practice are experienced as contributing to both the future of the practice of environmental health and the health of future generations, shifting the focus to beyond the immediacy of achieving optimal health outcomes for the community.

The description of the critical variations between the categories aims to support the evidence base for the four qualitatively different ways of experiencing the practice of environmental health and the structural relationships or how the categories fit together to form the outcome space. In this study, the relationship was hierarchical, from less comprehensive (protecting) to most comprehensive (leading and collaborating).

The critical features of ways of experiencing practice have also been described using themes of expanding awareness, which refer to the dimensions of variation, which have been grouped into themes (Åkerlind, 2002; Daniel, 2016). These themes represent experiences that are present and run through each of the categories of description but expand to encompass more awareness than the previous categories. Themes of expanding awareness assist in supporting and describing the logical relationship between the categories (Åkerlind, 2002; Daniel, 2016). Five themes of expanding awareness were identified in this study: 'outcome of practice' (outcome), 'those impacted by practice' (impact), 'the approach to practice' (approach), agency' (agency) and 'the role of practitioner' (role). These themes are described and italicised, e.g., *outcome* in Sections 8.3, 8.4, and 8.5.

As described in Chapter 4, the identification of the critical aspects or features that vary between the categories is of importance, as according to variation theory, these key variants have implications for enabling a phenomenon to be experienced in more comprehensive ways (Ling & Marton, 2011; Lo, 2012; Pang, 2003). For example, a critical variation in experiencing the practice of environmental health in more comprehensive ways is to change students' awareness from experiencing practice as 'protecting' to experiencing practice as 'helping'. The 'outcome' of the practice as a theme of expanding awareness could be used to help shift experiencing practice from 'protecting' to 'helping'. In the following sections, I describe the critical variations between each of the four categories of description, supported by evidence from the transcripts in detail.

8.3 Category 1 (protecting) to Category 2 (helping)

Category 1, 'protecting', describes experiences that form the fundamental basis of the practice of environmental health. This fundamental basis is that practice protects people, and collectively, the community from harm. In protecting, practitioners are aware of the given boundaries within which practice must function to achieve this outcome. These given boundaries are seen to apply to both the practitioners and the people or community they serve, with a focus on following the required processes.

The key variation between Category 1 (protecting) and Category 2 (helping) is a shift in focus from only experiencing practice as fundamentally protecting from harm to practice creating a sustainable healthy community. This shift in focus is still inclusive of a practitioners'

awareness that the fundamental outcome of practice is to protect from harm but varies as practitioners experience the positive *outcomes* practice can have to the economic, social and environmental sustainability of the community. This shift indicates a broadening of awareness of the outcomes of practice from the former category, as practice is seen as preventing the negative consequences associated with the prevention of harm and having a wider benefit for the community. This shift is captured by Trisha:

> ultimately to help the community because if you get a negative interaction quite a lot it can be difficult but I find it hugely satisfying then when you do provide someone with some education that changes a practice within their business for the better or you gain compliance from a business that's been non-compliant for quite some time, and to think that even though you may not see any feedback from the community because they haven't even been aware that that was the issue. But just I think - just to be mindful of the fact that ultimately people want to come into the municipality you're in, to their home and their area and feel like they can go and eat and relax and that everything's safe there. Ultimately it's satisfaction of the community. (Trisha p10)

The variation between Category 1 (protecting) and Category 2 (helping) is also associated with a variation in how practitioners conceptualise those *impacted* by practice. In Category 2, there is a shift in focus from only experiencing practice as protecting *people* or *collectively the community* to protecting and helping *stakeholders*. Stakeholders include people, as in Category 1, but become broader as practitioners conceptualise practice as having impacts on a range of entities, including business operators, ratepayers, consumers and other organisations, within and outside their immediate community, which practitioners also experience as having a stake in the outcomes of practice.

The shift in focus from *protecting* people to *helping* stakeholders also indicates a variation in the *approach* to practice. This variation involves a change from practitioners experiencing practice as controlling or preventing risks to experiencing practice as a *shared responsibility* between the practitioner and the stakeholder, with the aim of empowering stakeholders to self-manage risks to help create a healthy, sustainable community. The adoption of a shared responsibility involves practitioners, as in Category 1, focusing on the assessment of the risk of harm to health and the environment. However, in Category 2, a greater focus on engaging

225

stakeholders in this process or working with stakeholders by sharing their expertise to manage these risks is adopted. This shift is described by Kelvin:

> If you interviewed me a few years ago, I wouldn't have been saying the words outcomes based, managing the risk. I wouldn't have been saying those things. I was very much you are compliant or you're not compliant. And I know I probably had unrealistic expectations. I wasn't working with the proprietors, where now I work with them. You know, I didn't get them to write a letter back saying this is my management plan, this is how I am going to, you know, even if it's 12, 24 months, this is how I am going to work through it. Also, to provide evidence that they are taking it seriously and they are planning to action it. So, I think I've changed completely, but I've changed as a person as well. (Kelvin p11)

The shift in approach to practice from *protecting* people to *helping* stakeholders is related to practitioners' experiences of being exposed to increasingly complex situations where several competing demands impact how to address hazards to the community's health and environment. This shift is also associated with the non-black and white nature of practice becoming apparent, together with the complexities surrounding assessing risk and gaining compliance with legislation. For example, whether a legislative non-compliance imposes an immediate threat to the community, requiring immediate legislative measures and the implications of these actions for the stakeholders involved, such as a loss of a service to the community. Alternatively, questioning whether gaining compliance with legislation, without engaging stakeholders in a process that enables them to understand the importance of managing risks which pose a hazard to the community, will help achieve sustained benefits for the stakeholder and the broader community. The approach to practice is also broader than the former category as consideration of the role of stakeholders and the complex environment surrounding decision-making also become part of the practitioner's awareness. The need to take a holistic approach to environmental health practice also comes to the fore. Susan and Kelvin particularly highlight the shift in focus to the approach to practice:

> That's always stuck with me because I look back on my own practice and I think yeah, when I first graduated, I think I saw things as very black and white, things were compliant, or they weren't. Whereas I was more likely to rely on legal tools to back

226

myself up, whereas very quickly I learnt, you know, communication, helping people understand why something is important, you know, people don't – you know, if people see something is going to affect their business and how it affects their consumers, their customers and so forth, they are more likely to be interested than if you just say the law says so. So, I think my journey has meant that I went from sort of seeing things black and white to seeing that there are many, many, many shades of grey and how you work with people will ultimately determine how successful you are in your job. (Susan p13)

You know, opportunity, I guess, it comes down to the certain situation, too. If they're critical, if there is critical items and you should have known better, well it's clear cut, there's a breach. But if there is, you know, particularly minor, maybe major items, you give them – I'm getting a bit flustered here. You know, also people have a business, so everyone is feeling the pinch with money, we can't have too high expectation. So, we do have to give people a chance to comply and to prove to us they know what they are doing. Our job, it's never black and white, it's rarely black and white. A person could have a hand wash basin obstructed, but they mightn't be preparing food at that moment in time, so where is the risk? So, yes, there's a non-compliance but, you know, we have to look at it from a holistic perspective. (Kelvin p9)

There is also a variation in the way the *role* of the practitioner is conceptualised between Category 1 (protecting) and Category 2 (helping). In Category 1, although there is recognition of the role of education in protecting people from harm, the enforcement role of the practitioner in order to achieve this outcome is seen as the core of the practice role. Paul describes this:

The bottom line is we are statutory officers. We really are police officers, we have the same status as a police officer and you really just going out to see that everything is as it should be and if you find that it's not, that you take appropriate action under your delegated authority. (Paul p12)

In Category 2, the focus of the practitioner's *role* shifts from enforcer to educator, where education is seen as core to the practitioner's role as is experienced as more likely to gain favourable outcomes than relying on enforcement. This role is broader than the role of practice

from Category 1, as although the enforcement nature of the role is still understood, the focus on gaining outcomes through education is also experienced as providing the opportunity for compliance indicates a more complex understanding of practice. This is described by Kelvin:

> I have always sort of gone down the path of education, giving them the opportunity, and I always find I get the outcome now. If they don't take that opportunity there, then I wouldn't hesitate to prosecute. But I always think fundamentally we are educators before we are enforcers and, you know, to stand up in front of a magistrate, too, to be able to say we have given them every opportunity, they should have known better and this happened, I think the court would look more favourably on council, opposed to what opportunity did they have? (Kelvin p9)

The shift in focus from given boundaries to changing boundaries also represents a variation from Category 1 to Category 2. As with Category 1, there is an understanding by practitioners of the boundaries practice operates within; however, the shift to changing boundaries indicates a variation to the *agency* associated with how the practitioner experiences the ability to act. This agency relates to experiencing practice as promoting outcomes that go beyond protection to those that have positive benefits for both practice and creating a healthy, sustainable community. This variation appears to relate to practitioners' intrinsic motivation or the human element, where practitioners can become aware and challenged by the impacts practice decisions can have on people's lives and the organisational context in which practice operates. Practice is experienced as a balancing act between these competing factors. Graham describes this:

> trying to balance out the best option is really, really challenging and, I guess, the best thing a council could do is have really strict policies and procedures in place that the unit and the department have agreed on so that you follow set process and it's all documented and that if anything does blow up, then you fall back to that and say, "This is the agreed process. This is why the timeframe has taken this long." But a lot of times councils don't have that strict framework and particularly with different complaints that you deal with, sometimes you have to go around it and you have to get other departments involved particularly with illegal, clandestine labs as well, like meth labs, that we get involved with, police are involved. Aged care; sometimes a hospital,

because it's a mental health issue. Yeah, that's another thing that we do with hoarders as well. Yeah, it's really difficult to try and balance out everything' (Graham p 5)

so I'm wanting to take that initiative so that I can get the ball rolling because I don't want it to become stagnant and just get forgotten about and then this guy's still suffering. It's like, we need to make a move, get it done; don't get lazy. And you need to really talk. And we don't have an internal process for that, you just do it. And it seems like a lot of our job is doing that, you really need to take initiative and just do it. Don't be lazy, just go out and get - if you don't know something, just go and ask; figure it out. (Graham p11)

As also described by Sally:

So yes, I tread that line often in this profession. I think my colleague, [person], for instance, is much better at actually just sticking with legislation, being quite sort of hard-nosed about 'this is just what the legislation says and this is what you must do'. I do kind of see the human element and do get a little bit involved in their other issues, take into consideration other aspects of where they might be at. Once again though, Louise, it's like I said, small towns make it really different. I didn't really have this level of involvement with people when I was at [location] in city councils, because really you would see people literally once or twice a year and they were always busy and you were busy and you just sort of get the job done, do what you had to do and you were out of there. But in the country, you run into these people in the supermarket, at various events. Or everyone knows each other too, so it's the extra information you get about your proprietors from other people you know in the town. (Sally p 15)

Given the broadening of awareness associated with each of the variations described above, Category 2 (helping) represents a more comprehensive view of practice than Category 1 (protecting) and is also inclusive of Category 1 in the outcome space.

229

I have used the phrase *sustainable community outcomes* to describe the critical variation between the ways the practice of environmental health has been experienced between Category 1(protecting) to Category 2 (helping).

8.4 Category 2 (helping) to Category 3 (collaborating)

A key variation from Category 2 (helping), where practice is experienced as creating a *sustainable healthy* community' to Category 3 (collaborating), where practice is experienced as achieving *optimal health outcomes* for the community, is the way practitioners experience the *outcome* of practice solutions. In Category 2 (helping), there is an awareness of the positive outcomes that practice can have on the economic, social and environmental viability of the community. There is also a focus on promoting the positive benefits practice can have in helping to achieve these outcomes. In Category 3 (collaborating), the awareness of these outcomes broadens and becomes more complex as practitioners experience how practice solutions impact on each of these factors (environmental, economic and social viability) when considered as a whole system, with the political context of such decisions becoming more apparent.

The outcome of practice varies from Category 2 (helping) where these factors (environmental, economic and social viability) arise and are often considered on an individual stakeholder basis; rather than as a collective whole, i.e., where the impacts of practice solutions for all stakeholders are considered. In Category 3 (collaborating), practice solutions are determined by considering the best possible outcomes for all stakeholders, by considering the impacts of these factors in relation to *each of the stakeholders*, as a whole system. As such, there is a shift from creating a sustainable health community to achieving optimal health outcomes for the community, where the complexities and reality of what can be achieved, when solutions to managing or preventing risks associated with hazards to human health and the environment are considered within a complex systems environment, are realised.

The shift to 'optimal health outcomes' is also related to conceptualising risk as a balance between best practices approaches and where the 'line in the sand' can be drawn for determining practice solutions. This aspect indicates a broadening of awareness of the complexities of practice from the former categories, as not only do solutions to hazards require

an evidence base to ensure health is not compromised, but this evidence needs to be considered within a systems environment in order to decide on the appropriate intervention which is right for the context. These aspects are described by Ted:

> Blue green algae toxins can be a risk to public health if they get into the seafood chain sort of thing. So highly principled people would say that soon as there's that algal bloom we should prevent people from fishing because there's a risk. The evidence shows that there's a risk that it can get into the food chain and people can get exposed to that toxin and suffer some illness as a result of it. So where do we draw the line? When do we put out advisories warning people not to fish for recreational fishing? When do we close down commercial fisheries and things like that? What's the consequences of putting people out of work, stopping people from undertaking recreational activities which are good for health and wellbeing? We need to make decisions like that every day in here so that critical understanding of risk exposures etc. and working out where the line in the sand is to intervene is something that we do. (Ted p5)

The shift in variation from 'creating a sustainable healthy community' in Category 2 to 'achieving optimal health outcomes for the community' in Category 3 (collaborating) is also associated with a variation in how practitioners *approach* gaining solutions to practice problems experienced within a complex systems environment. In Category 3, there is a shift from modifying the required process to help *stakeholders* self-manage risks to a focus on developing an agreed process by *collaborating in partnership* with those impacted by problems or those considered to have the expertise to contribute solutions to hazards that impact human health and the environment. The approach involves creating a governance structure or an appropriate authorising environment and agreed-on process, involving identifying those who have a role in developing solutions. Ted describes this:

> Well from day one when it was identified that there might be a species of algae in the lakes that released toxins, probably two years before we ever had to intervene, from day one we did what I explained before with the way we project manage things. We put together a governance group which were Executive Directors of [Industry Group), Department of [Government] and Department of [Government]. We've got a problem;

we need an authorising environment to investigate what the solution is. Put together a project team to investigate it which included representative of the (impacted industry). Regional representatives from [organisation], us, [organisation] etc., food people. (Ted p11)

So they were part of the process, understood the risk. When we go back to them, when we actually reached that level where we had to close the [industry] down and we had the meeting with them, they knew that it had been happening. It didn't happen out of the blue. They were involved all along. They knew what would happen if it reached a certain level. So while it didn't ease the pain and it didn't stop them from being upset, it was manageable because we had good process in place. (Ted p11)

Process is everything. If you haven't got good process, if you haven't got good governance, if you haven't got good stakeholder representation in the process you're not in the game. When I started 30 years ago we just made decisions and this is the decision, live with it. That's no longer the case. You couldn't do that anymore. You wouldn't survive. (Ted p11)

The variation in approach to practice from Category 2 (helping) to Category 3 (collaborating) also indicates a broadening of awareness of how practitioners conceptualise those *impacted* by practice from former categories. This variation takes place as practitioners experience a shift from not only sharing practice decisions amongst affected parties but experience becoming part of a working entity. This entity is formed through the establishment of a governance structure or an appropriate authorising environment as previously described. Practitioners experience those involved in this process as having a role in developing solutions to problems that are right for the context, indicating an approach that goes beyond the sharing of expertise to one of collaboration. These experiences indicate a broadening of awareness from experiencing those *impacted* by practice as people, organisations or *stakeholders* to *partners*. In this broadening of awareness, those involved in this process are seen to have a role beyond that of only having a stake in the outcome, but as part of a broader set of responsibilities. This includes being part of the practice solution and becoming advocates for these solutions. Ted describes these aspects:

232

I would never start any work without going to the [type of] industry and saying, "we've got this issue. We need people from the industry to work through it with us." So we've got a very good reputation and are very successful at achieving change in the [type of] industry because from day one we work in partnership with the industry to understand the reality of the problem in the first place and understand what is the most practical way of resolving the problem. They then understand what's at risk to the industry if they don't do something. When we write up a guideline or a direction or advice, it's basically written in a way that the industry understands in their language. Probably most if not every time they'll go out and be the number one advocates to achieve that change. (Ted p7)

when I go out there in partnership with the industry and say we've identified this issue. We've undertaken this process to identify what the problem is and in partnership we believe this is the appropriate way to address this problem. The risk is understood in a context that's right for that group. (Ted p7)

There is also a variation in how the *role* of the practitioner is conceptualised from former categories. In Category 3 (collaborating), the focus of the *role* of practitioner shifts from being an educator, underpinned by an enforcement role to a *role* of mediator or negotiator, indicated by the focus on arriving at solutions that are right for the context in partnership with the relevant parties. This variation also indicates a broadening of awareness of the practice role, as arriving at solutions that are right for this context becomes more complex than adopting an educative or enforcement role.

The shift in focus from changing boundaries to connecting boundaries also represents a variation from Category 2 (helping) to Category 3 (collaborating). This key shift involves recognising the *agency* of other partners in contributing to the achievement of optimal health outcomes, which is experienced as being negotiated in conjunction with the practitioner's own ability to contribute to these outcomes. This *agency* is related to recognising that there are a number of pathways available to achieve optimal outcomes, requiring a multidisciplinary approach and understanding of what the boundaries are for each partner and how they can be

connected to achieve these optimal outcomes. By linking these boundaries, this is experienced as resulting in gaining better outcomes for the community. Natalie describes this:

> I suppose that's not just the individual [organisation] for this plan, I think for the heatwave planning and most of our strategic plans, we'll have other --if not other agencies, then other parts of council that you need to work with. The domestic waste water management plan is legislated, so most of our external agencies know about it anyway, but I mean basically it's just a case of contacting the agencies about what we're doing; what we're trying to do and what the timeframes are. If we need to meet with them and go through certain issues, we'll do that individually. Sometimes I've organised a meeting with everybody at the table. In this instance, it was done more on an individual basis, so we developed up the plan, we got the other agencies to comment on the plan. In other cases, I've had all the agencies around the table and we've done a planning session and we've talked through what everybody's priorities are, where they link together and all that sort of stuff, and sometimes that's a better outcome. It depends. I did that for the bushfire recovery plan and that's a better outcome because everybody knows what everybody else's priorities are and how they can actually work together rather than compete for the same things. (Natalie p4)

The recognition of the agency of partners in contributing to optimal health outcomes by connecting boundaries is also related to practitioners' conceptualisation of problems and solutions through a complex systems environment. Through this lens, the expertise, interests and experience of other partners are required to be considered in conjunction with those of the practitioners. This appears to be related to the practitioner's experiences of a 'jack of all trades, masters of none' skill set, highlighted in Category 2. In Category 3, practitioners recognise the limits of their expertise and the need to work with the 'masters' or those with greater expertise to develop practical, affordable solutions based on evidence in collaboration with these 'masters'. Whilst there is an understanding of the boundaries of practice, this category also looks towards changing boundaries and connecting these boundaries to arrive at achievable solutions and enable the changes required to achieve optimal health outcomes. Ted describes this:

Well, there's evidence of practice. Once again, I think that's where environmental health practitioners are good. They have that ability to understand what the evidence is to protect public health and they know how far back they can come from the perfect position, the ideal position to get a satisfactory resolution. We do typically not so much environmental health practitioners – environmental health practitioners in my eyes are sort of jack of all trades, masters of none. So we need to be working with masters to understand the issues. Masters want to achieve perfect practice. So if you're a masters in microbiology or a masters in engineering, you want to achieve world best practice. You want a 99.99 percent solution to absolutely minimise level of risk. The difference between a 99.99 percent intervention and a 80 percent intervention might be marginal on the actual population health impact and the practicality, affordability to achieve the 99.99 percent solution is always unachievable. The practicality and affordability to achieve a 95 98 80 percent solution wherever that line might be, that's going to actually allow for a change is the reality of life. (Ted p12)

Given the broadening of awareness associated with each of the variations described above, Category 3 (collaborating) represents a more comprehensive view of practice than Category 2 (helping) and is also hierarchically inclusive of Category 1 (protecting) and Category 2 (helping) in the outcome space.

The phrase *system-based solutions* I have used to describe the critical variation between the ways the practice of environmental health has been experienced between Categories 2 (helping) to Category 3 (leading and innovating).

8.5 Category 3 (collaborating) to 4 (leading and innovating)

A key variation from Category 3 (collaborating) to Category 4 (leading and innovating) is a shift in focus from achieving 'optimal health outcomes' in Category 3 to 'create our future' in Category 4. This shift varies as practitioners focus on sustaining the future of the practice of environmental health through leading communities and innovating practice. To create our future indicates a broadening of awareness of the *outcome* of practice, as the outcomes now extend to ensuring that practice can continue to respond to the challenges posed by an evolving world to ensure the future health of generations.

235

The variation from achieving 'optimal health outcomes' in Category 3 to 'create our future' in Category 4 is associated with a variation in the *approach* to practice, involving experiencing practice as a collaborative responsibility, as described Category 3, to the responsibility of stewardship. The responsibility of stewardship signifies a practitioner's focus on leading practice solutions and promoting opportunities for innovation to ensure the sustainability of the professional practice of environmental health and the health of future generations.

In experiencing practice as a responsibility of stewardship, there is an emphasis on practitioners' individual qualities and characteristics. This includes having a high level of expertise, trust and vision, coupled with a focus on supporting others to achieve the ability to 'create our future'. The variation in *approach* to practice is associated with an awareness by practitioners of a range of complex and evolving factors surrounding environmental health practice. This includes factors relating to environmental health workforce development, the impacts of advances in technology and the evolution of disease on practice with a continued need to pursue resource-effective and efficient ways to achieve better health outcomes for the community.

