Understanding Preparedness: The Influence of Teaching and Learning Experience on Bioscience Integration by Nursing Lecturers

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ABSTRACT

This thesis explores how teaching and learning experiences influence nursing lecturers' preparedness to integrate biosciences in their teaching practice. The biological sciences have been a problematic component of nursing education and practice for many years and bioscience knowledge levels amongst many nursing lecturers are reported to be poor. This research encompasses a detailed exploration of the teaching and learning experiences of ten New Zealand nursing lecturers to identify experiences that influence their preparedness with bioscience integration.

The phenomenon of preparedness was explored from the perspective of transcendental phenomenological philosophy and the key theoretical construct of intentionality. Study participants' subjective, conscious experiences were explored through in-depth interview and phenomenological analytical procedures to identify the universal experience and essences of how experiences came to be. Preparedness as a phenomenon is influenced by participants experiencing contrast, reflection and responsibility in learning, nursing, and teaching practice. These cognitive and affective processes occur as a result of the complex relationship between experiences, personal values and beliefs about 'good' nursing and teaching practice, and are found to be more influential than experience alone. This is an important discovery for nursing education as mere exposure to examples of bioscience in nursing may not affect students' or lecturers' perceptions of bioscience value.

The way that bioscience knowledge is valued within personal perceptions of good nursing underpins lecturers' preparedness, and shapes the way that learning, teaching and practice experiences are evaluated. The research demonstrates the importance of reflective learning and meaning perspectives in bioscience education, and the preparedness of nursing lecturers to practice integrated teaching. However,

despite a willingness to integrate bioscience when teaching nurses, lecturers question their confidence with traditional academic perceptions of bioscience knowledge. The findings question contemporary pedagogies in bioscience education and epistemological perspectives of bioscience theory in the context of nursing as a practice-based profession. Recommendations are made to facilitate reflective learning, and lecturers' preparedness with integrated teaching, through progressive spiral curricula that value clinical bioscience knowledge and the contribution of nursing lecturers' clinical expertise.

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CHAPTER ONE

Introduction and Background

> Combining both the art and the science of nursing, seeing and bringing to bear the distinctive characteristics of each form, *and* of the relation between them, imposes a complexity in professional nursing practice that virtually defies description. *(Peplau, 1988, p. 9 original emphasis)*

Introduction

The complex relationships within knowledge use in nursing practice contribute to one of the most persistent issues in nursing education: *the bioscience problem*. Despite decades of research in bioscience education for nurses, many nurses struggle to learn the biological science underpinning nursing practice, and nursing lecturers commonly struggle to teach it (Craft, Hudson, Plenderleith, Wirihana, & Gordon, 2013; Jordan, Philpin, Davies, & Andrade, 2000; McVicar, 2009). These issues with bioscience teaching and learning have collectively been referred to as *the bioscience problem* since its documented emergence in the early 1970s. Many studies have examined problems with student learning and the impact of specific teaching interventions on students' achievement in bioscience courses, but the experiences of nursing lecturers have received less attention. Studies do report that many nursing lecturers' have poor bioscience knowledge, and/or ability to articulate its application to practice when teaching (Friedel & Treagust, 2005; Larcombe & Dick, 2003; McVicar, 2009). This situation exists despite evidence that learning bioscience by exploring theory to practice application is beneficial for students (Lim & Honey, 2006; Logan & Angel, 2011; McVicar, 2009).

The researcher in this study is a nursing lecturer with interest, qualifications and considerable experience with bioscience application in nursing, and teaching practice. Integrating bioscience concepts in clinically focused teaching comes easily to the researcher and is reported to be easily understood by students. However, these students anecdotally report that integrated teaching is uncommon amongst science and nursing lecturers, particularly in pre-registration nursing education. The researcher was inspired to explore if, why, and how lecturers' experiences with learning and teaching bioscience in nursing influenced their preparedness to integrate biosciences in their teaching. Student learning is facilitated by integrated teaching; therefore greater understanding of the factors that enable and hinder lecturers' preparedness has the potential to identify strategies that may enable greater bioscience application in teaching, and nursing practice.

Background

In their practice nurses are required to use knowledge from a number of disciplines in order to exercise professional judgement in clinical assessment, decision making, communication, care provision and evaluation in situations that can be dynamic and unpredictable. Nursing education is thus challenged to prepare and equip registered nurses with the knowledge and practice experience that is believed to enable professional practice. Whilst minimum practice and education standards for registration are stipulated by the governing bodies of each country (see for example The Ministry of Health, 2003; Nursing Council of New Zealand, 2007, 2010), debate regarding the recognition and value of distinct knowledge domains within nursing education has a long and contentious history (Chinn & Kramer, 2011; Peplau, 1988).

Prominent within debates of nursing epistemology is the unresolved balance of art and science in nursing. Although the notion of nursing as both art and science has been present since the time of Nightingale, the *two cultures* are known to divide rather than unite conceptions of nursing knowledge and practice (Closs, 