The shift of experiencing practice to stewardship also indicates a broadening of awareness of those *impacted* by practice from former categories, as practice is conceptualised as going beyond protecting people (Category 1) or helping stakeholders (Category 2) or collaborating with partners (Category 3) to the ability to create our future, where this future is inclusive of the community and the practitioner's own future. Martin describes this:

> So that's where for me I personally believe it's really important that we're responsible for creating our future, you know, the next generation we need to be leading them to show them how to actually get good outcomes, how to be empowered to make changes. In particular I believe the key is through not empowering the existing staff members but looking at our future staff members as well and ensuring that, yeah the unis have everything that they need to feel that they're empowered to actually understand what environmental health is about and that they're actually current and relevant to the industry because unfortunately in 10-20 years' time if I'm not here other people aren't here and if we haven't actually developed the next people to come through, environmental health will take a couple of steps back unfortunately from protecting the

236

community and which therefore will be my own health if I'm retiring too so. (Martin p9)

In this category, there is also a variation in the way the *role* of the practitioner is experienced from previous categories. As indicated in Martin's quote above, the practitioner's role shifts from being a collaborator or negotiator to one which influences and empowers others to make changes as a means to create our future. This shift indicates a more complex understanding of the practitioner *role* than of former categories.

The shift in focus from connecting boundaries to without boundaries also represents a variation from Category 3 (collaborating) to Category 4 (leading and innovating). The variation is related to practitioners' experiences of leading communities and innovating practice. A practitioner's *agency* to apply practice expertise in a range of contexts and communities and achieve outcomes that improve or enhance practice outcomes through innovation are also realised. This variation is also associated with practitioners focusing on being proactive or having a vision to improve health outcomes. These actions are also experienced as having no endpoint. These experiences also indicate a broadening of awareness of practice from former categories. Some of these aspects are described by Nathan:

> I think you always have to constantly look at how you'd like things to be; where are we at, where do you want things to be and then work with your teams and others, stakeholders, expert's etcetera on how to reach that vision. I think there's quite a power in doing that, in bringing people along with you too if you have a vision and that vision you have to be able to paint very clearly. I suppose we're lucky in a way in that being a science-based field you do have the ability to have evidence to back up, evidence and information and experience of how to get to that point. But I think if you stop having a vision of where you want to be then that's when you get that sort of well we only react rather than where do we want to be? (Nathan p12)

Given the broadening of awareness associated with each of the variations described above, Category 4 (leading and innovating) represents a more comprehensive view of practice than Category 3 and is also hierarchically inclusive of Category 1, 2 and 3 in the outcome space.

The phrase *future generational outcomes* I have used to describe the critical variation between the ways the practice of environmental health has been experienced between Categories 3 (collaborating)-Category 4 (leading and innovating).

8.6 Distribution of participants across categories

The formation of the categories of description was based on the analysis of the qualitative variations in the way practice was experienced amongst the nineteen practitioners in this study. The analysis involved assigning the transcripts of each participant to a category based on the experiences of practice they discussed during the interview process. This analysis resulted in the development of the four distinctly different categories of description. The distribution of participants who were assigned to each of the categories based on their interview transcript ranged from 2 to 14. In summary, I argue that the distribution of the nineteen transcripts participants amongst the four categories of description indicates that the study was successful in identifying variation in the ways the professional practice of environmental health was experienced.

8.7 Conclusion

This chapter described the three critical variations between the four categories of description to support the hierarchical nature of the outcome space presented in Chapter 7. Identifying the critical variation between the categories involved an analysis of the similarities and differences of the critical aspects or features of awareness between these categories, based on evidence from the transcripts. The critical variation between each of the categories was also described and was found to be logically linked in a hierarchical order to form an outcome space. The categories were also linked by an expanding awareness of five themes that supported the categories' hierarchical relationship. In conclusion, I argue that the study has successfully identified the variation in the ways of experiencing the professional practice of environmental health. In the following chapter, I discuss the findings in relation to the research questions posed in this study and the implications of the results for improving the professional practice of environmental health.

Chapter 9: Discussion

9.1 Introduction

In the previous chapters, I presented the findings from the two questions posed in this thesis: What are the variations in the ways environmental health professionals experience the practice of environmental health, and what are the critical variations between the ways environmental health professionals experience the practice of environmental health? The findings from the phenomenographic investigation revealed four qualitatively different ways of experiencing the professional practice of environmental health. These different ways of experiencing practice were represented in four categories of description, logically and empirically linked to form an outcome space. The categories of description and outcome space represent a holistic experiential description of practice (HEDP) and a new conceptualisation of the professional practice of environmental health.

The key aim of the chapter is to discuss the findings in relation to the research questions posed in this study and the implications of the HEDP for improving the professional practice of environmental health, the key problem underpinning this thesis. This includes proposing that the HEDP generated from this study provides a more useful way to conceptualise this area of practice than current descriptions. This chapter also discusses the application of phenomenography, as adopted in this study for investigating practice. It explains how this research has extended existing literature, including establishing the main contribution of this thesis: a new and novel way to conceptualise the professional practice of environmental health, which has the potential to act as a framework to improve practice and education for professional practice.

I commence by providing an overview of the research questions and findings of this thesis to help support the discussion presented in this chapter.

9.2 Overview of research questions and findings

To establish a new conceptualisation of the professional practice of environmental health, two questions were posed in this thesis. What are the variations in the ways environmental health professionals experience the practice of environmental health, and what are the critical variations between the ways environmental health professionals experience the practice of environmental health?

The research questions were underpinned by variation theory (Bussey et al., 2013; Åkerlind, 2018). As outlined in Chapter 3, variation theory explains why people experience and understand phenomena in a limited number of qualitatively different but interrelated ways (Bussey et al., 2013; Åkerlind, 2018). This may also result in practice being enacted in varying ways by both individuals and groups. Phenomenography is the research approach used to uncover the variation in ways of experiencing a phenomenon (Marton & Booth, 1997; Åkerlind, 2018). Uncovering the critical variations between the ways of experiencing helps to delineate the distinctly different ways of experiencing a phenomenon, represented as categories of description and identify how these different ways are logically related to form a holistic description of practice, referred to as the outcome space (Marton & Booth, 1997).

The findings from this study identified four qualitatively different ways of experiencing practice the professional practice of environmental health, representing the findings of the first research question (Chapter 7). I described these as 'protecting', 'helping', 'collaborating', 'leading and innovating'. The findings also revealed three critical variations between the categories of description, which I described by the phrases 'sustainable community outcomes'; 'systems-based solutions' and 'future generational outcomes'. The different ways of experiencing were also logically linked from less to more comprehensive ways of experiencing the professional practice of environmental health, from 'protecting' to more comprehensive ways 'leading and innovating'. Five themes of expanding awareness were identified, which helped to support and describe this relationship. These themes were described as the 'outcome' (outcome of practice), 'impact' (those impacted by practice), 'approach' (approach to practice), 'agency' (the agency of the practitioner) and 'role' (role of the practitioner). These descriptions represented the findings from the second research question (Chapter 8).

In the following section, I discuss the similarities of the current description of professional practice in relation to the findings generated from this study to assist in achieving the key aims of this chapter.

9.3 Similarities of current descriptions of the professional practice of environmental health with the new HEDP developed in this study

A helpful way to establish how the findings of this study have extended our understanding of the professional practice of environmental health and how the new HEDP provides a more useful way to conceptualise this area of practice is to briefly discuss the key similarities between the four categories of description found in this study with the environmental health literature reviewed in Chapter 4. I do so by firstly comparing the key focus of each category of description with existing studies investigating practitioners' experiences of practice. This is followed by a general comparison of these aspects with the broader environmental health literature.

9.3.1 Existing studies investigating practitioners' experiences of practice

In Chapter 4, I identified a gap in the existing literature with respect to studies investigating the variation in the ways environmental health professionals experienced the practice of environmental health from the phenomenographic perspective I adopted in this thesis. Studies investigating practitioners' experiences of practice are also few. Despite this limitation, similarities can be found with the categories of description found in this study and other studies investigating practitioners' experiences of their practice.

For example, findings from research undertaken by the Australian Government aimed at providing greater insight into the experiences of environmental health practitioners responding to emergencies (Environmental Health Committee (enHealth), 2010) are reflective of the focus of the 'protecting', 'helping' and 'collaborating' category of descriptions in this study. The aforementioned research describes experiences of practitioners assessing immediate threats to the community as a priority, in accordance with a practitioner's legislative responsibility to ensure the community is protected from harm (Environmental Health Committee (enHealth) 2010). These experiences resonate with the key focus of the 'protecting' category found in this

study which also describes a practitioner focusing on the legislative responsibilities as a core aspect of practice.

The findings from the research undertaken by Environmental Health Committee (enHealth), 2010) also described practitioners helping the community to understand various risks in the context of enabling communities to keep themselves safe from the hazards of emergencies. This included the need for practitioners to find the right balance between making decisions that did not compromise a practitioner's professional integrity and judgement whilst working within the realities of the environment they were faced with (Environmental Health Committee (enHealth), 2010). These descriptions of practice are also reflective of the 'helping' category found in this study and the 'changing boundaries' aspect of this category. For example, the 'changing boundaries' aspect I identified as representing a practitioner's focus on changing and adapting practice whilst not compromising the core statutory responsibilities or boundaries of practice as a practitioner. Other descriptions of practitioners working collaboratively with other agencies and stakeholders in planning and responding to emergencies (Environmental Health Committee (enHealth), 2010) are also reflective of the focus of the 'collaborating' category of description in this study.

Findings from the study undertaken by Rideout & Oickle (2016) also resonate with the key focus of the 'helping' category of description. Rideout & Oickle (2016) identified that environmental health practitioners often recognised several barriers associated with gaining regulatory compliance amongst socially disadvantaged groups. To address this problem, as the authors describe, practitioners often adopted a range of strategies to 'help' overcome these barriers. Consideration of issues of social disadvantage were also key elements of a practitioner's awareness in the 'helping' category of description, as was the focus on adopting a range of strategies to 'help' overcome barriers to gaining regulatory compliance amongst such groups.

Other studies have also identified the importance of building collaborative relationships with stakeholders (Buckley, 2016; Buckley, 2015; Meyer et al., 2017; Rideout & Oickle, 2016) and of the practical problem-solving approach adopted by practitioners as key aspects underpinning the professional practice of environmental health (Dhesi & Lynch, 2016). These aspects were also reflected in several of the categories of description found in this study. For example, the

practical problem-solving approach adopted by practitioners formed critical aspects or features of the 'collaborating' category. This was experienced by practitioners useful in gaining practical solutions to managing environmental health problems amongst multiple stakeholders, which were right for the context.

9.3.2 The broader environmental health literature

Similarities can be found with respect to the key focus of each of the four categories of description identified in this study, with the theories and approaches underpinning the practice of environmental health I presented in Chapter 4. In particular, those related to the three historical phases I outlined in the previous chapter. These similarities have been represented in Table 14.

Table 14: Comparison of the key focus of the four categories of description in this study with the environmental literature

Key focus of category of description described in this study	Comparison with current understandings and key influences underpinning the professional practice of environmental health practice
Protecting people to prevent harm within given boundaries	Focus reflective of the fundamental theories and approaches associated with the traditional environmental health paradigm involving activities based on the identification of risk community education and legislative control of diseases (e.g., *see* Battersby, 2016; Baum 2003; Reynolds,1995; Frumkin, 2016; Smith, 2008) as outlined in the first historical phase (Section 4.3.1).
Helping stakeholders to create a sustainable healthy community by changing boundaries	Focus reflective of theories and approaches associated with the socio-ecological model of health, involving consideration of economic, social and environmental implications of practice decisions and achieving health-promoting behaviours amongst the community (e.g., *see* Cragg & Nutland, 2015; Baum;2016; Smith, 2008; Lin et al., 2014) as outlined in the second historical phase (Section 4.4.2).
Collaborating with partners to achieve optimal health outcomes for the community by connecting boundaries	Focus reflective of theories and approaches associated with ecological and system-based approaches to solving environmental health problems (Brown, Harris, & Russell, 2010; Neller, 2000; Parker et al., 2016), involving activities with an emphasis on collaboration and partnership to solve environmental health problems, including a whole societal

Key focus of category of description described in this study	Comparison with current understandings and key influences underpinning the professional practice of environmental health practice
	response, less reliance on legislative measures for sustainable gains (e.g. *see* Smith, 2008; Reynolds, 2011; Commonwealth Department of Health and Aged Care, 1999; Couch et al., 2016; Day, 2016) outlined in the third phase (Section 4.4.3).
Leading communities and innovating practice to create our future without boundaries	Focus reflective of the future focus of the practice of environmental health involving a call for leadership amongst the practice community, to not only ensure the viability of the profession but the ability to address the evolving complexities of problems facing our societal future (e.g., *see* Berg, 2007; Whiley, Willis, Smith, & Ross, 2019; Windsor and Associates, 2005; Day, 2016; Gerding et al. 2019) (Section 4.4.6).

Additionally, in Chapter 4, I outlined the key principles underpinning Australia's National Environmental Health Strategy (NEHS). The findings of this study reflected a number of these principles in practitioners' descriptions of their practice. For example, the NEHS principle Protection of Human Health, "identify threats posed by environmental hazards as early as possible, by introducing appropriate safeguards. Ideally these should be sustained cost-effective" (Commonwealth Department of Health and Aged Care, 1999, p.9) was apparent in the 'protecting' category. In this category, the practitioner's awareness of the importance of identifying threats posed by environmental hazards to human health as early as possible or which posed an immediate threat formed key elements of this category.

Consideration of safeguards that are "sustained and cost-effective" (Commonwealth Department of Health and Aged Care, 1999, p. 9) was further reflected in the 'helping' category of this study. For example, practitioners described the importance of education as a key strategy for empowering the community to self-manage risks, experienced as a more sustainable strategy than relying on regulatory control. Practitioners also considered the economic implications of gaining regulatory compliance and prioritised those that posed the most risk. Several other aspects of Australia's NEHS principles were also reflected in the categories of description found in this study. For example, the adoption of risk-based management approaches, the role of partnership in addressing environmental health problems and improving

the efficiency of environmental health services through innovation formed key elements of the 'protecting', 'collaborating' and 'leading' categories of description, respectively.

Although I have only provided a brief comparison of the key similarities of the findings of this study with the literature reviewed in Chapter 4, from a phenomenographic perspective, there is an expectation that similarities should exist. These similarities indicate that the professional practice of environmental health was the shared phenomenon practitioners focused upon in this study. This also further supports the validity and reliability of the findings, which I discussed in Chapter 6.

While similarities can be drawn between the findings of this study and the environmental health literature reviewed in Chapter 4, the focus of this study was to identify the variation in the ways environmental health professionals experienced the practice of environmental health rather than the similarities. This different study focus has resulted in several significant differences between current descriptions of this area of practice and the findings of this study. I discuss these differences further to establish how the findings of this study have extended our understanding of the professional practice of environmental health. This discussion includes how the new HEDP provides a more useful way to conceptualise this area of practice than current descriptions allow. Following this section, I explore the implications of these findings for improving the professional practice of environmental health.

9.4 Differences between current descriptions of practice with the new HEDP developed in this study- extending our understanding of practice

The key difference between current descriptions of practice and the HEDP generated in this study is a new description of practice has been formed based on the five characteristics I contended were necessary to help improve the professional practice of environmental health. Namely, a description of practice:

- based on the lived experiences of environmental health professionals
- constituted from varying backgrounds, experiences and contexts of practice
- constituted from the critical variation in the ways of experiencing practice
- involving a detailed, holistic description of the different ways of experiencing practice

- which has high communicative validity.

By generating a description of the practice based on these five characteristics, this study has extended existing understanding of the professional practice of environmental health through empirically establishing a description that has focused on what doing and knowing within practice looks like, in the form of detailed, rich, contextualised descriptions of practice. This description has been generated from practitioners' own lived experiences of practice. This approach is a departure from current descriptions of practice, which are often fragmented and decontextualized, such as those involving a focus on describing the types of knowledge and skills required to practise as the basis for professional development. Furthermore, although there may be similarities between the findings of this study and those discussed in Section 9.4, these descriptions do not describe how these various experiences, theories and approaches relate to form the practice itself. This includes recognising that the same practice may be understood and enacted by practitioners in qualitatively different ways, thus resulting in different outcomes (Marton & Booth 1997).

In this study, the four categories of description have provided detailed qualitatively and distinctly different insights into 'how' practitioners enact their practice and 'what' practice was about for each respective category of description. This has linked how practitioners 'practice' with what they understand their practice is. The categories of description (both individually and collectively) have also provided insight into practice as a form of doing, knowing, being and becoming. Specified within each category are details of professional doing and knowing, and each category represents a different way of being an environmental health professional. The categories also provide insight into the risks, challenges and ambiguities associated with environmental health practice and being an environmental health professional. The changes in awareness between the categories are also a form of professional becoming.

To illustrate the above points further, using the 'protecting' category of description as an example, practice was experienced as protecting people to prevent harm and the fundamental purpose of practice. The critical aspects or features focused upon by practitioners when experiencing practice in this way included an awareness of the boundaries that practice operates within and the need to maintain currency with these operational boundaries (knowing and doing). These operational boundaries were influenced by the legislative framework and

organisational policies underpinned by a practitioner's professional training (knowing). Key elements of this category also included a practitioner focusing on following processes, assessing risk, documenting and collecting evidence and giving expert advice in the form of education (knowing and doing). The enforcement role was also experienced as a fundamental aspect of a practitioner's role when protecting the community from harm. In this category, there was also an awareness of the challenges posed by the poor visibility and lack of understanding of this area of practice and the implications this may have for the ability of the practitioner to protect the community from harm (challenges and risks to practice). The category also illustrates practitioners' experiences of threats to their own personal safety whilst also experiencing the importance practice has in protecting the community from harm. Collectively, these aspects represent a practitioner's professional way of being when experiencing practice as protecting the community from harm.

In addition, by revealing the variation in the different ways practitioners experience their practice and the critical variations *between t*hese different ways of experiencing practice, the findings have also extended our understanding of practice by describing how these different experiences are logically and structurally related to form an HEDP. In this study, this relationship was hierarchical, with 'protecting' the least comprehensive category and 'leading' the most comprehensive way of experiencing practice. Comprehensive, refers to an expansion and deeper level of awareness of the elements or aspects of practice than previous categories, rather than a better way of experiencing practice. This relationship provides a map of professional becoming, thus extending our understanding of practice by providing insight into how to develop more professional ways of being. This has been achieved through the combination of identifying the critical variation between the categories and the themes of expanding awareness across the categories. The critical variations provide insight into how the focus of awareness shifts across the categories of description, namely Category 1 to 2 (*protecting to helping),* Category 2 to 3*, (helping to collaborating)* and Category 3 to 4 (*collaborating* to *leading and innovating),* whereas the themes of expanding awareness illustrate critical features or aspects within practice that evolve through the process of becoming., namely, the 'outcome', 'impact', the 'approach', 'agency' and 'role'.

For example, to illustrate the above further, a key variation between Category 1 (protecting) and Category 2 (helping) is a shift in focus from only experiencing practice as fundamentally

protecting from harm to practice creating a sustainable healthy community. This shift in focus is still inclusive of practitioner's awareness of the fundamental outcome of practice to protect from harm but varies as practitioners experience the positive outcomes practice can have to the economic, social and environmental sustainability of the community. Within this example, there is also a shift in the theme of expanding awareness of agency. Practitioners experience a shift in the ability to act beyond the protection from harm to promoting positive outcomes for the community whilst not compromising their core boundaries practice. The critical variation between Category 1 (protecting) and Category 2 (helping) I also described by the term 'sustainable community outcomes', where the outcomes of practice are experienced as having positive impacts on the community's sustainability rather than only meeting the required processes to prevent harm.

Thus, the HEDP generated from this study provides a more useful way to conceptualise this area of practice than current descriptions. It is more useful because the findings provide insight into how the professional practice of environmental health can be experienced in more comprehensive ways, by changing the focus of awareness from one category (a way of being) to the next category (way of being) – hence describing the process of professional becoming. In so doing, as described in Chapter 2, this provides the basis for an alternate model of professional development which recognises both the epistemological and ontological dimensions of practice to support the development of professional ways of being that can deal with the complexities, ambiguities, and dynamic change inherent in professional practice (Dall'Alba 2009b). A description of practice from this perspective is currently absent from the literature.

In summary, the findings of this study have extended our understanding of practice and contributed to the literature in several ways. The findings have provided new insights into what doing and knowing within practice looks like, in the form of detailed, rich, contextualised descriptions of practice, based on practitioners own lived experiences of practice. These findings have also generated an HEDP, involving a hierarchical set of categories of description from 'protecting' being the least comprehensive category to 'leading' the most comprehensive way of experiencing practice. This relationship provides a map of professional becoming, thus extending our understanding of practice by providing insight into how to develop more professional ways of being. Additionally, the themes of expanding awareness, which help to

describe the critical features or elements of practice that evolve through the process of becoming, also provide a new and nuanced way to describe the professional practice of environmental health.

Collectively, the findings of this study have resulted in a new and novel way to conceptualise the professional practice of environmental health in the form of an HEDP. This new way also has the potential to act as a framework to assist in improving the professional practice of environmental health and education for professional practice, whilst helping to address the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education. This is the main contribution of this thesis. In the next section, I support this claim further by discussing the key implications of these findings, for improving the professional practice of environmental health at the societal, professional and education levels. This discussion makes a practical contribution to the literature.

9.5. Societal

A key aspect of the HEDP, which has implications for improving the professional practice of environmental health, relates to the presentation of the findings as a diagrammatic representation and short description of the qualitatively different ways the professional practice of environmental health is experienced (referred to as an outcome space in phenomenography) in Chapter 7, Figure 1. The presentation of the findings in this form provides a practical tool that could be disseminated amongst the broad community by the profession or other relevant stakeholders to improve societal awareness and understanding of what the practice of environmental health is. This includes the societal benefits of this area of practice. Raising this awareness is required to assist in addressing the problems associated with poor visibility, lack of societal understanding and valuing of this area of practice (Blake, 2007; Dhesi & Lynch, 2016; Environmental Health Committee (enHealth), 2009, 2010; Fabian, 1996; Knechtges, 2018; Morton Consulting Services, 2004; Treser, 2018; Whiley, Willis, Smith, & Ross, 2019; Windsor &Associates, 2005). Addressing these problems is important to help gain sufficient societal support and resources to assist in achieving improvements to this area of practice. Lack of this support, as the findings have indicated, not only poses implications for the ongoing

viability of this area of practice but also for the societal trust placed in the environmental health profession to address societal needs in altruistic, competent and moralistic ways.

For example, lack of societal understanding and valuing of the professional practice of environmental health formed a critical feature or aspect of a practitioner's awareness in the 'protecting' category. These aspects were associated with difficulties in gaining an evidence base to demonstrate the societal benefits of this area of practice, posing challenges for attracting organisational resources and support, particularly for the regulatory aspects of practice. Practitioners experienced these difficulties as having implications for the ability of the professional practice of environmental health to effectively protect the community from harm, or as one practitioner described having to wait until something "blows up" before sufficient measures were put in place to assist in dealing with environmental health problems. These challenges are not only reflective of the broader literature in this area (Blake, 2007; Burke, 2002; Knechtges, 2018; Treser, 2018; Whiley et al., 2019) but arguably pose a challenge to the societal trust placed in the competence of the environmental health profession, particularly if sufficient support and resources are not available to help facilitate the ability of the environmental health profession to protect the community from harm. This aspect is also problematic in a societal context where many media reports associated with this area of practice often focus on failings in the system rather than the positive benefits of practice, posing a challenge to the acceptance of environmental health professional advice (Briley et al., 2000).

Ensuring the ongoing viability of the environmental health profession, I argue, is also important in a societal context where responding to the complexities and uncertainties associated with the evolving range of environmental health problems require multidisciplinary, coordinated, consistent and collaborative responses (Commonwealth Department of Health and Aged Care, 1999; Environmental Health Committee (enHealth), 2009). The findings of this study have also indicated environmental health professionals are well placed to assist in achieving these outcomes. For example, the findings associated with the 'helping' category suggest environmental health professionals have an important role in assisting the community to address issues of social disadvantage by acting as a key point of contact for referral to social support agencies. This aspect was particularly reflected by practitioners' descriptions of the need to involve other health professionals, departments of council or agencies to help resolve problems due to the evolving complexity of environmental health problems.

The detailed descriptions of the four categories of description presented in Chapter 8 also provide the opportunity for stakeholders, including individuals, organisational management, policymakers and other communities of practice, to gain a more complete or comprehensive understanding of what the professional practice of environmental health is and how it is enacted. This includes how this area of practice contributes to or supports government and organisational policies, such as those associated with Australia's NEHS or local municipal strategic plans, together with the complexities associated with gaining the outcomes related to these different ways of experiencing practice.

As an example of the above, the complexities experienced by practitioners in helping the community to self-manage risks, as a critical aspect of the 'helping' category of description, particularly amongst communities that may have a high incidence of social disadvantage. Gaining this insight amongst various stakeholders could assist in generating greater societal resources and support to help achieve improvements to the professional practice of environmental health. This includes the ability for this area of practice to adopt more proactive or 'upstream' approaches to dealing with environmental health problems and become 'unstuck' from the delivery of a narrow environmental health agenda, posed as a key problem for this area of practice (Burke, 2002; Dhesi & Lynch, 2016; Dhesi & Stewart, 2015; Environmental Health Committee (enHealth), 2009).

Additionally, the detailed categories of description allow the opportunity to identify the range of stakeholders or communities of practice that engage with this practice area. Whilst identifying such groups associated with each category of description would be the subject of further research, gaining this knowledge could be applied to identify which stakeholders or communities of practice could be more effectively engaged or joined with the professional practice of environmental health. This could improve this area of practice by assisting in achieving better management, collaboration, coordination, and more effective use of resources amongst the multiple stakeholders now involved in addressing environmental health problems. Gaining these outcomes is a key strategic objective of the Australian Government and accords with contemporary approaches to dealing with environmental health problems (Commonwealth Department of Health and Aged Care, 1999; Battersby, 2016; Environmental Health Committee (enHealth), 2009).

9.6 Professional

The key implication of the HEDP at the professional level for improving the professional practice of environmental health relates to the potential of this new conceptualisation of practice to address issues such as inconsistency in approaches to regulatory enforcement, workforce retention (Environmental Health Committee (enHealth), 2009, 2010; Morton Consulting Services, 2004; Windsor & Associates 2005) whilst also support the professional development of the environmental health workforce. In addition, the HEDP provides a description of practice which could serve as a useful tool for the practitioner community to critically reflect on the practice itself, including the moralistic and altruistic aspects of practice to support practitioners become a deliberate professional (Trede & McEwen, 2016). Critical reflection is a key element required for practitioners to effectively perform, improve and develop their respective areas of occupational practice, including helping practitioners deal with the complexities of practice (Cherry, 2005; Higgs 2019), as I discussed in Chapter 2. I explore how the HEPD can further address these problems at the individual, team/team management/organisational level.

9.6.1 Individual practitioner level

At the individual practice level, the HEDP can be used to assist in raising a practitioner's awareness about how they are currently experiencing the professional practice of environmental health and then to compare this to where they could be (Mann, 2007). For example, if a practitioner identified as only experiencing practice at the level one category of 'protecting', becoming aware of the other ways of experiencing practice in the higher-level categories enables a practitioner to reflect on where he or she could aspire to be (Mann, 2007). This can help improve practice by providing a pathway for professional development to assist in developing expert performance, as how a practitioner experiences their practice is central to how a practitioner performs and develops their practice (Dall'Alba & Sandberg 2006).

Additionally, by a practitioner becoming aware of other ways of experiencing practice may also assist in addressing issues such as workforce retention, particularly if a practitioner had only experienced practice in less comprehensive ways, providing them with only a partial or limited view of practice. Gaining insight into other ways of experiencing practice may assist in workforce retention by shifting negative perceptions held by some practitioners concerning the

narrow focus of this area of practice (Environmental Health Committee (enHealth), 2009) and how this area of practice could achieve more satisfying outcomes for practitioners.

In addition, the HEPD can assist to improve practice by providing the practitioner with the knowledge to help select or articulate the practice approach relevant to the context, given all situations take place within a wider context (Mann, 2007; Dall'Alba, 2009b). To explore this further, as the findings of this study have indicated, the context a practitioner operates within may be influenced by factors such as the nature of the risk, geographical location of practice, organisational policies and resources and the stakeholders involved. For example, when dealing with an environmental health problem, the nature of the risk (e.g., the contamination of a food or water supply) may pose an immediate threat to a person or the community, requiring the practitioner to operate in a less comprehensive way, such as from a Category 1 perspective of 'protecting'. As the findings have indicated, this requires the practitioner to adopt the role of enforcer and operate within the boundaries of practice where the *agency* associated with the way practice is enacted is limited. However, the practitioner may be adopting this approach from their more comprehensive ways of experiencing practice, for example, at a Category 4 level of 'leading and innovating'.

Furthermore, if the broader context changed or became unpredictable, for example, the threat had the potential to be ongoing and impact multiple stakeholders, requiring multiple expertise to address the problem, the practitioner may select to operate at a Category 3 level of 'collaborating' to deal with the problem, or alternatively at Category 4 level of 'leading and innovating' if the context demanded. Developing more comprehensive ways of experiencing practice improves practice by enabling the practitioner to select the approach relevant to the context, with effective practice the ability to create and apply the right knowledge to a range of varying situations and unfamiliar conditions (Cherry, 2005; Marton & Booth, 1997). Being able to articulate why an approach was right for the context can also help improve practice by assisting in gaining resources and support to enact practice in the way that is appropriate for the context.

9.6.2 Team practice level

At the team practice level, the HEDP can assist in improving practice by providing a basis to help identify the different ways practitioners may experience practice when dealing with the

same situation, particularly to support gaining more consistent approaches to regulatory enforcement. For example, suppose a practitioner in a team only experienced practice as 'protecting', as in Category 1. In that case, this may result in different approaches to enforcement than those of a team member who was operating within Category 2 'helping' when dealing with this same situation. Identifying the different team members' ways of experiencing practice opens up opportunities to improve consistency by reflecting on these different ways of experiencing practice to help identify and resolve such differences. Improving consistency, particularly in approaches to enforcement, is not only a challenge for this area of practice but an important aspect of ensuring societal trust in the environmental health profession (Meyer et al., 2017; Windsor, 2005; Morton Consulting Services, 2004; Couch et al.,2016).

9.6.3 Team management/organisational level

At a team management level, the HEDP can help to improve practice by providing a basis for relevant members of the organisation to compare the categories of description with current job positions. For example, they can compare how current positions reflect opportunities to provide environmental health services which 'help create a sustainable community', the focus of Category 2, or 'lead and innovate practice' to create our future, the focus of Category 4. In so doing, opening up opportunities for practitioners to enact practice in more comprehensive ways to assist in job attraction and retention. From an organisational perspective, the HEDP could also help improve the capacity to effectively deal with environmental health problems to 'create our future', the highest category of description. Achieving these outcomes may also require extending the awareness of current organisational views of this area of practice or even calling into question the nature of the organisation and its services (Dall'Alba & Sandberg, 2006). An example would be, calling into question environmental health services that only focus on meeting specified performative measures associated with the technical aspects of practice, rather than opting for services that adopt more holistic approaches to dealing with environmental health problems.

Additionally, at a team management level, the HEDP has implications for improving practice by assisting to determine a practitioner's suitability for a position within an organisation, by identifying how practitioners experience or understand their practice. As Sandberg (2001) contends, "being good at your job, means having the right understanding of your job" (p.24).

This assessment could also be used to assist in planning for the professional development of a practitioner. I explore this aspect further in the following section.

9.7 Educational

The key implication of the HEDP at the educational level, for gaining improvements to the professional practice of environmental health, relates to improving education for professional practice for both students and currently practising professionals. The HEDP can assist in improving education for professional practice by:

- Assisting to address the theory-practice divide
- Addressing problems associated with the provision of authentic learning experiences
- Promoting a pedagogy of deliberateness

The HEDP also presents a range of implications for the provision of formal and informal professional development opportunities for students and practitioners. I explore these aspects further.

9.7.1 Addressing the theory-practice divide

The HEDP has assisted in addressing the theory-practice divide by giving insight into the more tacit and less articulate aspects of practice. This insight contrasts with generating a description of practice that has separated conceptual knowledge from procedural knowledge or aimed to provide insight into ideal standards and performance. These later aspects are key critiques of the outcome of traditional research underpinning investigation into human practices, particularly as a basis for professional development (Freidson, 2001; Dall' Alba, 2009; Scanlon, 2011). Therefore the HEDP has provided a deeper understanding of a professional's experience of the practice of environmental health rather than distancing our understanding of it (Dall' Alba, 2009). This understanding has been achieved by providing a description of practice that has incorporated the ontological and epistemological aspects of practice. These perspectives enable practitioners and students to develop "an understanding of, and in," (Dall'Alba & Sandberg 2006, p.401) the professional practice of environmental health. Specifically, the HEDP provides the basis for an alternate model of professional development that shifts the focus from conceptualising, developing, and maintaining expertise based on acquiring knowledge skills to one that develops professional ways of being (Dall'Alba, 2004,

2005). This includes developing the ontological dimensions of practice to support the process of who students and practitioners are becoming (Dall'Alba 2009b), as I described earlier in Section 9.5.

As I have argued in this thesis, a focus on the acquisition of knowledge and skills promotes decontextualized, fragmented, individualistic and stepwise approaches to professional development. This approach not only has implications for the ability of practitioners to deal with the "messy problems in the swampy low land" (Schön, 1983, p3) but overlooks the variation in the ways practitioners experience or understand their practice. The findings of this study have also reflected that environmental health professionals deal with messy problems and there is variation in the ways the practice of environmental health is experienced, as described in Chapters 7 & 8. As previously discussed, overlooking the ways practice is experienced has implications for developing expert performance. It places students and practising practitioners at risk of becoming trapped in refining existing skills and developing knowledge within their existing understanding of practice rather than achieving more complex comprehensive or expert levels of performance (Dall'Alba & Sandberg, 2006).

To explore the above further in relation to the findings of this study, for example, in Category 1 'protecting' the outcome of practice, which I also identified as a theme of expanding awareness in Chapter 8, was experienced by practitioners as protecting people or collectively the community from harm. Suppose a student or a practitioner only experiences practice as 'protecting from harm'. In that case, this presents a risk of the person not being able to achieve more expert performance or levels of skilful practice, as this can result in a focus on continually improving and refining the knowledge and skills required to enact practice in this way. For instance, a focus on the continued refining of knowledge and skills regarding identifying hazards and control of risk in order to protect the community from harm.

Therefore, by developing students and practitioners embodied ways of experiencing the professional practice of environmental health, along with their skills and knowledge, to enact practice in the qualitatively different ways, "professionals not only learn knowledge and skills, but these are renewed over time whilst becoming integrated into ways-of-being the professional in question" (Dall'Alba & Sandberg 2006, p.401). This approach to professional development, I argue, also provides a basis to more effectively support the process of professional

socialisation (Higgs, 2013), including helping to address problems associated with graduate work-readiness described in Section 4.4.3. by assisting students to develop more professional ways of being. In so doing, this approach helps to address the theory-practice divide, a key critique of current approaches to professional development, which focus on separating the ontological and epistemological aspects of practice as the basis for professional development.

9.7.2 Addressing problems associated with the provision of authentic learning experiences

With respect to addressing the challenges associated with the provision of authentic learning experiences, including those associated with the resource-intensive nature of work-integrated learning (WIL) described in Section 4.4.3, the key implication of the HEDP is this framework provides a "detailed analysis of the forms of practice used within the domain of the program and how they can be conceptualised and enacted" (Boud, 2012, p.64). As such, the HEDP can assist in the design of authentic learning experiences that are more closely aligned with the typical challenges experienced in the practice settings within which students are likely to operate to help students deal with more complex and challenging situations (Boud, 2012).

To explore the above further, practitioners in this study described a wide variety of experiences they identified as relevant to environmental health practice. For example, Maxwell described an experience where he was required to resolve an issue involving a leaking septic tank on private property, posing serious hazards to a young family from a socially disadvantaged background. Resolving this issue posed several complexities, including a reluctance of the property owner to rectify the problem. Experiences such as these could be used as case studies to enable students to critically reflect on the challenges they would likely to encounter and how to overcome these challenges when experiencing practice as 'protecting' as described in Category 1 or 'helping' as described in Category 2. This case study could also explore the implications of these challenges for environmental health professional practice, including those relating to a practitioner's professional identity.

Designing learning experiences underpinned by the HEDP poses several advantages. In the first instance, using this approach offers an alternate and less resource-intensive authentic learning experience than that involving the provision of a work-placement experience for students. The ability to provide a work placement for all students, due to a range of issues such

as the resource-intensive nature of such experiences for universities, has been identified as problematic for this area of practice (Dunn et al., 2018). Secondly, where there are opportunities for students to engage with practitioners, either through the provision of a work placement or through the design of a learning task (e.g., through students interviewing a practitioner), the HEDP could be used to help students identify and critically reflect on the similarities and differences in the ways practice is understood by practitioners. These types of activities can assist students in developing more comprehensive ways of experiencing practice, thus, supporting the development of a student's professional ways of being and enhancing a student's ability to effectively deal with increasingly complex, varying and uncertain situations (Dall'Alba & Sandberg 2006; Dall'Alba 2009b).

9.7.3 Promoting a pedagogy of deliberateness

The HEDP promotes a pedagogy of deliberateness by providing pedagogical space to support the development of the deliberate professional (Trede & McEwen, 2016). As discussed in Chapter 3, Trede and McEwen (2016) refer to a deliberate professional as incorporating a range of characteristics. This includes the ability to be collaborative, thoughtful, assertive and decisive, whilst considering the social responsibilities of practice, moral commitment to democratic values and maintaining a duty of care. These characteristics are the alternatives to the narrowly defined role of the professional as an "expert objective, all-knowing, and superior" Trede and McEwen (2016, p. 6). They also propose a range of ideals underpinning a deliberate professional, in which the HEDP provides the ability to assist in the development of these ideals.

For example, one ideal underpinning a deliberate professional involves "deliberating on the complexity of practice and workplace cultures and environments" Trede and McEwen (2016, p. 6). The categories of description provide various insights into these aspects of practice. For instance, the 'helping' category offers insights into the complexities of managing organisational and community expectations associated with dealing with environmental health problems. It also provides insights into the challenges and strategies adopted by practitioners in dealing with these complexities. Therefore, the categories of description offer the pedagogical space for students to critically reflect on these aspects of practice to support becoming a deliberate professional.

Becoming a deliberate professional, I argue, is important to help restore societal trust in the environmental health profession as a group of professionals who address societal needs in moralistic, competent, and altruistic ways. Although the findings of this study have indicated addressing societal needs formed a core element of a practitioner's awareness, the results also indicated challenges to this aspect of practice. For example, challenges to the ability to gain consistency in approaches to regulatory enforcement as an aspect of environmental health practice, potentially posing implications for the societal trust in the environmental health profession.

9.7.4 Implications for the provision of formal and informal professional development opportunities for students and practitioners

I have argued that adopting a professional development model that develops the differing ways of experiencing practice, along with skill progression, has implications for improving education for professional practice. However, adopting this approach also presents a range of implications for the provision of formal and informal professional development opportunities for students and practitioners. From a formal professional development perspective, such as programs aimed at qualifying practitioners to gain professional recognition to practise in a university setting, there are several implications. These relate to ensuring a focus in curriculum design, the design of learning environments, learning and assessment activities and pedagogical approaches, which support the development of participants understanding of, and in, practice, to develop more professional ways of being (Dall'Alba & Sandberg 2006; Mann 2007; Dall'Alba 2009b).

For example, the above would involve creating learning opportunities that constantly monitor how students understand the professional practice of environmental health. These opportunities could include formal and informal mechanisms and supportive environments that allow students to challenge each other's understanding and reflect on their own understanding of practice (Dall'Alba & Sandberg 2006; Mann 2007; Dall'Alba, 2009b). It would involve allowing students to make an informed stance on who they are becoming and what they aspire to be as an environmental health professional. It would also include developing self-awareness to develop and improve their own practice (Dall'Alba, 2009b). Academics involved in the delivery of education in this area, including others who may have a role in education for professional practice, such as through the external professional accreditation of university

programs, should also reflect on their own embodied understanding of environmental health practice. In particular, how this understanding may influence the design and delivery of educational curricula.

In addition, supporting the adoption of a professional development model, which develops the differing ways of experiencing practice, along with skill progression, would also require a shift in focus of professional accreditation policies designed to support the professional accreditation of environmental health programs in universities. This shift would entail moving from granting external professional accreditation to universities, based on them demonstrating how the underpinning knowledge and skills are developed in students to universities demonstrating how students' different ways of experiencing practice are developed, along with the knowledge and skills to practise in these different ways. This may also require policies to re-examine the underpinning knowledge and skills currently outlined in accreditation policies to determine how they align with the different ways of experiencing professional practice, as found in this study, to support this alternate approach to professional development.

From an informal professional development perspective, such as in a working environment, implications relate to creating supportive settings that allow practitioners to challenge each other's understanding and reflect on their own embodied understanding of practice (Dall'Alba & Sandberg 2006; Mann 2007; Dall'Alba, 2009b). This may require the professional development of the environmental health practice community to facilitate this approach. An example would be assisting practitioners to identify their own ways of experiencing practice and the types of knowledge and skills needed to help support practitioners operate in more comprehensive ways to support ongoing professional development.

Furthermore, another key implication of adopting a professional development model based on developing professional ways of being, for improving education, relates to the need to continually monitor any changes in the ways practice is experienced amongst the professional community through ongoing research (Dall'Alba & Sandberg 2006; Mann 2007; Dall'Alba, 2009b). This monitoring is important to ensure such changes can be reflected in the provision of professional development activities to ensure ongoing improvements to education for professional practice.

In summary, HEDP has several implications for improving the professional practice of environmental health. At the societal level, this includes the potential to provide greater societal insight into this area of practice, to assist in gaining support and resources to help improve practice. At the professional level, it includes the ability to assist practitioners to critically reflect on how they currently experience practice and where they would like to be, to support the development of expert performance. At the educational level, it includes the ability to adopt educational approaches for both students and currently practising professionals, which develops professional ways of being. Such an approach can assist in the process of professional socialisation and the ability of practitioners to deal with the complexities and uncertainties associated with current and future practice, including the messy realities of the street. Collectively, the HEDP provides the opportunity to reinvigorate and contemporise the professional practice of environmental health for the 21st century. In the following section, I finish this chapter by briefly discussing how this study has extended the phenomenographic research literature.

9.8 Phenomenography for investigating practice – extending the research literature

Phenomenography was the research approach used in this study for investigating the variation in the ways practitioners experienced their practice. The findings of this study have extended the phenomenographic research literature by identifying and describing four qualitatively different ways of experiencing the professional practice of environmental health and the internal relationships between these different ways of experiencing, in accordance with the key aims of this research approach (Marton & Booth 1997; Åkerlind, 2015). The outcomes of the study have indicated that this methodology has been successful in uncovering variation in practitioners' experiences of the complex phenomenon of the professional practice of environmental health. This approach has yet to be used for investigating this phenomenon and so adds to the phenomenographic literature in this area.

This study has also provided a practical contribution to the application of phenomenography for investigating practice. This practical contribution relates to the development of an electronic online survey instrument. As described in Chapter 6, I developed this instrument as a tool to

gain maximum variation in experiences amongst an estimated 350 professionals currently employed in practice positions in Victoria and to address issues associated with:

- communicative validity and interpretative awareness (Åkerlind, 2002; Sin 2010), due to my background and experience, presenting potential problems such as the formulation of pre-conceived ideas about the nature of participant's experiences
- assist in pragmatic validity (Åkerlind, 2002) through the development of diversity criteria to assist in the usefulness and transferability of the findings to other contexts
- practicalities and efficiencies regarding how to recruit participants who worked in diverse locations.

The implementation of the online electronic survey resulted in the ability to select from a pool of 77 practitioners, of which 19 were selected for an interview. The survey provided a useful and practical way to recruit practitioners to support gaining maximum variation in experiences. For example, the use of the survey resulted in a reasonably immediate response and provided an efficient way for me to determine the eligibility of the respondents for the study. The survey also enabled me to keep the names of the respondents separate from the survey data during selection and capture demographic information from participants prior to the interview. These aspects meant I avoided having to spend time gaining this information at the time of the interview, lessening the imposition on practitioners' time, and assisted in addressing issues associated with my interpretative awareness. However, the limitation of this approach is that it may not have captured the maximum extent of variation, as not all practitioners whom I estimated were eligible to participate responded to the online survey or agreed to participate in an interview. Those who did not respond to the study may have presented different practice experiences than those who responded.

For example, those who did not respond to the online survey may have had a less experienced view of practice and considered that their contribution was not applicable or had a lesser interest in this area of practice than those who did respond. These experiences would still have been valid. If included in this study, it may have resulted in the formation of an additional category, such as a less comprehensive category of description than 'protecting'. Despite this limitation, the study's findings identified variation in the ways practitioners experienced the practice of environmental health. As discussed in Chapter 6, whilst a further investigation is

required regarding the communicative and pragmatic validity of the findings, informal presentation of the findings amongst the practitioner community has indicated that the findings of the study have resonated with the practitioner community. To my knowledge, this practical approach to recruiting participants has not been reported in the phenomenographic research literature, thus adding a practical contribution to this area of research.

9.9 Conclusion

In this chapter, I have discussed the findings from this study in relation to the research questions posed to address the key problem underpinning this thesis, which is the need to improve the professional practice of environmental health. I have also proposed that the HEDP generated from this study provides a more useful way to conceptualise this area of practice than current descriptions by describing the process of professional becoming. I have also aimed to establish that this new and novel conceptualisation of practice has the potential to act as a framework for improving the professional practice of environmental health and education for professional practice. In so doing, also help to address the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education. This new conceptualisation and framework is the main contribution of this thesis. In the following chapter, I conclude this thesis by summarising the findings, providing an overview of the implications of this research and outlining future research opportunities.

Chapter 10: Conclusion

10.1 Introduction

This thesis has made an original and substantial contribution to the literature by identifying the variation in the ways environmental health professionals have experienced the practice of environmental health. The study addresses a lack of empirical qualitative research into environmental health professionals experience of practice. The study contributes a new and improved understanding of the professional practice of environmental health by establishing a holistic experiential description of practice (HEDP). This description has formed a new and novel conceptualisation of the professional practice of environmental health. This thesis has argued that this new conceptualisation is required for environmental health professionals to effectively deal with the complexities and uncertainties associated with human interaction with the environment, both now and in the future. This new conceptualisation provides a new way forward for the environmental health profession.

The two research questions posed for this thesis were:

1. What are the variations in the ways environmental health professionals experience the practice of environmental health?
2. What are the critical variations between the ways environmental health professionals experience the practice of environmental health?

In the following sections, I summarise the findings, the contribution of this thesis to the literature and provide an overview of the implications of this research for improving the professional practice of environmental health. I also identify several avenues for future research.

10.2 Summary of findings

This thesis was guided by the practice theory (Reckwitz, 2002; Schatzki, 2012; Shove et al., 2012) and variation theory (Bussey et al., 2013; Åkerlind, 2018) and used the research approach of phenomenography (Marton & Booth 1997) to identify four qualitatively different ways of

experiencing the practice of environmental health: 'protecting'; 'helping'; 'collaborating'; and 'leading and innovating'. These different ways of experiencing practice were described in categories of description which were empirically and logically linked to form an outcome space. Five themes of expanding awareness were identified, which helped to support and describe the hierarchical relationship of the outcome space, from less comprehensive ways of experiencing practice ('protecting') to more comprehensive ways, ('leading and innovating'). These findings combined represent the answers to the two research questions. The categories of description and outcome space represent a holistic experiential description of practice (HEDP) and a new conceptualisation of the professional practice of environmental health.

10.3 Overview of implications

In this thesis, I have identified and discussed several implications of this research for improving the professional practice of environmental health. The key implication relates to the potential of the HEDP to act as a framework for improving practice and education for professional practice and assist in addressing the challenges associated with the complex and interrelated relationship between society, the environmental health profession and education. At the societal level, this includes the potential to provide greater societal insight into this area of practice to assist in gaining support and resources to help improve practice and ensure the ongoing viability of this area of practice. At the professional level, it includes the potential to provide a pathway for professional development to assist in developing expert performance (Dall'Alba & Sandberg, 2006; Dall'Alba, 2009b). The framework also provides the basis to help identify the different ways practitioners may experience practice when dealing with the same situation, to support gaining more consistent approaches to regulatory enforcement. At the educational level, it includes the ability to adopt educational approaches for both students and currently practising professionals, which develops professional ways of being (Dall'Alba & Sandberg, 2006; Dall'Alba, 2009b). Such an approach can assist in the process of professional socialisation (Higgs,2013) and the ability of practitioners to deal with the complexities and uncertainties associated with current and future practice, including the messy realities of the street. Collectively, gaining these improvements has implications for restoring the societal confidence in the environmental health profession to address societal needs in altruistic, competent and moralistic ways as a key defining characteristic of a profession.

10.4 Summary of contribution

This thesis makes several contributions to knowledge. It has contributed to the phenomenographic research literature by identifying and describing four qualitatively different ways of experiencing the professional practice of environmental health and the logical relationship between these different ways of experiencing. It has also provided a practical contribution to the application of phenomenography for investigating practice by developing an electronic online survey instrument to assist in participant recruitment and selection. This thesis has also contributed to the environmental health literature by providing new insights into what doing and knowing within practice looks like, in the form of detailed, rich, contextualised descriptions of practice, based on practitioners' own lived experiences of practice. These findings have also generated an HEDP that provides a framework that can help improve practice, education for professional practice and address the challenges associated with the complex and interrelated relationship between society, the environmental health profession, and education. In so doing, providing the basis to contemporise and re-energise the professional practice of environmental health for the 21st century. This is the main contribution of this thesis. In the following section, I explore the opportunities for future research arising from this thesis.

10.5 Future research

This study was an exploratory, descriptive study, positioned in an interpretative paradigm. For the research design, I used phenomenographic methods to investigate nineteen environmental health professionals' experiences of their practice in an Australian context. A critique also informed the study of the characteristics associated with the traditional conceptualisation of a profession to support the theoretical framework adopted in this thesis. This range of parameters provides several opportunities for future research into the professional practice of environmental health and professional practice more broadly. I explore these opportunities further.

10.5.1 Professional practice of environmental health

There are several opportunities for future research applicable to the professional practice of environmental health which should be undertaken to advance further the findings arising from this research. In the first instance, further research should be undertaken in relation to the

266

findings associated with the four categories of description identified in this study. For example, an investigation should be undertaken into the range of stakeholders which interact with this area of practice to support the joining of communities and landscapes of practice, as I proposed in Chapter 9. This could be achieved through further analysis of the data collected in this study.

Additionally, each of the categories of description in this study has provided a range of insights into the professional practice of environmental health. These insights would benefit from further research to support gaining improvements to this area of practice. For example, further investigation of the experiences of practitioners as front-line workers in dealing with hostile situations is an area of practice under-researched. Insight into these experiences could be achieved through further analysis of the data collected in this study. Future research should also involve identifying the underpinning knowledge and skills required to support the ability of environmental health professionals to operate in the different ways of experiencing practice as identified in this study. This would assist in developing and designing a curriculum to support the alternate approach to professional development based on developing professional ways of being (Dall'Alba & Sandberg 2006; Dall' Alba, 2009b). Insight into this aspect could also be initially achieved through further analysis of the data collected in this study.

Given the exploratory nature of this investigation, further research should be undertaken to support the communicative validity of the findings. This research could involve a focus group with representatives from academia, professional bodies and practitioners representing various industry sectors, including local, state government and private consultancies. The aim would be to gain their insight into how the HEDP could be practically and effectively communicated amongst the practice community to assist in gaining improvements to the professional practice of environmental health. Additionally, research should be undertaken to examine the pragmatic validity of the findings to effect change at the societal, professional and education levels. For example, at the societal level, future research should focus on whether the HEDP has changed perceptions of the professional practice of environmental health and what the implications of this change are for improving practice. This could involve designing an intervention, such as a workshop amongst elected officials, senior organisational management or policymakers or broader members of the community based on the findings from this study, supported by an appropriate evaluation framework to assess any changes.

Given this investigation was based in an Australian setting, future research should also be undertaken amongst environmental health professionals in other settings. For example, a similar study based on the research approach adopted in this thesis should be undertaken amongst a group of environmental health professionals from other countries or specific regions within countries who also hold a professional qualification to practice environmental health. This investigation may capture greater variation in the ways the professional practice of environmental health is experienced, which can further inform how to gain improvements into this area of practice. Such an investigation could also provide opportunities to reflect on similarities and differences between the different ways of experiencing practice amongst the different settings and the implications of these different ways of experiencing for improving practice. It could also provide the opportunity to create a strong, unified identity among the environmental health profession.

Given the widening of the environmental health workforce, as described in Chapters 1 & 4, an investigation using the research approach adopted in this thesis should also extend to those who may not necessarily hold a professional qualification to practice but identify as environmental health practitioners. This research could also provide opportunities to reflect on the similarities and differences between the different ways practice may be experienced between these groups and the implications of these different ways of experiencing practice for improving practice. In so doing, it also provides the opportunity to explore how to more effectively join these communities of practice to help deal with the complexities and uncertainties associated with human interaction with the environment.

10.5.2 Professional practice more broadly

In Chapter 3, I critiqued the traditional characteristics underpinning the professions as a basis to inform the theoretical framework underpinning this study and to argue for a new conceptualisation of the professional practice of environmental health. Given these critiques, future investigations of similar nature to the study I have undertaken should also be undertaken among other professions. This would provide the opportunity to reconceptualise professional practice more broadly, helping to contemporise professional practice for the 21st century and restore the societal trust in the professions to address societal needs in altruistic, competent and moralistic ways as key defining characteristics of a profession. To date, whilst several studies have investigated various aspects of practice from the phenomenographic perspective adopted

in this thesis, as outlined in Chapter 4, to my knowledge exploring professional practice from a holistic standpoint as I have adopted in this study has not been undertaken more broadly among the professions.

10.6 Concluding remarks

The need for Australia to enhance its environmental health capacity has never been more vital. Global crises such as the COVID-19 pandemic demand we find new ways to improve our societal practices to prevent and address the negative impacts of human interaction with the environment. This thesis has provided a new way to address this problem by reconceptualising the professional practice of environmental health. It has also proposed that the traditional characteristics underpinning the professions are inadequate and pose serious challenges to the future societal relevance of the professions.

By reconceptualising the professional practice of environmental health, as I have done in this thesis, opens opportunities for this area of practice. Importantly, the reconceptualisation provides a description of practice that has the potential to help environmental health professionals deal with the complexities and uncertainties of current and future practice whilst assisting in ensuring this area of practice remains relevant to our societal future. It also provides a way to help join our communities and landscapes of practice to deal with current and future societal challenges effectively. Holding onto the traditional conceptualisation of a profession is no longer an option. It is time to think differently about how we describe professional practice, to not only improve professional practice but also help restore societal confidence in the professions. This thesis provides a new way forward to achieve this outcome.

References

Adams, W., Davis, T., Rossignol, A., & Silverman, G. (2001). Undergraduate environmental health education: Preparing for the future. *Journal of Environmental Health, 63*(7), 27- 31. Retrieved from https://pubmed.ncbi.nlm.nih.gov/11381469/

Åkerlind, G. (2002). *Principles and practice in phenomenographic research.* Paper presented at the International Symposium on Current Issues in Phenomenography, Canberra, Australia.

Åkerlind, G. (2003). Growing and developing as a university teacher-variation in meaning. *Studies in Higher Education*, *28*(4), 375-390. https://doi.org/10.1080/0307507032000122242

Åkerlind, G. (2005). Learning about phenomenography: Interviewing, data analysis and the qualitative research paradigm. In J.A. Bowden & P. Green (Eds.), *Doing Developmental Phenomenography* (pp. 63- 73). Melbourne: RMIT Unviersity Press.

Åkerlind, G. (2012). Variation and commonality in phenomenographic research methods. *Higher Education Research & Development, 31*(1), 115-127. https://doi.org/10.1080/07294360.2011.642845

Åkerlind, G. (2018). What future for phenomenographic research? On continuity and development in the phenomenography and variation theory research tradition. *Scandinavian Journal of Educational Research, 62*(6), 949-958. https://doi.org/10.1080/00313831.2017.1324899

Åkerlind, G., Bowden, J. A., & Green, P. (2005). Learning to do phenomenography: A reflective discussion. In J.A. Bowden & P. Green (Eds.), *Doing Developmental Phenomenography* (pp. 74- 100) Melbourne: RMIT University Press.

Allsop, J., & Saks, M. (2002). *Regulating the health professions*. London: SAGE Publications Ltd.

Angel, P., Jenkins, A., & Stephens, A. (2018). Understanding entrepreneurial success: A phenomenographic approach. *International Small Business Journal*, *36*(6), 611-636.

Ashworth, P., & Lucas, U. (2000). Achieving empathy and engagement: A practical approach to the design, conduct and reporting of phenomenographic research. Studies in Higher Education, *25*(3), 295-308. https://doi.org/10.1080/713696153

Aston, J., & Seymour, H. (1998). *The new public health*: Open University Press.

Barnard, A., McCosker, H., & Gerber, R. (1999). Phenomenography: a qualitative research approach for exploring understanding in health care. *Qual Health Res, 9*(2), 212-226. https://doi.org/10.1177/104973299129121794

Barnett, R. (2000). University knowledge in an age of supercomplexity. *Higher education, 40*(4), 409-422. https://doi.org/10.1023/A:1004159513741

Battersby, S. (2016). Historical context, philosophy and principles of environmental health. In S. Battersby (Ed.), *Clay's Handbook of Environmental Health* (21st ed. pp. 23-81): Routledge.

Baum, F. (2003). *The new public health*: Oxford University Press.

Baum, F. (2016). *The new public health*: Oxford University Press.

Bell, S. (2002). Environmental health: Victorian anachronism or dynamic discipline? *Environmental Health, 2*(4), 23.

Bennett, D., McCarthy, M., O'Flynn, S., & Kelly, M. (2013). In the eye of the beholder: student perspectives on professional roles in practice. *Medical Education, 47*(4), 397-407. https://doi.org/10.1111/medu.12114

Berger, P. L., Luckmann, T., & Zifonun, D. (1967). *The social construction of reality. A treatise in the sociology of knowledge.* Great Britain: Penguin Press.

Billett, S. (2004). Learning through work: participatory workplace practices. In A.Fuller, A.Munro & H.Rainbird (Eds.),*Workplace learning in context* (pp. 125-141): Routledge. https://doi.org/10.4324/9780203571644

Billett, S. (2015). *Integrating practice-based experiences into higher education.* Dordrecht: Springer.

Birden, H., Glass, N., Wilson, I., Harrison, M., Usherwood, T., & Nass, D. (2014). Defining professionalism in medical education: a systematic review. *Medical teacher, 36*(1), 47-61. https://doi.org/10.3109/0142159X.2014.850154

Bjurling-Sjöberg, P., Engström, G., Lyckner, S., & Rydlo, C. (2013). Intensive care nurses' conceptions of a critical pathway in caring for aortic-surgery patients: A

phenomenographic study. *Intensive and Critical Care Nursing, 29*(3), 166-173. http://dx.doi.org/10.1016/j.iccn.2012.11.002.

Blair, R. A., Morse, B. S., & Tsai, L. L. (2017). Public health and public trust: Survey evidence from the Ebola virus disease epidemic in Liberia. *Social Science & Medicine, 172*, 89-97. https://doi.org/10.1016/j.socscimed.2016.11.016

Blake, R. (2007). President's message: environmental health—The invisible profession, Part 1. *Journal of Environmental Health, 70*(1), 4-31.

Blythe, S., Grabill, J. T., & Riley, K. (2008). Action research and wicked environmental problems: Exploring appropriate roles for researchers in professional communication. *Journal of Business and Technical Communication*, *22*(3), 272-298. https://doi-org.ezproxy.lib.swin.edu.au/10.1177/1050651908315973

Boud, D. (2012). Problematising practice-based education. In J.Higgs, R.Barnett, S.Billet, M.Hutchings, F.Trede (Eds.), *Practice-Based Education* (pp. 55-68): Rotterdam, The Netherlands: Sense.

Boud, D. (2016). Taking professional practice seriously: Implications for deliberate course design. In F. Trede & C. McEwen (Eds.), *Educating the Deliberate Professional: Preparing for future practices* (pp. 157-173). Switzerland: Springer.

Boud, D., Keogh, R., & Walker, D. (1996). Promoting reflection in learning: A model. In R.Edwards, A.Hanson & P.Raggart (Eds.), *Boundaries of Adult Learning* (pp. 32-56). Abingdon: Routledge.

Boud, D., & Walker, D. (1998). Promoting reflection in professional courses: The challenge of context. *Studies in Higher Education*, 23(2), 191-206. https://doi.org/10.1080/03075079812331380384

Bowden, J. A. (2000). The nature of phenomenographic research. In J.A Bowden & E. Walsh (Eds.), *Phenomenography* (pp. 1-18). Melbourne: RMIT University Press.

Bowden, J. A. (2005). Reflections on the phenomenographic team research process. In J.A Bowden & P. Green (Eds.), *Doing Developmental Phenomenography* (p. 11-31). Melbourne: RMIT Unviersity Press.

Brennan, M., Konkel, S., & Lewis, T. (2009). Developing an International Competence-Based Curriculum for Environmental Health. *Environment and Health International, 11*(1), 25-31. Retrieved from https://www.ifeh.org/magazine/ifeh-magazine-2009_v11_n1.pdf

Bridgstock, R., Grant-Iramu, M., Bilsland, C., Tofa, M., Lloyd, K., & Jackson, D. (2019). Going beyond "Getting a Job": Graduates' narratives and lived experiences of employability and their career development. In J.Higgs, W.Letts & G.Crisp (Eds.), *Education for Employability (Volume 2) Learning for future possibilities* (pp. 89-104): Netherlands: Brill Sense.

Briley, R., Fowler, P., & Teel, J. (2000). Media relations. *Journal of Environmental Health, 62*, 32. Retrieved from https://link.gale.com/apps/doc/A63717913/AONE?u=anon~530b2476&sid=googleScholar&xid=02108785

Brimblecombe, P. (2003). Historical perspectives on health: The emergence of the Sanitary Inspector in Victorian Britain. *The Journal of the Royal Society for the Promotion of Health, 123*(2), 124-131. https://doi:10.1177/146642400312300219

Brown, V. A., Harris, J.A., & Russell, J. (2010). *Tackling wicked problems: Through the transdisciplinary imagination*: London: Routledge.

Bruce, K., Ahmed, A., & Huntly, H. (2011). An approach to understanding the professionalism of financial planners. *Journal of Business Systems, Governance and Ethics*, 6(3) https://doi.org/10.15209/jbsge.v6i3.205

Buckley, J. (2015). Food safety regulation and small processing: A case study of interactions between processors and inspectors. *Food policy, 51*(C), 74-82. https://doi:10.1016/j.foodpol.2014.12.009

Buckley, J. (2016). Interpersonal skills in the practice of food safety inspections: a study of compliance assistance. *Journal of Environmental Health, 79*(5), 8-13. https://www.jstor.org/stable/26330576

Burke, S., Gray, I., Paterson, K., & Meyrick, J. (2002). *Environmental Health 2012: A key Partner in Delivering the Public Health Agenda*. (ISBN 1-84279-111-7). Retrieved from http://www.eh.org.au/tools/reports/UK%20environmental_health_2012[1].pdf.

Burritt, R. Guthrie, J., & Evans, E. (2016). Professional associations-Past contributions, present tensions and future opportunities. In J.Guthrie, E. Evans & R.Burritt (Eds.), *Relevance and professional associations in 2026* (pp. 9–21). Sydney, Australia: Chartered Accounts Australia and New Zealand. Melbourne: RMIT University. Retrieved from https://www.psc.gov.au/sites/default/files/Relevance%20and%20Prof%20Associations%20in%202026.pdf

Bussey, T. J., Orgill, M., & Crippen, K. J. (2013). Variation theory: A theory of learning and a useful theoretical framework for chemical education research. *Chemistry Education Research and Practice, 14*(1), 9-22. https://doi:10.1039/C2rp20145c

Carpenter, D. M., Geryk, L. L., Chen, A. T., Nagler, R. H., Dieckmann, N. F., & Han, P. K. J. (2016). Conflicting health information: a critical research need. *Health Expectations, 19*(6), 1173-1182. http://doi:10.1111/hex.12438

Carr-Saunders, A. M., & Wilson, P. A. (1933). *Professions (The)*: Oxford: Clarendon Press.

Cassel, J. (1976). The contribution of the social environment to host resistance: The Fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology, 104*(2), 107-123.

Cherry, N. L. (2005). Preparing for practice in the age of complexity. *Higher Education Research & Development, 24*(4), 309-320. http://doi:10.1080/07294360500284649

Clark, D. (1999). Environmental health officers' understanding about an Aboriginal environmental health worker program in the Northern Territory. *Australian and New Zealand Journal of Public Health*, 23(1), 93-94.

Clark, C., Davila, A., Regis, M., & Kraus, S. (2020). Predictors of COVID-19 voluntary compliance behaviors: An international investigation. *Global Transitions, 2*, 76-82. https://doi.org/10.1016/j.glt.2020.06.003

Cohen, A. K., & Cromwell, J. R. (2020). How to Respond to the COVID-19 Pandemic with More Creativity and Innovation. *Population Health Management*. *24*(2),153-155. https://doi.org/10.1089/pop.2020.0119

Coll, R. K., Eames, C. W., Paku, L. K., Lay, M. C., Hodges, D., Bhat, R., . . . Ferkins, L. (2011). An exploration of the pedagogies employed to integrate knowledge in work-integrated learning. *The Journal of Cooperative Education and Internships*, *43* (2), 14-35.

Collier-Reed, B., & Ingerman, A. (2013). Phenomenography: From critical aspects to knowledge claim. In J. Huisman & M. Tight (Eds.), *International Perspectives on Higher Education Research, 9*, 243-260. https://doi.org/10.1108/S1479-3628(2013)0000009016

Commonwealth Department of Health and Aged Care. (1999). *The National Environmental Health Strategy*. Canberra: enHealth Council, Commonwealth Department of Health and Aged Care. Retrieved from https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-publicat-environ.htm

Commonwealth of Australia Department of Health and Ageing. (2000). *The National Environmental Health Strategy: Implementation Plan*. Canberra: enHealth Council, Commonwealth Department of Health and Aged Care.

Condon-Paoloni, D., Yeatman, H. R., & Grigonis-Deane, E. (2015). Health-related claims on food labels in Australia: understanding environmental health officers' roles and implications for policy. *Public Health Nutrition, 18*(1), 81-88. https://doi.org/10.1017/S1368980013003078

Connell, R., Fawcett, B., & Meagher, G. (2009). Neoliberalism, new public management and the human service professions: Introduction to the special issue. *Journal of Sociology, 45*(4), 331-338.

Cooper, L., Orrell, J., & Bowden, M. (2010). *Work-integrated learning: A guide to effective practice*: Routledge.

Cope, C. (2004). Ensuring validity and reliability in phenomenographic research using the analytical framework of a structure of awareness. *Qualitative Research Journal, 4*(2), 5-18.

Cork, S. (2019). Our place in society and the environment: Opportunities and responsibilities for professional practice futures. In J. Higgs, S.Cork, D.Horsfall (Eds.), *Challenging Future practice possibilities* (pp. 79-90). Rotterdam, The Netherlands: Sense Publishers

Cork, S., & Alford, K. (2019). Plausible practice futures. In J. Higgs, S.Cork, D.Horsfall (Eds.), *Challenging future practice possibilities* (pp. 29-40). Rotterdam, The Netherlands: Sense Publishers.

Cork, S., & Horsfall, D. (2019). Thinking the unthinkable: Challenges of imagining and engaging with unimaginable practice futures. In J. Higgs, S.Cork, D.Horsfall (Eds.), *Challenging future practice possibilities* (pp. 17-28). Rotterdam, The Netherlands: Sense Publishers

Corsini, F., Laurenti, R., Meinherz, F., Appio, F. P., & Mora, L. (2019). The advent of practice theories in research on sustainable consumption: Past, current and future directions of the field. *Sustainability, 11*(2), 341. https//doi:10.3390/su11020341

Couch, R., Stewart, J., Barratt, C., Dhesi, S., & Page, A. (2016). Research and evidence-based environmental health. In S. Battersby (Ed.), *Clay's Handbook of Environmental Health* (21st ed. pp. 102-127). Routledge.

Cragg, L., & Nutland, W. (2015). *Health Promotion Practice* (2nd Ed). Maidenhead: McGraw-Hill Education.

Craye, M., Funtowicz, S., & Van Der Sluijs, J. P. (2005). A reflexive approach to dealing with uncertainties in environmental health risk science and policy. *International Journal of Risk Assessment and Management, 5*(2-4), 216-236.

Creswell, J. (2013). *Qualitative inquiry and research design: choosing among five approaches* Boston: Pearson.

Crisp, G., Higgs, J., & Letts, W. (2019). The employability agenda. In J.Higgs, W.Letts & G.Crisp (Eds.) *Education for Employability (Volume 2) Learning for possible futures* (pp. 3-12). Rotterdam, The Netherlands: Sense Publishers.

Cromar, N. (2006). The Declining Environmental Health Workforce: An International Perspective on Doing Things Smarter. *Environmental Health, 6*(3), 11.

Crotty, M. (1998). *The foundations of social research: meaning and perspective in the research process.* London: Sage Publications.

Cruess, R. L., Cruess, S. R., & Johnston, S. E. (2000). Professionalism: An ideal to be sustained. *The Lancet, 356*(9224), 156-159.

Dakubo, C. Y. (2010). *Ecosystems and human health: a critical approach to ecohealth research and practice*: Springer Science & Business Media.

Dall'Alba, G., & Sandberg, J. (1996). Educating for competence in professional practice. *Instructional Science, 24*(6), 411-437.

Dall'Alba, G. (2004). Understanding professional practice: investigations before and after an educational programme. *Studies in Higher Education, 29*(6), 679-692. http//:doi:10.1080/0307507042000287195

Dall'Alba, G. (2009a). A deepening crisis of confidence in the professions. In *Learning to be Professionals* (pp. 3-10) Netherlands: Springer

Dall'Alba, G. (2009b). Learning professional ways of being: Ambiguities of becoming. *Educational Philosophy and Theory, 41*(1), 34-45. 9 https://doi.org/10.1111/j.1469-5812.2008.00475.x

Dall'Alba, G., & Sandberg, J. (2006). Unveiling professional development: A critical review of stage models. *Review of educational research, 76*(3), 383-412. https://doi.org/10.3102/00346543076003383

Daniel, S. (2016). *Experiences of lecturing* (Unpublished doctoral dissertation), Swinburne University of Technology, Melbourne, Australia.

Day, C. (2016). Environmental health–a changing practice. In S. Battersby (Ed.), *Clay's Handbook of Environmental Health* (21st ed., pp. 82-111). New York: Routledge.

Dewey, J. (1993). *How we think: A restatement of the relation of reflective thinking to the education process.* Chicago: IL: Henry Regnery.

Dwyer, S. C., & Buckle, J. L. (2009). The space between: On being an insider-outsider in qualitative research. *International journal of qualitative methods, 8*(1), 54-63. https://doi.org/10.1177/160940690900800105

Dhesi, S., & Stewart, J. (2015). The developing role of evidence-based environmental health: perceptions, experiences, and understandings from the front line. SAGE Open*,* https://doi.org/10.1177/2158244015611711

Dhesi, S., & Lynch, Z. (2016). What next for environmental health? *Perspectives in Public Health, 136*(4), 225-230. https://doi.org/10.1177/1757913915609946

Douglas, R., & Best, A. (2010). A shared vision for public health: Then and now. *Canadian Journal of Public Health, 101*(4), p.273-274.

Drew, C. H., Duivenboden J & Bonnefoy, X. (2000). *Environmental health services in Europe 5: Guidelines for evaluation of environmental health services*: (European Series, No. 90).Retrieved from https://www.euro.who.int/en/publications/abstracts/environmental-health-services-in-europe-5.-guidelines-for-evaluation-of-environmental-health-services

Dryhurst, S., Schneider, C. R., Kerr, J., Freeman, A. L., Recchia, G., Van Der Bles, A. M., . . . van der Linden, S. (2020). Risk perceptions of COVID-19 around the world. *Journal of Risk Research*, 1-13. https://doi.org/10.1080/13669877.2020.1758193

Dunn, L. (2002). Addressing cultural diversity and food safety programs: the Victorian experience. *Environmental Health, 2*(1), 31.

Dunn, L., Nicholson, R., Ross, K., Bricknell, L., Davies, B., Hannelly, T., . . . Roiko, A. (2018). Work-integrated learning and professional accreditation policies: An environmental health higher education perspective. *International Journal of Work-Integrated Learning, 19*(2), 111-127.

Dunn, L., & Tenkate, T. (2011). Cooperative and work-integrated education in environmental health. In R.Coll & K.Zegwaard (Eds.) *International handbook for cooperative and work-integrated education: International perspectives of theory, research and practice* (pp. 157-164). Retrieved from https://www.ijwil.org/files/IJWIL_19_2_111_127.pdf

Dunn, L., & Pocknee, C. (2009). *Broadening Work Integrated Learning In Undergraduate Programs*, Paper presented at the WACE Asia Pacific Conference on Work-Integrated Learning, Singapore.

Dunn, L. A., Schier, M. A., Hiller, J. E., & Harding, I. H. (2016). Eligibility requirements for work-integrated learning programs: Exploring the implications of using grade point averages for student participation. *Asia-Pacific Journal of Cooperative Education, 17*(3), 295-308. Retrieved from https://www.ijwil.org/files/IJWIL_19_2_111_127.pdf

Durey, A., & Thompson, S. C. (2012). Reducing the health disparities of Indigenous Australians: time to change focus. *BMC health services research, 12*(1), 1-11. https://doi.org/10.1186/1472-6963-12-151

Eames, C., & Coll, R. K. (2010). Cooperative education: Integrating classroom and workplace learning. In S. Billett (Ed.) *Learning through practice, professional and practice-based learning* (pp. 180-196): Dordrecht, Netherlands: Springer.

Edwards, D., Perkins, K., Pearce, J., & Hong, J. (2015). *Work Integrated Learning in STEM in Australian Universities: Final report: Submitted to the Office of the Chief Scientist.* Australian Council for Educational Research (ACER). Retrieved from https://research.acer.edu.au/higher_education/44

Entwistle, N. (2005). Learning outcomes and ways of thinking across contrasting disciplines and settings in higher education. *Curriculum Journal, 16*(1), 67-82. https://doi.org/10.1080/0958517042000336818

Environmental Health Australia (2014). Environmental Health Course Accreditation Policy. Retrieved from http://accreditation.eh.org.au/

Environmental Health Committee (enHealth) (2009). *enHealth Environmental Health Officer Skills and Knowledge Matrix*. Canberra: Commonwealth of Australia. Retrieved from https://www2.health.vic.gov.au/about/publications/policiesandguidelines/enhealth-environmental-health-officer-skills-knowledge-matrix

Environmental Health Committee (enHealth) (2010). *The role of environmental health officers in emergencies: stories from the front line*. Department Health and Ageing, Canberra. Retrieved from https://www2.health.vic.gov.au/about/publications/policiesandguidelines/The-role-of-environmental-health-officers-in-emergencies-Stories-from-the-front-line

Environmental Health Committee (enHealth) (2012). *Risky business – a resource to help local governments manage environmental health risks,* Australian Health Protection Principal Committee, Canberra. Retrieved from https://www1.health.gov.au/internet/main/publishing.nsf/content/A12B57E41EC9F326CA257BF0001F9E7D/$File/Risky-Business.pdf

Environmental Health Standing Committee (enHealth) (2020). *enHealth Strategic Plan 2020-2023*. Canberra: Commonwealth of Australia. Retrieved from https://www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-environ-enhealth-committee.htm

Eraut, M. (2011). Developing a Broader Approach to Professional Learning. In A. Mckee & M. Eraut (Eds.), *Learning trajectories, innovation and identity for professional development* (pp 21-45) (Vol. 7).Netherlands: Springer

Evetts, J. (2006a). Introduction: Trust and professionalism: Challenges and occupational changes. *Current Sociology, 54*(4), 515-531. http//doi:10.1177/0011392106065083

Evetts, J. (2006b). Short Note: The sociology of professional groups: New directions. *Current Sociology, 54*(1), 133-143. http//doi:10.1177/0011392106057161

Evetts, J. (2011). A new professionalism? Challenges and opportunities. *Current Sociology, 59*(4), 406-422. https://doi.org/10.1177/0011392111402585

Evetts, J. (2013). Professionalism: Value and ideology. *Current Sociology, 61*(5-6), 778-796. https//doi:10.1177/0011392113479316

Eyler, J. M. (1973). William Farr on cholera: The sanitarian's disease theory and the statistician's method. *Journal of the History of Medicine, 28* (2), 79-100. https://doi.org/10.1093/jhmas/XXVIII.2.79

Fabian, N. (1996). The invisible profession. *Journal of Environmental Health, 58*(9), 4-7.

Feldstein, D. (1971). Do We Need Professions in Our Society? Professionalization versus Consumerism. *Social Work, 16*(4), 5-11. https://doi.org/10.1093/sw/16.4.5

Ferguson, L. H., & Ramsay, J. D. (2010). Development of a profession: The role of education and certification in occupational safety becoming a profession. *Professional safety, 55*(10), 24-30.

Forster, M. (2016). Developing an "experience framework" for an evidence-based information literacy educational intervention. *Journal of Documentation.*72(2): 306-320. https://doi.org/10.1108/JD-06-2015-0077

Freeman, M., & Evans, E. (2016). Professional associations, accreditation and higher education: Foundations for future relations. In J.Guthrie, E. Evans & R.Burritt (Eds.), *Relevance and professional associations in 2026* (pp. 9–21). Sydney, Australia: Chartered Accounts Australia and New Zealand. Melbourne: RMIT University. Retrieved from

https://www.psc.gov.au/sites/default/files/Relevance%20and%20Prof%20Association s%20in%202026.pdf

Freidson, E. (2001). *Professionalism, the third logic: On the practice of knowledge*: University of Chicago Press.

Friis, R. H. (2012). *Essentials of environmental health* (2nd ed.): Sudbury, Mass: Jones & Bartlett Learning.

Frumkin, H. (2016). Introduction to Environmental Health. In H. Frumkin (Ed.), E*nvironmental health: From global to local* (pp.3-23): ProQuest eBook Central https://ebookcentral.proquest.com.

Gerding, J. A., Landeen, E., Kelly, K. R., Whitehead, S., Dyjack, D. T., Sarisky, J., & Brooks, B. W. (2019). Uncovering environmental health: An initial assessment of the profession's health department workforce and practice. *Journal of Environmental Health*, *81*(10), 24–33.

Gergen, K. J. (2001). *Social construction in context.* London: Sage.

Green, P., & Bowden, J. A. (2009). Principles of Developmental Phenomenography. *Malaysian Journal of Qualitative Research 2*(2), 55-74.

Green, J., & Thorogood, N. (2018). *Qualitative methods for health research*: Sage.

Gordon, L. (2002). Setting the context: Environmental health practitioner competencies. *Journal of Environmental Health, 65*(1), 25-27.

Hager, P., & Hodkinson, P. (2011). Becoming as an appropriate metaphor for understanding professional learning. In L.Scanlon (Ed.) *"Becoming" a professional* (pp. 33-56): London: Springer.

Hamlin, C. (1998). *Public health and social justice in the age of Chadwick: Britain, 1800-1854*: Cambridge University Press.

Handcock, T. (1986). Lalonde and beyond: Looking back at "A new perspective on the health of Canadians". *Health Promotion International, 1*(1), 93-100. https://doi.org/10.1093/heapro/1.1.93

Hartstein, D., & Rogers, J. (2019). Professional associations as regulators: an interview study of the Law Society of New South Wales. *Legal Ethics, 22*(1-2), 49-88. https://doi.org/10.1080/1460728x.2019.1692472

Heidegger, M. (1926/1990) Being and time. Oxford, England: Basil Blackwell

Higgs, J. (2012). Practice-based education: The practice-education-context-quality nexus. In J.Higgs, R.Barnett, S.Billet, M.Hutchings, F.Trede (Eds.), *Practice-Based Education* (pp. 3-12): Rotterdam, The Netherlands: Sense Publishers.

Higgs, J. (2013). Professional socialisation. In S.Loftus, T.Gerzina, J.Higgs, M.Smith & E.Duffy (Eds.) *Educating health professionals* (pp. 83-92): Rotterdam, The Netherlands: Sense Publishers.

Higgs J. (2016) Practice Wisdom and Wise Practice. In: Higgs J., Trede F. (Eds) *Professional Practice Discourse Marginalia. Practice, Education, Work and Society* (pp.65-72) Rotterdam: Sense Publishers https://doi.org/10.1007/978-94-6300-600-2_8

Higgs, J. (2019). Exploring practice in context. In J. Higgs, S.Cork, D.Horsfall (Eds.), *Challenging future practice possibilities* (pp. 3-16). Rotterdam, The Netherlands: Sense Publishers.

Higgs, J., Loftus, S., & Trede, F. (2010). Education for future practice. In J.Higgs, I.Goulter, S.Loftus, J. Reid & F.Trede (Eds) *Education for future practice* (pp. 1-13). Rotterdam: Sense Publishers.

Holden, E., Linnerud, K., & Banister, D. (2014). Sustainable development: Our Common Future revisited. *Global Environmental Change, 26*, 130-139. https://doi.org/10.1016/j.gloenvcha.2014.04.006

Horsfall, D., & Higgs, J. (2019). Re-claiming social purpose and adding values to the world around us. In J. Higgs, S.Cork, D.Horsfall (Eds.), *Challenging future practice possibilities* (pp. 65-78). Rotterdam, The Netherlands: Brill Sense.

Jackson, D., Rowbottom, D., Ferns, S., & McLaren, D. (2017). Employer understanding of work-integrated learning and the challenges of engaging in work placement opportunities. *Studies in Continuing Education, 39*(1), 35-51. https://doi.org/10.1080/0158037X.2016.1228624

Jolly, L. (2007). *Women, Men and the practice of Engineering.* Paper presented at the Australasian Association for Engineering Education (AAEE) Annual Conference. Retrieved from https://conference.eng.unimelb.edu.au/aaee2007/papers/paper-39.pdf

Jordan, H., Dunt, D., Dunn, L., & Verrinder, G. (2008). Evaluating the actions towards environmental health using DPSEEA and program logic. *Environmental Health, 8*(1), 11-25.

Kanes, C. (2010). Challenging professionalism. In C. Kanes (Ed), *Elaborating professionalism: Studies in practice and theory.* (pp 1-16). Dordrecht: Springer.

Kenny, D., & Adamson, B. (1992). Medicine and the health professions: issues of dominance, autonomy and authority. *Australian Health Review, 15*, 319-319.

Keune, H. (2012). Critical complexity in environmental health practice: simplify and complexify. *Environ Health: 11*(19), 1-10 https://doi.org/10.1186/1476-069X-11-S1-S19

Kinney, P. L. (2018). Interactions of climate change, air pollution, and human health. *Current Environmental Health Reports, 5*(1), 179-186. https://doi.org/10.1007/s40572-018-0188-x

Knechtges, P. L., & Kelley, T. R. (2015). Article commentary: Educating future environmental health professionals. *Environmental Health Insights, 9*, 23-26. https://doi.org/10.4137/EHI.S33105

Kolb, D., Rubin, I & McIntyre, J. (1984). *Organisational psychology: An experimental approach to organisational behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Kotchian, S. (1997). Perspectives on the place of environmental health and protection in public health and public health agencies. *Annual Review of Public health, 18*(1), 245-259. https://doi.org/10.1146/annurev.publhealth.18.1.245

Kreber, C. (2016). The 'civic-minded' professional? An exploration through Hannah Arendt's vita activa'. *Educational Philosophy and Theory, 48*(2), 123-137. *Educational Philosophy and Theory, 48*(2), 123-137. https://doi.org/10.1080/00131857.2014.963492

Kreuter, M. W., De Rosa, C., Howze, E. H., & Baldwin, G. T. (2004). Understanding wicked problems: a key to advancing environmental health promotion. *Health Education & Behavior, 31*(4), 441-454. https://doi.org/10.1177/1090198104265597

Kvale, S. (2006). Dominance through interviews and dialogues. *Qualitative Inquiry, 12*(3), https://doi.org/10.1177/1077800406286235

Laffin, M. (1998). The professions in the contemporary sector. In M. Laffin (Ed) *Beyond bureaucracy?: The professions in the contemporary public sector* (pp.1-17). London: Routledge.

Laffin, M., & Entwistle, T. (2000). New problems, old professions? The changing national world of the local government professions. *Policy & Politics, 28*(2), 207-220. https://doi.org/10.1332/0305573002500929

Larson, M. S. (2003). Professionalism: The third logic. *Perspectives in Biology and Medicine, 46*(3), 458-462.

Larson, H. J., & Heymann, D. L. (2010). Public health response to influenza A (H1N1) as an opportunity to build public trust. *Jama, 303*(3), 271-272. https://doi.org/10.1001/jama.2009.2023

Lave, J. (1991). Situating learning in communities of practice. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 63–82). American Psychological Association. https://doi.org/10.1037/10096-003

Lave, J. (1993). The practice of learning. In S.Chaiklin & J. Lave (Eds.) *Understanding practice. Perspectives on activity and context*, (pp. 3-32). Cambridge: Cambridge University Press

Leadbeatter, D., & Peck, C. (2018). Are dental students ready for supercomplex dental practice? *European Journal of Dental Education, 22*(1), 116-121. https://doi.org/10.1111/eje.12268

Legido-Quigley, H., Asgari, N., Teo, Y. Y., Leung, G. M., Oshitani, H., Fukuda, K., . . . Heymann, D. (2020). Are high-performing health systems resilient against the COVID-19 epidemic? *The Lancet, 395*(10227), 848-850. https://doi.org/10.1016/S0140-6736(20)30551-1

Lewis, M. (2017). *ARC Professionalism Project Mapping Professional regimes internationally*.Retrieved from https://www.psc.gov.au/news-and-publications/publications

Lin, V., Smith, J., Fawkes, S., Robinson, P., & Gifford, S. (2014). *Public health practice in Australia: The organised effort* (2nd ed.). Crows Nest, NSW: Allen & Unwin.

Ling, L. M., & Marton, F. (2011). Towards a science of the art of teaching: using variation theory as a guiding principle of pedagogical design. *International Journal for Lesson and Learning Studies, 1*(1), 7-22.

Lipsky, M. (1971). Street-Level Bureaucracy and the analysis of urban Reform. *Urban Affairs Quarterly, 6*(4), 391-409. https//doi:10.1177/107808747100600401

Lo, M. L. (2012). *Variation Theory and the Improvement of Teaching and Learning*. Acta Universitatis Gothoburgensis. Retrieved from https://gupea.ub.gu.se/bitstream/2077/29645/5/gupea_2077_29645_5.pdf

Loughland, T., Reid, A., & Petocz, P. (2002). Young people's conceptions of the environment: A phenomenographic analysis. *Environmental education research*, *8*(2), 187-197. https://doi.org/10.1080/13504620220128248

Luo, J. (2021). Forecasting COVID-19 pandemic: Unknown and unknowns and predictive modelling. *Technological Forecasting and Social Change 166 (5),* 120602- 120602. https://doi.org/10.1016/j.techfore.2021.120602

Lyons, C., & Malowany, M. (2009). Who's a public health professional? The struggle for recognition by Sanitary Inspectors in early 20th century Canada. *Canadian Journal of Public Health, 100*(6), 409-412.

Maller, C. (2012). *Using social practice theory to understand everyday life: Outcomes for health and wellbeing.* Paper presented at The Annual Conference of the Australian Sociological Association: Emerging and Enduring Inequalities, Refereed Conference Proceedings. Retrieved from https://tasa.org.au/

Mann, L. (2007). *Ways of experiencing sustainable design in engineering: A Phenomenographic investigation* (Unpublished doctoral dissertation). The University of Queensland, Queensland, Australia.

Mardis, M. A., Hoffman, E. S., & Rich, P. J. (2014). Trends and issues in qualitative research methods. In *Handbook of research on educational communications and technology* (pp. 173-193). New York: Springer

Marion, J. W., & Murphy, T. J. (2016). Direct from AEHAP: A fork in the road for environmental health workforce development and US public health. *Journal of Environmental Health, 79*(2), 40-43.

Marton, F. (1981). Phenomenography—describing conceptions of the world around us. *Instructional Science, 10*(2), 177-200. https://doi.org/10.1007/BF00132516

Marton, F. (1986). Phenomenography—a research approach to investigating different understandings of reality. *Journal of thought*, 28-49. http://www.jstor.org/stable/42589189

Marton, F., & Booth, S. A. (1997). *Learning and awareness.* USA:Lawrence Erlbaum Assoicates, Inc.

Marton, F., & Pong, W. Y. (2005). On the unit of description in phenomenography. *Higher Education Research & Development, 24*(4), 335-348. https://doi.org/10.1080/07294360500284706

McCarthy, A. (1996). Protecting the public health — the role of environmental health. *Public health, 110*(2), 77-80. http://dx.doi.org/10.1016/S0033-3506(96)80050-3

McCosker, H., Barnard, A., & Gerber, R. (2004). Phenomenographic study of women's experiences of domestic violence during the childbearing years. *Journal of Issues in Nursing, 9*(1), 76-88.

McKee, M., & Coker, R. (2009). Trust, terrorism and public health. *Journal of Public Health, 31*(4), 462-465. http//doi:10.1093/pubmed/fdp091

McKernan, H., & Dunn, L. A. (2009). Intercultural Communication, Food Safety and Environmental Health Practice: A Professional Development Model. *Environmental Health, 9*(3/4), 16-30.

McKeown, T. (1979). *The Role of Medicine: Dream, Mirage or Nemesis?* Oxford: Blackwell.

McMichael, A., Friel, S., Nyong, A., & Corvalan, C. (2008). Global environmental change and health: impacts, inequalities, and the health sector. *BMJ: British Medical Journal, 336*(7637), 191.

McMichael, A., & Martens, P. (2002). Global environmental changes: Anticipating and assessing risks to health. In P. Martens & A. McMichael (Eds.), *Environmental Change, Climate and Health: Issues and Research Methods* (pp. 1-17). Cambridge: Cambridge University Press.

Meyer, S. B., Wilson, A. M., Calnan, M., Henderson, J., Coveney, J., McCullum, D., . . . Webb, T. (2017). In the interest of food safety: a qualitative study investigating communication and trust between food regulators and food industry in the UK, Australia and New Zealand. *BMC Public Health, 17*(1), 1-13. https://doi.org/10.1186/s12889-017-4118-x

Moeller, D. W. (2011). *Environmental health*: Harvard University Press.

Moon, M. J. (2020). Fighting Against COVID-19 with Agility, Transparency, and Participation: Wicked Policy Problems and New Governance Challenges. *Public Administration Review, 80* (4) 651-656. https://doi.org/10.1111/puar.13214

Morris, G., & Robertson, M. R. (2003). Environmental health in Scotland and the health improvement challenge. *Royal Environmental Health Institute of Scotland, Edinburgh*. Retrieved from https://www.rehis.com/sites/default/files/Morris-Robertson%20Report.pdf

Morton Consulting Services. (2004). *Public Health Workforce in Local Government: Functions, Skills, Recruitment and Retention.* Retrieved from Brisbane, Qld: Retrieved from http://www.health.qld.gov.au/ph/Documents/ehu/24710.pdf

Muzio, D., Brock, D. M., & Suddaby, R. (2013). Professions and institutional change: Towards an institutionalist sociology of the professions. *Journal of management studies, 50*(5), 699-721. https://doi.org/10.1111/joms.12030

Nerland, M. (2016). Learning to Master Profession-Specific Knowledge Practices: A Prerequisite for the Deliberate Practitioner? In F. Trede & C.McEwen (Eds) *Educating the Deliberate Professional. Preparing for future practice* (pp. 127-139): Springer.

Newman, S., & Lawler, J. (2009). Managing health care under New Public Management: A Sisyphean challenge for nursing. *Journal of Sociology, 45*(4), 419-432. https://doi.org/10.1177/1440783309346477

Neller, A (2000). Opportunities for bridging the gap in environmental and public health management in Australia. *Ecosystem Health* 6(2), 85-91 https://doi.org/10.1046/j.1526-0992.2000.00016.x

Oldenburg, B., Burton, N., & Parker, E. A. (2004). Health promotion and environmental health. In N. Cromar, S. Cameron, & H. Fallowfield (Eds.) *Environmental health in Australia and New Zealand* (pp. 213-226). Canberra: Oxford University Press.

Oosthuizen, J. (2009a). A Comparative analysis of the course accreditation requirements of Environmental Health Australia and the enHealth Environmental Health Officer Skills and Knowledge Matrix. *Environmental Health, 9* (3), 91-100.

Oosthuizen, J. (2009b). Climate change and heatwaves in Australia: A research opportunity for environmental health officers? *Environmental Health, 9*(3/4), 11.

Orrell, J. (2004). *Work-integrated Learning programmes: Management and educational quality*. Paper presented at the Third Australian Universities Quality Forum (AUQF); Quality in a Time of Change, Adelaide. Retrieved from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.466.3357&rep=rep1&type=pdf

Orrell, J., & Higgs, J. (2012). Social and political change: Implications for professional and practice-based university education. In J. Higgs, R.Barnett, S.Billett, M.Hutchings, F.Trede (Eds.), *Practice-Based Education. Perspective and Strategies* (pp. 41-54): The Netherlands: Sense.

Orgill, M., (2012). Variation theory. In N. M. Seel (ed.), *Encyclopedia of the sciences of learning* (pp. 3391–3393). Heidelberg, Germany: Springer-Verlag GmbH.

Page, A. (2008). *Work-based and experiential learning: a manual to promote and support work-based learning in environmental health* (Unpublished professional doctoral thesis). Middlesex University.

Pang, M. F. (2003). Two faces of variation: On continuity in the phenomenographic movement. *Scandinavian Journal of Educational Research, 47*(2), 145-156. https://doi:10.1080/00313830308612

Papadopoulos, A., Sargeant, J. M., Majowicz, S. E., Sheldrick, B., McKeen, C., Wilson, J., & Dewey, C. E. (2012). Enhancing public trust in the food safety regulatory system. *Health Policy, 107*(1), 98-103. https://doi.org/10.1016/j.healthpol.2012.05.010

Parker, C. L., Rhodes, J. D., & Schwartz, B. S. (2016). Sustainability and health. In H. Frumkin(Ed) *Environmental Health: From Global to Local* (3rd ed., pp. 59- 83). New York: Josey Bass

Parkes, M., & Horwitz, P. (2016). Ecology and ecosystems as foundational for health. In H. Frumkin (Ed) *Environmental Health: From Global to Local* (3rd ed., pp. 27-58). New York: Josey -Bass

Parkes, M., Panelli, R., & Weinstein, P. (2003). Converging paradigms for environmental health theory and practice. *Environmental Health Perspectives, 111*(5), 669-675. https://doi.org/10.1289/ehp.5332

Parkes, M., & Weinstein, P. (2004). An ecosystem approaches. In N. Cromar, S. Cameron, & H. Fallowfield (Eds.) *Environmental health in Australia and New Zealand* (pp. 45-65), Melbourne, Australia: Oxford University Press.

Parkinson, N. (1991). Professional identity and the development of the profession. *Environmental Health Journal, 99*(2), 37-38.

Parkinson, N. (2015). 'Inspector of Nuisances' to 'Environmental Health Practitioner': a case study of title changes in the professionalisation process. *Journal of Environmental Health Research 15*(1), 4 -22.

Patrick, C., Peach, D., Pocknee, C., Webb, F., Fletcher, M., & Pretto, G. (2009). *The WIL [work integrated learning] report: A national scoping study*: Queensland University of Technology, Dept. of Teaching and Learning Support Services. Retrieved from https://eprints.qut.edu.au/44065/

Patton, M. Q. (2005). *Qualitative research*: Wiley Online Library.

Paull, J. (2013). The Rachel Carson Letters and the making of silent spring. *SAGE Open*. Retrieved from https://doi.org/10.1177/2158244013494861

Peterson, D., & Fensling, S. (2011). *Risk-based regulation: good practice and lessons for the Victorian context.* Paper presented at the Victorian Competition and Efficiency Commission Regulatory Conference, Melbourne.

Pham, T., & Saito, E. (2019). Teaching towards graduate attributes: how much does this approach help Australian graduates with employability. In T. Hong, M. Bui, T.M. Nguyen & D.Cole (Eds), *Innovate higher education to enhance graduate employability: Rethinking the possibilities* (pp. 109-121). Abingdon: Routledge.

Plume, R., Page, A., & Garelick, H. (2018). Responding to the risk of reducing resources: Development of a framework for future change programmes in environmental health services. *International Journal of Disaster Risk Reduction, 31*(8*)*, 30-36. https://doi.org/10.1016/j.ijdrr.2018.04.013

Pond, K., & Pedley, S. (2016). Water and environmental health. In S Battersby (Ed.) *Clay's Handbook of Environmental Health* (21st ed., pp. 476-516). Routledge.

Priestly, B. G., Di Marco, P., Sim, M., Moore, M. R., & Langley, A. (2007). Toxicology in Australia: A key component of environmental health. *Journal of Toxicology and Environmental Health, Part A, 70*(19), 1578-1583. https://doi.org/10.1080/15287390701429505

Professional Standards Councils. (2015). *21 years of regulatory innovation through professional standards*. Retrieved from https://www.psc.gov.au/21-years-of-regulatory-innovation-through-professional-standards

Prüss-Ustün, A., Wolf, J., Corvalán, C., Neville, T., Bos, R., & Neira, M. (2017). Diseases due to unhealthy environments: an updated estimate of the global burden of disease attributable to environmental determinants of health. *Journal of Public Health, 39*(3), 464-475. https://doi.org/10.1093/pubmed/fdw085

Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European Journal of Social Theory, 5*(2), 243-263.

Rehberg, K. (2006). Institutions and neo-institutionalism. In A. Harrington, B. I. Marshall, & H. P. Müller (Eds.), *Encyclopedia of Social Theory, (pp. 280-283.),* London and New York: Routledge.

Rehfuess, E. A., & Bartram, J. (2014). Beyond direct impact: Evidence synthesis towards a better understanding of the effectiveness of environmental health interventions. *International journal of hygiene and environmental health, 217*(2-3), 155-159. https://doi.org/10.1016/j.ijheh.2013.07.011

Reynolds, C., (1995). *Public health law in Australia.* Leichardt, New South Wales: Federation Press.

Reynolds, C. (2011). *Public and environmental health law*: Leichardt, New South Wales: Federation Press.

Rideout, K., & Oickle, D. (2016). Integrating equity into environmental health practice: Findings of a pilot study. *Environmental Health Review, 59*(1), 35-39.

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences, 4*(2), 155-169.

Robson, M. G., & Toscano, W. A. (2007). *Risk Assessment for environmental health* (1st ed.). Hoboken: John Wiley & Sons, Incorporated.

Roos, G. (2015). Technology-driven productivity improvements. With a focus on ICT enabled automation in the professional services industry. In *Technology-driven productivity improvements and the future of work* (pp. 1- 60). United States of America: IGI Global.

Rosen, G. (2015). *A history of public health*: John Hopkins University Press.

Samson, P. L. (2014). Practice Wisdom: The Art and Science of Social Work. *Journal of Social Work Practice*, 1-13. https//doi:10.1080/02650533.2014.922058

Sandberg, J. (2001). Understanding competence at work. *Harvard Business Review, 79*(3), 24-26.

Sandberg, J. (2005). How do we justify knowledge produced within interpretative approaches? *Organisational Research Methods, 8*(1),41-68.

Sandberg, J., & Pinnington, A. H. (2009). Professional competence as ways of being: An existential ontological perspective. *Journal of management studies, 46*(7), 1138-1170. https//doi:10.1111/j.1467-6486.2009.00845.x

Scanlon, L. (2011). "Becoming"a professional. In L. Scanlon (Ed) *"Becoming" a Professional* (pp. 13-32): Springer.

Scammell, M. K. (2010). Qualitative environmental health research: An analysis of the literature, 1991-2008. *Environmental Health Perspectives, 118*(8), 1146-1154. https//doi:10.1289/ehp.0901762

Schatzki, T. (2012). A primer on practices. In J. Higgs, R.Barnett, S., Billett, M., Hutchings, & F. Trede (Eds.)*, Practice-based education. Perspectives and strategies* (pp. 13-26). Rotterdam, The Netherlands: Sense

Schatzki, T., R, Knorr Cetina, K., & Savigny, E. V. (2001). *The Practice Turn in Contemporary Theory*. London: Taylor & Francis Group.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Schön, D. A. (1987). *Educating the reflective practitioner. Toward a New Design for Teaching and Learning in the Professions.* The Jossey-Bass Higher Education Series

Sheehan, M, Lam J., & Burke T (2016). Risk assessment in environmental health. In H. Frumkin (Ed.), *Environmental Health: From Global to Local* (3 ed.) (pp747- 769) Ebook Central (Proquest). https://ebookcentral.proquest.com

Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes.* Sage.

Sin, S. (2010). Considerations of quality in phenomenographic research. International Journal of Qualitative Methods, 9(4), 305-319.

Smith, J. (2008). The future of environmental health officer practice and the role of Environmental Health Australia. *Environmental Health, 8*(3), 71-74.

Stoodley, I. D. (2012). IT professionals' experience of ethics and its implications for IT education (Unpublished doctoral dissertation). The University of Queensland, Queensland, Australia.

Strengers, Y., & Maller, C. (2014a). Beyond behaviour change: Practical applications of social practice theory in behaviour change programmes. In *Social Practices, Intervention and Sustainability* (pp. 77-91): Routledge.

Strengers, Y., & Maller, C. (2014b). *Social practices, intervention and sustainability: Beyond behaviour change.* Routledge.

Sullivan, W. M. (2004). Can professionalism still be a viable ethic? *The good society, 13*(1), 15-20.

Susskind, R. E., & Susskind, D. (2015). *The future of the professions: How technology will transform the work of human experts.* USA*:* Oxford University Press

Talbot, L. J., James E; Verrinder, G; & Jackson, P. (2007). Curriculum Development, Accreditation and Quality Assurance in University Environmental Health Education. *Environmental Health, 7* (10)*,* 35-36.

Tan, K. (2009). Variation theory and the different ways of experiencing educational policy. *Educational Research for Policy & Practice, 8*(2), 95-109. https//doi:10.1007/s10671-008-9060-3

Tenkate, T. (2005). Environmental health university education in Australia: Market forces, threats and opportunities, *Environmental Health, 5* (3), 13-18.

Tenkate, T., & Smith, J. (2002). Development of a professional certification scheme for environmental health practitioners. *Environmental Health, 2*(1), 81-85.

Thomas, P. (1998). Environmental health. In M. Laffin (Ed.), *Beyond bureaucracy?The professions in the contemporary public health sector* (pp. 129-145). London: Routledge.

Trede, F., & Higgs, J. (2019). Collaborative decision making in liquid times. In J. Higgs, G M. Jensen, S. Loftus, N. Christensen (Eds.),*Clinical reasoning in the health professions* (4 ed.) (pp. 154-170). Edinburgh: Elsevier.

Trede, F., & McEwen, C. (2016). Scoping the deliberate professional. In F. Trede & C.McEwen (Eds) *Educating the Deliberate Professional. Preparing for future practice* (pp. 3-14) Springer

Treser, C. D. (2018). Environmental health: The invisible profession. *Journal of Environmental Health, 81*(5), 34-36.

Trigwell, K. (2000). Phenomenography: Variation and discernment. *Proceedings 1999 7th International Symposium in improving student learning,* 75- 85: Oxford, UK.

Udow-Phillips, M., & Lantz, P. M. (2020). Trust in public health is essential amid the COVID-19 pandemic. *Journal of hospital medicine, 15*(7), 431-433.

UN-Habitat, I. (1996). *Report of the UN conference on human settlements (Habitat II). Istanbul: United Nations Development Programme.* Retrieved from https://www.un.org/en/conferences/habitat/istanbul1996

United Nations (2015) *The Millennium development goals report.* Retrieved from https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf

Victorian Competition and Efficiency Commission (2007) *Simplifying the menu: food regulation in Victoria, draft report*, April. Retrieved from https://www.dtf.vic.gov.au/sites/default/files/2018-02/food-regulation-in-victoria-inquiry.pdf

von Treuer, K., Keele, S., & Sturre, V. (2012 October). What makes staff (and universities) ready, WIL-ing and able? In Campbell, M. (Ed*) Collaborative Education: Investing in the Future –*Proceedings of the 2012 ACEN National Conference, (pp. 296-301), Perth.

Vu,T. T., & Dall'Alba, G. (2011). Becoming authentic professionals: Learning for authenticity. In L. Scanlon (Ed.)*"Becoming" a professional* (pp. 95-108): Dordrecht:Springer.

Wacquant, L. (2016). A concise genealogy and anatomy of habitus. *The Sociological Review, 64*(1), 64-72. https://doi.org/10.1111/1467-954X.12356

Walsh, E. (2000). Phenomenographic analysis of interview transcripts. In J. Bowden & E. Walsh (Eds.), *Phenomenography* (pp. 19-33). Melbourne: RMIT University Press.

Walther, J., Kellam, N., Sochacka, N., & Radcliffe, D. (2011). Engineering competence? An interpretive investigation of engineering students' professional formation. *Journal of Engineering Education, 100*(4), 703-740. https://doi.org/10.1002/j.2168-9830.2011.tb00033.x

Warde, A. (2005). Consumption and theories of practice. *Journal of Consumer Culture, 5*(2), 131-153. https://doi.org/10.1177/1469540505053090

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*: Cambridge University Press. https://doi.org/10.1177/1469540505053090

Wenger-Trayner, E., Fenton-O'Creevy, M., Hutchinson, S., Kubiak, C., & Wenger-Trayner, B. (2014). *Learning in landscapes of practice: Boundaries, identity, and knowledgeability in practice-based learning*: Routledge.

Whiley, H., Willis, E., Smith, J., & Ross, K. (2019). Environmental health in Australia: overlooked and underrated. *Journal of Public Health, 41*(3), 470-475. https://doi.org/10.1093/pubmed/fdy156

Windsor and Associates, (2005). *Environmental Health Officer Workforce Review*. Retrieved from https://www2.health.vic.gov.au/about/publications/policiesandguidelines/Environmental-Health-Officer-Workforce-Review

Windsor & Associates (2012). *Accreditation Framework discussion paper*. Unpublished

World Commission on Environment and Development. (1987). *Our common future*. Retrieved from http://www.un-documents.net/wced-ocf.htm

World Health Organisation (1989). *Environment and health: the European Charter and commentary first European Conference on Environment and Health, Frankfurt, 7-8 December 1989* Retrieved from WHO Regional Office for Europe: https://apps.who.int/iris/handle/10665/272715

World Health Organisation (*1994) Environmental Health Action plan for Europe* Paper Retrieved from WHO Regional Office for Europe: https://www.euro.who.int/__data/assets/pdf_file/0005/109877/EUR_ICP_CEH_212A.pdf

World Health Organisation (2000) *Climate change and human health: impact and adaptation* prepared by Kovats, R. S., Menne, B., McMichael, A. J., Corvalan, C., & Bertollini, R. Retrieved from https://apps.who.int/iris/handle/10665/66776

Wu, X., Lu, Y., Zhou, S., Chen, L., & Xu, B. (2016). Impact of climate change on human infectious diseases: Empirical evidence and human adaptation. *Environment International, 86*, 14-23. https://doi.org/10.1016/j.envint.2015.09.007

Yassi, A., Kjellström, T., De Kok, T., & Guidotti, T. L. (2001). *Basic environmental health*: USA: Oxford University Press.

Yates, C., Partridge, H., & Bruce, C. (2012). Exploring information experiences through phenomenography. *Library and Information Research*, 36(112), 96-119. https://doi.org/10.29173/lirg496

Appendix A: Online screening survey instrument

For the purpose of this survey, an environmental health role is any role you consider relates to the practice of environmental health

1. Do you have a professional qualification that enables you to practice in an environmental health role?
   a. Yes
   b. No
   c. If no, there is no need to continue this survey

2. What country where you born in?

3. What languages other than English do you speak?

4. What is your gender?
   a. Male
   b. Female

5. Which age group are you represented by?
   a. Under 25
   b. 26 – 30
   c. 31 – 39
   d. 40 – 49
   e. 50 – 59
   f. 60 +

6. Where did you obtain this qualification?
   a. Victoria
   b. Interstate (please specify the state)
   c. Overseas (please specify country)

7. Please indicate the nature of your qualification
   a. Diploma
   b. Degree
   c. Post Graduate Diploma
   d. Other (Please specify)

8. Are you currently employed in an environmental health practice related position in Victoria?
   a. Yes
   b. No

9. If no, what is your current employment status?
   a. Leave of absence
   b. Seeking an environmental health position
   c. Working in an unrelated area
   d. Working in a related area outside of Victoria

10. Was practising as an environmental health practitioner your first primary job?
   a. Yes
   b. No.

11. If no, please describe the previous job or jobs you held before qualifying to practice

12. Please estimate the number of years you have been involved in practising environmental health as a qualified practitioner.

13. What best describes your current or most recent environmental health practice position? (you may select more than one)
   a. Environmental Health Officer/ Practitioner
   b. Team leader
   c. Manager
   d. Director
   e. Contractor
   f. Consultant
   g. Project worker
   h. Specialist officer/practitioner Please describe
   i. Technician
   j. Other Please describe

14. What geographical areas have you practised environmental health in? (this could be within or outside Australia, and you may circle more than one)
   a. Metropolitan/urban
   b. Regional
   c. Rural
   d. Shire

15. If you have practised in other states other than Victoria, please indicate which state(s)

16. If you have practised in other countries other than Australia, please indicate which country(s)
17. Indicate the types of activities that you consider have been part of your practice experience in environmental health (select as many as you wish)

     a. Statutory Based compliance in the regulatory areas of
- i. Food
- ii. Tobacco
- iii. Public Health and Wellbeing
- iv. Environmental Protection
- v. Local laws
- vi. Other please specify

     b. Specialist activities in the areas of (select as many as you wish)
- i. Emergency management
- ii. Immunisation
- iii. Waste water management
- iv. Indigenous health
- v. Health promotion
- vi. Public health planning
- vii. Sustainability
- viii. Education and training
- ix. Research
- x. Vector control
- xi. Food safety
- xii. Communicable diseases control
- xiii. Recycling
- xiv. Other: please specify

18. Would you be willing to participate in a 40- 60-minute interview that aims to explore your practice experience?
- a. Yes
- b. No

19. If yes, could you please provide an email address and contact number, so an interview can be arranged?

20. Would you be interested in obtaining a short summary of the overall findings of the research when available?
- a. Yes
- b. No

21. If yes, could you please provide an email address or contact details which the results can be forwarded to you?

Thank you for your participation in this survey. You will be contacted regarding the outcomes of this survey shortly.

Appendix B: Interview protocol

Prior to commencement of interview

1. **Introduction to project – Project Information statement (referencing key points below)**
   a. The **purpose of this interview** is to gain an understanding of how you have experienced the practice of environmental health.
      a. outcome of the study - collective understanding of practice not individual understanding, aimed at describing the practice of environmental health.
      b. No right or wrong answers to these questions. This project is **not about testing your** knowledge of practice, but about how you experienced your practice area, so only you can know that!
   b. Interview 45-60 minutes audio recorded – don't miss anything, accurate to what you say
2. Confidentiality, through safe storage and keeping names separate from data / anonymity through de-identifying and you will be given a pseudonyms – fake name!!
3. Can remove information you provide if you do not feel comfortable being included in study reporting, free to withdraw at any time
4. The outcomes of study used to inform professional development of the workforce, including education programs

2. Explanation of interview format

c. During the interview, when you provide a response, I am going to be very neutral. What this means, is that I will be restraining from showing a particular reaction, such as "good" or "great", or generally discussing or offering my view. My questions will be aimed at getting you to describe your own experience as fully as possible, so by being neutral is aimed at not interrupting or influencing the way you think about practice. *It's not that I am not connected or making a judgement or naive it is just the nature of this method of research*!

3. Signing of consent form

Interview commencement – start the TAPE!!

1. Thank you for agreeing to participate in the interview.
   a. As discussed, I am going to ask you some questions about your experiences *as an* environmental health practitioner.

b. For the purpose of this study, an experience is any activity that you consider relates to environmental health.

c. Can you tell me about the different things you do as a practitioner?
Wait 5 to 10 seconds……………………………….what sort things did you do yesterday… is that common…. Just a sense initially of the sorts of things you do

Practice experience (1)   15- 30 minutes

1. Can you tell me about a recent experience that you have had in environmental health?
*Wait 5 to 10 seconds …………………………………..*perhaps something that sticks in your mind?

   a. Can you tell me a little more about what ***you did*** during that activity?
      i. You mentioned xxxx can **you** explain further what this involved?
      ii. Why was it important that ***you*** did that?
      iii. You mentioned xxxx can you explain further what you mean by that?
      iv. How is that <u>important</u> for environmental health practice or how does that <u>relate</u> to <u>your</u> eh practice? <u>Importance</u> and <u>related</u> to

   b. During this experience, what were <u>you</u> trying to achieve? *How important was that to you*?

   c. On reflection, is there anything that you would have done differently in this experience? If so, what would it be? If so, why could you not have done it then?

Back up - Practice experience (2) (less than 15 minutes) – repeat – Another

We have talked about this experience, was this practice activity typical for you?

Why or why was it not typical, can you me an example of another issues?

Interview conclusions

1. Based upon what we have talked about today what is environmental health practice about, for you?
2. Has the way you think about environmental health practice changed over time? In what way? Why and how?
3. Is there a particular experience that you recall that changed the way you think about practice?
4. If so, can you please describe it?
5. Why did it change the way you think about practice?

6. Is there anything more that you would like to add?
7. Do you have any questions?

Thank you for your participation. **STOP THE TAPE!!**

Appendix C: Sample interview

Q   So thank you for agreeing to participate in the interview. As discussed, I'm going to ask you some questions as an environmental health practitioner. For the purpose of this study an experience, is any activity that you consider relates to environmental health. So can you tell me about the different things you do as a practitioner?

A   Okay. So, do you want what I currently do, or what I have done differently as a practitioner?

Q   Either one.

A   So as a practitioner I have been involved in investigating noise complaints, food.. looking at food safety, a lot of--in my current role and looking at more strategic planning around environmental health issues, particularly at the moment the *domestic waste water management plan*.. and some emergency management planning around heatwave planning and pandemic planning. Basically, I suppose, in general a lot of the things that we deal with is things in the environment that will affect people's health, so whether it's noise, or wood smoke, or odour, or effluent from septics, or food safety, we often have been involved in that in terms of environmental health. I suppose on the other side of it, I've also done. my overseas work with [organisation] around more environmental health and public health messaging.. community health education, which I think fits under that banner. I think that's about it.

Q   Can you tell me about a recent experience that you've had in environmental health?

A   That's a funny question. [laughs] Just something from what we would do day-to-day?

Q   Yeah just an experience that you've had recently, something that perhaps sticks in your mind.

A   I suppose first and foremost in my head is that we have just finished drafting up our *domestic waste water management plan*. That has involved really looking at what some of the risks and the threats of not managing domestic waste water in the council would mean, and what kind of management strategies we would put into place around that.; and developing up an action plan about how we might address those over the next few years. That's what I really have been working on for the last few months.

Q   Okay so with the domestic water plan, can you tell me about the sort of things that you actually did when developing that plan?

A   Basically we've looked at where our major environmentally sensitive areas are; where we have developments that may not have a lot of space to manage their waste water, so therefore there might be issues with waste going offsite, going into the stormwater, going into other people's properties; we've looked at GIS mapping and interrogating data off our database around types of systems that are approved and the complaints and that sort of stuff; we've worked with other agencies around--particularly [organisation] which is our water authority--around their planning for installing sewerage infrastructure; we've worked with other councils around what they're doing in waste water management, sharing ideas; and a lot of writing.

Q   So you mentioned lots of things that you were involved in that, can you perhaps talk a little bit more about--you mentioned "interrogating data"; what does that mean?

A   In this instance, and I suppose in a lot of things that we do, is we do gather a lot of information in the environmental health field, whether it's the number of inspections that we do, or the number of types of non-compliances that we have and that sort of stuff. In this instance we keep a record of the types of systems that we approve on database, and basically we went through that and looked at what types of systems that we had, whether they were what's called 'primary treatment' or 'secondary treatment'; when they were approved; we looked at things that maybe had been in the system and hadn't been approved, so data gaps in our processes; and we also looked at--so that's a more recent part of our database and we've got our old hard copy files from 10, 20, 30 years ago that we had to do some sampling of around okay if we looked at 100 properties and we only found that 50 of them had plans of the septic, then we kind of assume that generally speaking, we've only probably got 50% of the records for the rest of the ones that aren't on the database. We've got like 6,000 properties with septics in the location], so that's pretty massive and a lot of gaps in our information management. So in terms of interrogating the data that was what it was, and also looking at mapping and GIS layers around where [organisation] has provided sewerage versus not, and making assumptions around properties that would have sewer connected or not connected.

Q   In terms of that process of interrogating the data, you talked about "data gaps" in the process, why was it important that you did that?

A   The reason why we were doing that was to really get a snapshot of what.. where we were up to in terms of our septic system information management, and also trying to highlight the issues around compliance and monitoring of septics. You can't monitor something if you don't know what's there, so it was really to put into the plan and provide information to the

Councillor--whom we need to approve the plan--that this is where we're at, it's not.. it's a kind of a consequence of councils and amalgamations, of different ways of record keeping and different systems and that sort of stuff, but if this is what we know, part of our action plan is trying to find out what we don't know and what's involved in doing that; what's involved in bringing that kind of information up to speed so that we can monitor it better and have a better understanding of what systems have been installed, and also be able to direct our education materials and have them more targeted at different types of situations.

Q   So generally when you're doing this, trying to get information, what are you trying to achieve?

A   Well at the end of the day, we want to reduce the risk of waste water getting into the waterways or causing illness. Basically, we have a lot of old systems where people's laundry water and everything just goes straight out into the drains in the street, and so we want to improve basically the public health and environmental health associated with domestic waste water. That's the end goal. Getting there is about making more.. at the end of the day we're not going to be able to make everyone have the best system in the world, but it's about educating them on how to use it better, and how to reduce what's going into it because if you reduce what's going in, you reduce what's coming out; better being able to maintain their septics like they would do for their car or their refrigerator if it broke down and that sort of stuff, so it is kind of increasing that education in landholders that are using septics.

Appendix D: Brief description of participant characteristics and initial impression post-interview

Elizabeth

Elizabeth is a 31-39-year-old female, Australian born, with a post-graduate qualification in Environmental Health. She has practised as an environmental health practitioner in two States in Australia for less than five years. Her current position is a Senior Health Protection Officer. The regulatory compliance areas Elizabeth highlighted as part of her practice experience include Food, Tobacco, Public Health and Wellbeing and Environmental Protection legislation. The specialist activities she considers are part of her practice experience include: Emergency Management, Immunisation, Indigenous Health, Public Health Planning, Sustainability, Education and Training, Food Safety, Communication Disease Control, Housing and Accommodation.

Post Interview Reflection: Environmental health practice is varied, based on evidence, and about doing your job properly within standards. It's about following procedures, about being professional and having broad knowledge with specialised skills and about determining and responding to real and perceived risks and getting outcomes. It's about ongoing learning and continuing professional development, being consistent, educating and being able to ask friends and colleagues for support.

Annie

Annie is a 31-39-year-old female, born (country other than Australia) , with an Australian degree qualification in Environmental Health. Environmental health practice was the first job in her career, and she has practised in the Victorian metropolitan area for 15 -20 years with both local and state government agencies. Her current position is as an Environmental Health Officer/ Practitioner. The regulatory compliance areas Annie highlighted as part of her practice experience include: Food, Tobacco, Public Health and Wellbeing and Environmental Protection and Local Laws legislation, with specialist practice experience in Emergency Management, Immunisation, Food Safety and Communication Disease Control.

Post Interview Reflection: Environmental health practice is about building relationships and collaboration, trust, respect. Being able to do different things, respond to different needs depending on the context. It's thinking about the strategic response, why we are here and contributing to the greater good. It's about alleviating the fear of the community, informing and responding to risk. It's about moving from the practical base to the strategic focus whilst interacting with other disciplines, being able to share, delegate and achieve consistencies in approach.

Kelvin

Kelvin is a 26- 30-year-old male, Australian born, with an Australian degree in Environmental Health. Environmental health practice was the first job in his career, and he has been practising for more than ten years. Kelvin has practised in Victoria and in other states in Australia, including metropolitan, rural or regional and remote areas. He has worked in environmental health positions with local and state government agencies. He is currently employed as an environmental health officer. The regulatory compliance areas indicated as part of his practice experience include Food, Tobacco, Public Health and Wellbeing and Environmental Protection. The specialist activities Kelvin identified as part of his practice experience include Immunisation, Waste Water Management, Indigenous Health, Food Safety, Communicable Disease Control, Housing and Accommodation.

Post Interview Reflection: Environmental health practice is about complexities, being accountable, understanding risks to the community and to yourself. It's about enjoyment, building relationships, education, about change and meeting expectations. It's about increasing confidence, being opened minded and having a basis for decisions, teamwork and not being black and white. It is about achieving health outcomes for community groups.

Simon

Simon is a 31-39-year-old male, Australian, born with an Australian degree qualification in Environmental Health. He has also undertaken postgraduate studies. Environmental health practice was the first job in his career, and his has been practising for 10-15 years. Simon has practised in the Victorian metropolitan and rural area and internationally undertaking emergency relief posts. He has held positions with local and state government agencies. His current position is Director of Health Services. The regulatory compliance areas Simon highlighted as part of his practice experience include: Food, Tobacco, Public Health and Wellbeing and Environmental Protection and Local Laws legislation. The specialist activities he considered as part of his practice experience include Emergency Management, Immunisation, Food Safety and Communication Disease Control.

Post Interview Reflection: Environmental health practice is about protecting the health of the community, but it's also about being innovative, creative and leadership. It's about bringing together stakeholders, ensuring you are knowledgeable and being at the top of your game, being able to respond to situations, adaptive to the complexities of dealing with different parties, with communication a very important part of practice. Practice is powerful; it's about networking keeping current.

Nathan

Nathan is a 50-59-year-old male, Australian born, with an Australian Diploma in Environmental Health. He has also completed postgraduate studies. Environmental health practice was the first job in his career, and he has been practising for more than 20 years. He has practised in Victorian metropolitan areas and worked in environmental health positions with local and state government and in private industry. He is currently a project worker. The regulatory compliance areas Nathan highlighted as being part of his practice experience include: Food, Tobacco, Public Health and Wellbeing and Environmental Protection. The specialist activities Nathan identified as part of his practice experience include Immunisation, Food Safety, Communicable Disease Control and Recycling.

Post lnterview Reflection: Environmental Health practice is about vision and pride. It is powerful, community centred with a focus on protecting health. It's about moving from reactionary to proactive, underpinned by evidence. It is about building relationships and influencing health outcomes and continuous improvement.

Pamela

Pamela is 50-59-year-old female, Australian born, with an Australian Degree in Environmental Health. Environmental health practice was the not the first job in her career, she previously worked in nursing, childcare and the food industry. Pamela has been practising for 5 to 10 years in New South Wales, South Australia and Victoria, including metropolitan, rural or regional areas. She has worked in environmental health positions with local government agencies. She is currently an environmental health officer. The regulatory compliance areas Pamela indicated as being part of her practice experience include: Food, Tobacco, Public Health and Wellbeing, Environmental Protection and local laws. The specialist activities Pamela identified as part of her practice experience include Emergency Management, Immunisation, Waste Water Management, Health Promotion, Public Health Planning, Sustainability, Education and Training, Research, Vector Control, Food Safety, Communicable Disease Control, Recycling, Housing and Accommodation.

Post Interview Reflection: Environmental health practice is about compliance, education being fair, helping the community and having a duty of care, about achieving health protection, having the support of a team and being able to deal with challenging situations. It is about self-protection, preservation and safety, gaining cooperation and being able to read situations, having a 6th sense about people and reflection.

Colin

Colin is a 40-49-year-old male, Australian born, with an Australian Degree in Environmental Health. Environmental health practice was the first job in his career, and he has been practising for more than 20 years. He has practised in New South Wales, Queensland and Victoria, including metropolitan, rural or regional and remote areas and has undertaken an international posting. He has worked in environmental health positions with local government agencies and as a private contractor. He is currently a manager in environmental health. The regulatory compliance areas Colin indicated as part of his practice experience include: Food, Tobacco, Public Health and Wellbeing and Environmental Protection. The specialist activities Colin identified as part of his practice experience include Emergency Management, Immunisation, and Waste Water Management, Food Safety and Technology (Software development) and innovation.

Post Interview Reflection: Environmental health practice is about being an efficient system, getting the best possible outcomes within the resources available as a way to achieve health and public health protection as part of a broader system. It's about information sharing, keeping up-to-date, being innovative, being passionate, a protector and making change and being a champion for environmental health and leader in the community in order to prevent disease

Ted

Ted is 50-59-year-old male, Australian born, with an Australian Diploma in Environmental Health. He has also competed post-graduate studies. Environmental health practice was the first job in his career and he has been practising for more than 20 years. He has practised in Victoria, in metropolitan, rural or regional areas and has undertaken an international posting. He has worked in environmental health positions with local and state government. He is currently a Manager. The regulatory compliance areas Ted indicated as being part of his practice experience include: Food, Public Health and Wellbeing Environmental Protection and Water Safety. The specialist activities Ted identified as part of his practice experience include Emergency Management, Immunisation, and Waste Water Management, Food Safety, Education and Training, Research, Communicable Disease Control and Water.

Post Interview Reflection: Environmental health practice is about communication, information exchange, identifying and managing risks, working within governance frameworks, a process, making Victoria a healthier place to be through enacting change via cooperation and selling the benefits, planning for the future, succession planning, changing behaviour working with stakeholders through collaboration and on-going professional development and self-reflection.

Trisha

Trisha a 26-30-year-old female, born in (country other than Australia), with a Degree in Environmental Health obtained internationally and has undertaken post-graduate studies. Environmental health practice was the not the first job in her career, she previously worked as a health and safety consultant. Trisha has been practicing for less than 5 in the Victorian metropolitan areas. She is currently an environmental health officer/ practitioner and policy officer. The regulatory compliance areas Trisha indicated as being part of her practice experience include: Food, Tobacco, Public Health and Wellbeing, Environmental Protection and Local Laws. The specialist activities Trisha identified as part of her practice experience include Emergency Management, Waste Water Management, Health Promotion, Food Safety, Communicable Disease Control Housing and Accommodation.

Post Interview Reflection: Environmental health practice is about being reasonable, looking to support and guide the team, developing consistency, achieving outcomes that protect life as well as happiness for the community, striving for recognition to enable more resources to assist in protecting the community more and keeping up with best practice and continuous improvement.

Martin

Martin is 31-39-year-old male, born in Australia, with an Australian Degree in Environmental Health. Environmental health practice was the first job in his career, and he has been practicing for 10 to 15 years. He is currently a Team leader. The regulatory compliance areas Martin indicated as being part of his practice experience include Food, Public Health and Wellbeing, Environmental Protection and local laws. The specialist activities Martin identified as part of his practice experience include Emergency Management, Immunisation, Health Promotion, Public Health Planning, Education and Training, Food Safety, Communicable Disease Control

Post Interview Reflection: Environmental health practice is about trust, relationships, balancing stress and productivity, reducing liability, being creative in order to find solutions to problems that benefit the community, the environment and health, empowering people by education but knowing when to make the call between enforcement and a proactive approach, managing the political environment, being knowledgeable, team building, succession planning, keeping interested by ensuring variety in your work, looking towards securing the future.

Susan

Susan is a 40-49-year-old female, born in Australia with an Australian Degree in Environmental Health. She has also completed post-graduate qualifications. Environmental health practice was the first job in

her career. Susan has been practising for 15 to 20 years in several states in Australia, including metropolitan, rural or regional areas. She has worked in environmental health positions with local government agencies. She is currently an Educator. The regulatory compliance areas Susan indicated as being part of her practice experience include: Food, Tobacco, Public Health and Wellbeing, Environmental Protection and Local Laws. The specialist activities Susan identified as part of her practice experience include Emergency Management, Immunisation, Health Promotion, Sustainability, Education and Training, Research, Vector Control, Food Safety, Housing and Accommodation.

Post Interview Reflection: Environmental health practice is about sharing information and problems in order to develop solutions based on evidence which is supported through research and collaboration. It's about communication, self –reflection and creating sustainable ways to ensure the community can protect themselves as well as protecting the surrounding environment. It is about professional development, keeping up-to date, whilst ensuring policymakers and the wider community understand the complexities of practice in order to advocate for resources and gain greater recognition for the role.

Natalie

Natalie is a 31-39-year-old female, born in Australia, with an Australian Degree in Environmental Health. She has also completed post-graduate studies. Environmental health practice was the first job in her career and she has been practising for 15 to 20 years. Natalie has worked in environmental health positions with local government agencies in metropolitan and rural areas, international aid organisations and has practised in Victoria and overseas, including international emergency management postings.

She is currently a project officer. The regulatory compliance areas Natalie indicated as being part of her practice experience include Food, Tobacco, Public Health and Wellbeing, Environmental Protection and Local Laws. The specialist activities Natalie identified as part of her practice experience include Emergency Management, Immunisation, Waste Water Management, Health Promotion, Education and Training, Research, Food Safety, Communicable Disease Control, Housing and Accommodation.

Post Interview Reflection: Environmental health practice is about having the skills and knowledge to do a broad range of things, which is often reduced to a narrow scope of practice. It's about developing a sense of worth amongst the community as well as gaining a shared approach in order to gain consistency of outcomes amongst the community that improve health, using data to influence these outcomes. It's about gaining support through advocacy, being adaptable and applying your skills to help others. It's about your own individual view and passion and be able to impart your knowledge and educate others to gain health and environmental outcomes; it's also about perspective and working with others to gain solutions whilst understanding the capabilities and outcomes of others.

Maxwell

Maxwell is 26-30-year-old male, Australian born, with an Australian Degree in Environmental Health. Environmental health practice was not the first job in his career and has been practising for less than one year in the Victorian regional -rural area. He previously worked in the food industry. He is currently an environmental health officer/ practitioner. The regulatory compliance areas Maxwell indicated as part of his practice experience include Food, Public Health and Wellbeing, Environmental Protection. The specialist activities Maxwell identified as part of his practice experience include Emergency Management, Immunisation, Public Health Planning, Food Safety, Communicable Disease Control and housing and Accommodation.

Post Interview Reflection: Environmental health practice is about empathy and understanding, helping people out whilst trying to protect public health; it's about not being the enemy. It's about raising the profile amongst other stakeholders to ensure that de-regulation does not take place in order to ensure the community is protected. It is a lifestyle choice or what makes up part of your life. It's about ensuring good evidence to not only convince the magistrate but to convince those that need to make the change to do it. It's about gaining experience from others and being aware of the broader impacts to the community from your decisions

Paul

Paul is 60 plus-year-old male, Australian born, with an Australian Diploma in Environmental Health. Environmental health practice was not the first job in his career. Paul has been practising for over 20 years in regional -rural areas in New South Wales, Northern Territory, South Australia and Victoria. He previously worked as an electrician and in the water industry. He is currently an environmental health officer/ practitioner. The regulatory compliance areas Paul indicated as part of his practice experience include Food, Public Health and Wellbeing, Environmental Protection, Local Laws and Building and Town Planning-. The specialist activities Paul identified as part of his practice experience include, Immunisation, Waste Water Management, Food Safety, Communicable Disease Control and Vector Control

Post Interview Reflection: Environmental health practice is about gaining statutory compliance. It's about doing what we are trained to do, to protect public health through the application of legislation. It's about making sure you only asked what you are allowed to ask people to do within the boundaries of the law and being able to keep up to date with any changes to this law, and having the right expertise to make those decisions. It's about surveillance of the local area, looking for problems not sitting behind a desk dealing with issues only when they arise, it's about taking and making reports to the manager to

highlight the issues and gain change; keeping detailed notes for prosecution purposes, it's also about a struggle to gain recognition for the work you do.

Sally

Sally is an 50-59-year-old female, Australian born, with an Australian Degree in Environmental Health. Environmental health practice was not the first job in her career, and Sally has been practising for 10-15 years in regional or rural and remote areas in Western Australia and Victoria. She previously worked as a Lab Assistant, farmer, hospitality and clerical worker. She is currently an environmental health officer/ practitioner. The regulatory compliance areas Sally indicated as part of her practice experience include Food, Public Health and Wellbeing, Environmental Protection, Local Laws. The specialist activities Sally identified as part of her practice experience include: Immunisation, Waste Water Management, Food Safety, Communicable Disease and Vector Control, Housing and Accommodation, Recycling and Indigenous issues

Post Interview Reflection: Environmental health practice is about being human. It's about protecting health while trying to get good outcomes that will not impact on people's livelihood. It's about maintaining relationships in order to be able to do your job but still be an active member of the community. It's about providing evidence to support your decision and gaining support and feedback about what you do, to validate you approach to the job and achieve continuous improvement, keeping interested, maintaining professionalism, being an advocate for yourself and others and looking for ways to manage being time-poor.

Wayne

Wayne is a 50-59-year-old male, born Australian born, with an Australian Diploma in Environmental Health. He also has completed post-graduate qualifications. Environmental health practice was the first job in his career. Wayne has been practising for over 20 years in metropolitan, regional and rural areas in New South Wales and Victoria and has international environmental health experience. He is currently a Manager. The regulatory compliance areas Wayne indicated as being part of his practice experience include Food, Public Health and Wellbeing, Environmental Protection, Local Laws, Tobacco, Emergency Management and Fire Prevention. The specialist activities Wayne identified as part of his practice experience include Immunisation, Waste Water Management, Food Safety, Communicable Disease Control, Vector Control, Sustainability, Housing and Accommodation, Recycling and Education and Training.

Post Interview Reflection: Environmental health practice is about behaviour change underpinned by legislation. It is about professionalism, mitigating risks to the community and about hierarchy and process. It's about accountability, self-protection and promotion, gaining recognition, particularly within an increasing political environment and having good processes in place to support decision making and continually improving yourself so you are a better person.

Carmel

Carmel is 40-49-year-old female, Australia born, with an Australian Degree in Environmental Health. Environmental health practice was the first job in her career. Carmel has been practising for 10 to 15 years, in Victoria, including metropolitan, rural or regional areas. She has worked in environmental health positions with local government agencies. She is currently a consultant in environmental health practice. The regulatory compliance areas Carmel indicated as part of her practice experience include: Food, Tobacco, Public Health and Wellbeing, Environmental Protection and Local Laws. The specialist activities Carmel identified as part of her practice experience include Emergency Management, Immunisation, Health Promotion, Sustainability, Education and Training, Research, Vector Control, Food Safety, Housing and Accommodation

Post Interview Reflection: Environmental health practice is about communication, networking, working with people and helping to gain the right solution. It's about perseverance in order to gain respect, being able to meet the challenges whilst operating in an environment that needs to meet targets. It's about understanding a way to advocate for the role and position and making management aware of what you do so you can make an impact and not been left behind. It's about having a healthy community.

Graham

Graham is a 26- 30-year-old male, born (a country other than Australia), with an Australian Degree in Environmental Health. Environmental health practice was the first job in his career, and he has been practising for 1-5 years. He has practised in Victoria in metropolitan, rural or regional areas. He is currently an environmental health officer. The regulatory compliance areas Graham indicated as part of his practice experience include Food, Tobacco, Public Health and Wellbeing and Environmental Protection. The specialist activities Graham identified as part of his practice experience include Emergency Management, Food Safety, Communicable Disease Control and enforcement actions, including food sampling.

Post Interview Reflection: Environmental health practice is about preventing ill health for the benefit of the whole community. It's about finding a balance between different parties needs in order to get the

best outcome for council and the community. It is about using initiative, collaboration, communication, and learning and profession development in order to know how to respond in the best way. It's about letting the community know what you do so you can prevent problems.

Mandy

Mandy is a female with less than 25 years old, Australia born, with an Australian Degree in Environmental Health. Environmental health practice was the first job in her career and she has been practising for less than one year. Mandy has practised in Victoria and is currently an environmental health officer.   The regulatory compliance areas Mandy indicated as part of her practice experience include Food, Tobacco, Public Health and Wellbeing and Environmental Protection. The specialist activities Mandy identified as part of her practice experience include Vector Control and Food Safety.

Post Interview Reflection: Practice is about education and compliance and being flexible in your approach. It is about building good relationships in order to gain compliance and making people aware of the benefits to their business in doing so. It's about researching problems, so you can keep up to date and finding solutions and looking for better ways to do things using technology, it's about ongoing professional development.

Appendix E: Sample of notes developed for each individual participant

Paul	
What is practice about?	Protecting the community
For what purpose?	Stop outbreaks / Prevent harm
How do they do this?	Follow prescribed process/application of legislation and authority and control, do what trained to do, (hierarchy- reports to senior management for decision), work within boundaries
Quotes	So, it's in a council, in local government, it's just about using your delegated authority under the various acts and regulations to monitor, administer and to control what you can within your powers. you really just going out to see that everything is as it should be and if you find that it's not, that you take appropriate action under your delegated authority.
What else seems to be in their awareness?	Serving needs of ratepayers? Lack of agency – decisions made above him/ not recognised? View of other EHOs, do things differently – don't see the need for enforcement side? /Complex - in terms of who deals with
Mandy	
What is practice about?	Helping and protecting the health of community and
For what purpose?	Keeping residents safe / improve the community/ helping them to resolve issues
How do they do this?	Process/ procedure – but 'I try to be flexible and not so black-and-white in my approach'. -underpinned by 'open communication/relationship'
Quotes	So, it's more about developing a good relationship with the proprietors as well, because I find that's more effective in them achieving compliance because they're more willing to do something because they've been educated on why and also because we have a good rapport, as well. It's about providing education and helping people resolve issues that they haven't been able to resolve themselves, through nuisance complaints and things like that.
What else seems to be in their awareness?	Having a positive view from the community – happy to call any time Personal growth, personal view of the 'job', practice is changing need to keep up evolving industry s, using -helping, improving, new ways to do things Empowering people? E.g updating information, so they can come to them Education Building relationships/ communication

Appendix F: Sample notes to support grouping of transcripts into tentative categories

<u>**Paul**</u>

What: Focus on following process to protect the community, stop harm. Serve the needs of the rate payer, keep up to date with the Use delegated authority Monitor/ administer /control within your powers, work within boundaries, use your experience and what trained to do, keep up to date with the law and accept changes. Talk to people to find out problems –

What: protect and serve

How: delegated authority/ stop harm Use delegated authority Monitor/ administer /control within your powers, work within boundaries / Prosecution to protect the public / aware of political interface

Why: if not there it would be a problem, what paid to do

Similar: process, protect, legislation etc –

Context: Within boundaries / localised context / political context/ limited agency

<u>**Wayne**</u>

What: protect and serve - know or perceived health risks to the community

How: process / protocol, within legislative boundaries/ maintain professionalism/ risk mitigate/educate into compliance - population health perspective / aware political interface

Focus on following process and protocol – Preventing/ reducing risks through high level of education followed by enforcement / compliance regime. Education is aimed at 'behaviour changes because we're making you change something that you would have normally done for whatever reason' 'Educate you in the practice we think is important to us – if behaviour does not adapt – sanction'

Processes protect people, stand your ground legislation allows you to be there. Legislation there for a reason, smoking an issue so banned selling to children. Processes ensure staff are protected (high level of scrutiny and accountability what you do, political influences), organisation is protected and community through following processes and protocol. Practitioner requires the ability to maintain professionalism – do what you are paid to do, maintain community norms, provide high level of customer service, have high values due to the position of law enforcement, interpret legislation etc.

Why: protect community, individual and organisation individual and maintain community norms and expectations

Context: localised – aware of differences in state but need to adapt to local context, has shifted over the years from practice being about the numbers / KPIs visits to risk mitigation, minimise and prevent risks to the community. Full circle – Political context

Black and white, individual level

Elizabeth

What: Help **and p**rotect the community, going beyond just law enforcement, look at emerging issues there are what policies and frameworks, or other things can be developed to prevent things happening or to *reduce* the impacts on the community

How: Focus on following process, working within standard operating procedures, gaining consistency in decisions/processes / gaining evidence/ following legislation and giving correct facts, understanding risks, real or perceived / putting into context in investigate the problem (i.e is the complaint justified)   networking and asking questions / adapting to changing standards/ using a wide range of skills such as empathy, good communication,   educating and helping the population/ having to be a generalist in a specialist world, varied understanding, expertise and breadth of knowledge, professional development find out what is happening in the state, county, world changes that are happening, support to councils/

Why: empower people with knowledge so they understand, and the risk is reduced, reduce the risk, keep up with emerging issues, get confidence of proprietor know what you are talking about', doing job, / you are of a benefit/ help to achieve compliance/more sustainable

Context: localised and across the state situation of complainant, put at ease

Carmel

What: health wellbeing, benefit to the community, 'having a sense of why you do what you do' But fundamentally for me it's about *having a healthy community*, so I look at it from that aspect in terms of what we do and the benefits the community gain from that. So, yes, we have the very much certain *regulatory environments that control what we do*, but I think there's a lot of potential to spruik about the fact that we do those things, the community are much *healthier and better for it. What we do effectively creates a healthy community in a number of ways, shapes and forms. So, yeah, I probably look at it in a bit different light than some others, but yeah, that's just how I've seen it.*

How: setting policy at strategic level **,** developing policies and procedures to guide process, link environmental health outcomes to municipal strategic process , municipal wellbeing plan, looking at better ways to communicate with the community, food proprietors , multitasking on site –your looking, you're talking, your recording, giving directions, your, develop relationship proprietor (focus on the important things,), approach the whole situation, they are trying to run a business, it is tough for them   – take into account body language, needs of proprietor (CALD), being clear about your message, make them feel comfortable- benefits of why you are there , networking with colleagues, sharing information, how others would approach it, support staff, sticking it out with difficult proprietors, be persistent , good open communication –' get him comfortable with me-he thanked me for being helpful'

Why: manage complaints better, good at doing job, not good at promoting what we do benefits the community, more efficient at what you do at getting message across illness, 'really, at the end of the day you can usually work through them with just showing that you're there you can help them, things like that'. I think that's where we need to work a bit in that industry. Effective and efficient, gaining consistency and setting an expectation for the community; understanding time spent to activities (multiple things to do) so don't lose your budget, creating the picture understand the importance

(some councils don't think environmental health is needed),   preventative measures such as immunisation – burden of illness is reduced, as people are protecting themselves ; helping to achieve healthy community/

Similarities: Paul / Wayne/ Elizabeth/ Carmel/ following a process/ procedures/ understand the legislation/   gaining standard operating procedures application of legislation, professional development/ risks real or perceived –

Differences – Elizabeth / Carmel more on, working beyond legislation to other frameworks / adopt a empowerment role/ promoting the benefits of practice which can prevent or reduce impacts on the community, awareness of makes reference to changing - environment/community world/ and required to keep up with this (describes being a generalist in a specialist world/empower people) – more agency? Impacts wider than just people involve the community – holistic nature of situation Changing / adapting/helping

Appendix G: Sample notes summarising key aspects of the 'helping' category of description

Helping to create a healthy community

What seems in focus?

Helping / protecting the community/stakeholders/ from health and environmental risks, education / empowerment more sustainable, contribution to positive outcomes/ benefits/ adjusting practice/ creating 'healthy'

How you go about this involves a focus on.

Educator before enforcer

- "balancing act" / 'Not black and white
- Consideration of the whole context – what is the best outcome for the community/council/ what is the councils' priorities/ who is best to address this problem
    - Risk (to council / staff/ people/stakeholders) versus impact on economic, social /environmental consequences - don't sweat the small stuff – giving opportunity
    - Urgency of problems and risk
    - Metro versus rural versus remote / building relationships
    - Community group versus business
    - Managing community expectations/community/ organisational perceptions
    - Human side of practice/
- Education of community –
    - for empowerment (can do themselves/more likely) leading to compliance/ prevention and more sustainable outcomes
    - seen as a useful resource/sharing of expertise/helping
    - so community will come to you with problems (educate about what eh is and this enable a proactive approach to planning for health risks/jack of all trades
- Being effective (communication style, focusing on the high risk issues/outcomes) leading to efficiency (in KPIs outputs)
- Achieving consistency (promotes fairness, clarity regarding requirements, more likely to do and believe and trust)
- Team effort/networking to
    - get solutions to problems
    - maintain consistency
    - debrief and support each other
    - share /benchmarking
- Customer service? Service to the community
- Positive benefits to the community/ raising profile/ positive to negative perceptions of practice /implications of resourcing etc

Appendix H: Table developed to support themes of expanding awareness

Category	Outcome of practice	Those impacted by practice	Approach to practice	Capacity to act	Role of practitioner
Category One: Protecting from harm	Stop or control hazards fundamental to the practice of environmental health	People and community	Adoption of set process *practitioner led* responsibility for solutions to control and prevention of hazards	Limited to boundaries	Enforcer
Category Two Helping stakeholders to create a healthy, sustainable community	Fundamentals of practice achieved with solutions having a positive and sustainable benefit to stakeholders	Community and Stakeholders within and outside the immediate community	Process modifiable shared *responsibility* and holistic perspective to solutions for the control and prevention hazards	Ability to change capacity to act without compromising boundaries - context and intrinsically dependant	Educator with enforcement as 'fall back position
Category Three Collaborating in partnership for optimal health outcomes	Fundamentals achieved with solutions considered within a complex systems environment	Partners representing all impacted entities	Process collectively developed collaborative *responsibility* for solutions for the control and prevention of hazards	Ability to negotiate capacity to act by connecting boundaries without comprising boundaries	Facilitator and mediator
Category Four Leading and innovating create our future	Respond to future challenges to secure the health of generations	Present and future generations	Influence process stewardship responsibility	No limits to the capacity	Influencer and empowering

Appendix I: Consent Information Statement Online screening survey

Project Title: Experiencing the practice of environmental health

Principal Investigators:

Associate Professor Karen Farquharson	Ms Louise Dunn
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Associate Investigators

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Email: lmann@swin.edu.au	Email: dbossio@swin.edu.au

Interviewer: Louise Dunn

Introduction to Project and Invitation to Participate

You are invited to participate in the above project which will help us to understand the ways environmental health practice is experienced by practitioners. This research is being undertaken due to the impact of the increasingly complex, changing and evolving nature of the determinates of health, impacting on the practice of environmental health.

What this project is about and why it is being undertaken

This project aims to develop a more comprehensive understanding of the practice of environmental health, by discovering and describing the different ways practice is experienced by practitioners. Recent government environmental health workforce reviews have identified the skills and knowledge required to practice, contributing to an understanding of the practice area. However, studies focusing on the experience of practice amongst practitioners have yet to be undertaken. This project also forms part of Louise Dunn's PhD project. The findings are anticipated to be used to inform professional

education programs and stakeholders involved in environmental health workforce development. Research findings may also be published in conferences and journals, in addition to Louise's PhD thesis.

What participation will involve

Should you agree to participate, you will be asked to participate in a 5-10-minute online survey. The survey aims to identify a sample of 20- 25 qualified practitioners, with different characteristics and variation in environmental health practice experience, who would like to participate in a 40- 60 minute semi structured, open-ended interview. If you agree to participate in an interview, and form part of the sample group selected, you will be contacted to organise a mutually suitable time and location for the interview to take place.

The interview will involve you describing a practice experience that you have been involved in and describing your experience of the practice activity to the researcher Louise Dunn. Questions such as what you did, how you went about the activity and why, will be explored. The questions are not testing theoretical knowledge of practice; therefore, there are no right or wrong answers to these questions.

 With your permission, the interview will be audio-recorded so that we can ensure that we make an accurate record of what you say.

You will also be notified if you complete the online survey and do not form part of the initial sample group to be interviewed. You may also be further contacted for an interview if the opportunity arose.

Voluntary participation, rights and interests, privacy & confidentiality of participants

Your participation in this study is completely *voluntary*. Should you wish to withdraw at any stage or withdraw any unprocessed data you have supplied you are free to do so. It is also anticipated that this research will provide you with the opportunity to reflect on your practice and contribute to a more comprehensive understanding of the practice of environmental health.

Your anonymity will be maintained at all times by ensuring that any person who takes place in the study is not identified in any published or other presentation of the research. Any references to personal information, which may allow someone to guess your identity, will be removed, and you will only be referred to by a pseudonym.

Your confidentiality and privacy will be maintained at all times by ensuring that the on-line survey and interview responses, recorded audio tapes and informed consent forms remain accessible only to the researchers and remain under safe storage at all times, including password protecting any computer files. Your name and contact details will be keep separate from all data which is collected.

Once the study has been completed, a brief summary of the findings will be available to you if you should request this on the accompanying on-line survey.

If you would like to participate in this study, please visit the link below. Completion and submission of this on-line survey constitutes consent to use this information you supply in the publication of results for the research and enable us to contact you to arrange an interview if indicated by you.   Before participation in the interview, additional consent to participate in the interview will be obtained from you. You are free to withdraw from this research at any time, which includes this further interview if you choose to do so.

Further information about the project

If you would like further information about the project, please do not hesitate to contact:

Associate Professor Karen Farquharson
Office: AS 311, Hawthorn Campus

Mail 24, PO Box 218 Hawthorn, Victoria, 3122
Phone: +61 (03) 9214 5889
Email: Kfarquharson@swin.edu.au

COMMEMENCMENT OF SURVEY QUESTIONS

I agree to participate in this survey   - (URL LINK TO FIRST QUESTION ON SURVEY)

I do not agree to participate in the online survey - (URL LINK TO THANK-YOU PAGE)

Consent Information Statement

Project Title: Experiencing the practice of environmental health

Principal Investigators:
Associate Professor Karen Farquharson	Ms Louise Dunn
Associate Dean, Research and Engagement	School of Health Science
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Interviewer: Louise Dunn

Introduction to Project and Invitation to Participate

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What this project is about and why it is being undertaken

This project aims to develop a more comprehensive understanding of the practice of environmental health, by discovering and describing the different ways practice is experienced by practitioners. Recent government environmental health workforce reviews have identified the skills and knowledge required to practice contributing to an understanding of the practice area. However, studies focusing on the experience of practice amongst practitioners have yet to be undertaken. This project also forms part of Louise Dunn's PhD project. The findings are anticipated to be used to inform professional education programs and stakeholders involved in environmental health workforce development. Research findings may also be presented published in conferences and journals, in addition to Louise's PhD thesis.

What participation will involve

Should you agree to participate, you will be asked to participate in a 40- 60-minute semi-structured open-ended interview.

The interview will involve you describing a practice experience that you have been involved in and describing your experience of the practice activity to the researcher Louise Dunn. Questions such as what you did, how you went about the activity and why, will be explored. The questions are <u>not testing</u> theoretical knowledge of practice; therefore, there are no right or wrong answers to these questions.

With your permission, the interview will be audio-recorded so that we can ensure that we make an accurate record of what you say.

Voluntary participation, rights and interests, privacy & confidentiality of participants

Your participation in this study is completely *voluntary*. Should you wish to withdraw at any stage or withdraw any unprocessed data you have supplied you are free to do so. It is also anticipated that this research will provide you with the opportunity to reflect on your practice and contribute to a more comprehensive understanding of the practice of environmental health.

Your anonymity will be maintained at all times by ensuring that any person who takes place in the study is not identified in any published or other presentation of the research. Any references to personal information, which may allow someone to guess your identity, will be removed, and you will only be referred to by a pseudonym.

Your confidentiality and privacy will be maintained at all times by ensuring that the interview responses, recorded audio tapes and informed consent forms remain accessible only to the researchers and remain under safe storage at all times, including password protecting any computer files. At the conclusion of the PhD research all identifiable material including audio recordings and consent forms will be retained under lock and key by Louise Dunn in her office at Swinburne University for a minimum of five years, then destroyed.

Your name and contact details will be keep separate from all data which is collected.
Once the study has been completed, a brief summary of the findings will be available to you if you should request this on the consent information study.

If you would like to participate in this study, please sign the attached consent form.

Further information about the project
If you would like further information about the project, please do not hesitate to contact:

Associate Professor Karen Farquharson
Faculty of Health Arts and Design
Swinburne University
Office: AS 311, Hawthorn Campus
Mail 24, PO Box 218 Hawthorn, Victoria, 3122
Phone: +61 (03) 9214 5889
Email: Kfarquharson@swin.edu.au

Appendix K: Email Confirmation Ethics Approval

From: Keith Wilkins
To: Karen Farquharson; Louise Dunn
Cc: RES Ethics; Astrid Nordmann
Subject: SHR Project 2014/108 - Ethics Clearance
Date: Friday, 6 June 2014 5:06:15 PM
To: Associate Professor Karen Farquharson, Ms Louise Dunn - FHAD
Dear Karen and Louise

SHR Project 2014/108 Experiencing the practice of Environmental Health
A/Prof. Karen Farquharson, Ms Louise Dunn, Dr Llewellyn Mann, Dr Dianne Bossio - FHAD Approved
Duration: 06/06/2014 to 06/06/2017

I refer to the ethical review of the above project protocol by a Subcommittee (SHESC1) of Swinburne's Human Research Ethics Committee (SUHREC). Your responses to the review, as per the email sent earlier today, were put to the Subcommittee delegate for consideration. You will have received via separate email some feedback from the delegate for attention as you see fit.

I am pleased to advise that, as submitted to date, the project may proceed in line with standard on-going ethics clearance conditions here outlined.

All human research activity undertaken under Swinburne auspices must conform to Swinburne and external regulatory standards, including the current *National Statement on Ethical Conduct in Human Research* and with respect to secure data use, retention and disposal.

The named Swinburne Chief Investigator/Supervisor remains responsible for any personnel appointed to or associated with the project being made aware of ethics clearance conditions, including research and consent procedures or instruments approved. Any change in chief investigator/supervisor requires timely notification and SUHREC endorsement.

The above project has been approved as submitted for ethical review by or on behalf of SUHREC. Amendments to approved procedures or instruments ordinarily require prior ethical appraisal/clearance. SUHREC must be notified immediately or as soon as possible thereafter of (a) any serious or unexpected adverse effects on participants any redress measures; (b) proposed changes in protocols; and (c) unforeseen events which might affect continued ethical acceptability of the project.

At a minimum, an annual report on the progress of the project is required as well as at the conclusion (or abandonment) of the project. Information on project monitoring,
t:http://www.research.swinburne.edu.au/ethics/human/monitoringReportingChanges/
A dul yauthorised external or internal audit of the project may be undertaken at any
time.

Please contact the Research Ethics Office if you have any queries about on-going ethics clearance. The SHR project number should be quoted in communication. Researchers should retain a copy of this email as part of project recordkeeping.

Best wishes for the project.
Yours sincerely,

Keith Wilkins for Astrid Nordmann SHESC1 Secretary

Dr Astrid Nordmann

Research Ethics Executive Officer Swinburne Research (H68) Swinburne University of Technology PO Box 218, Hawthorn, VIC 3122

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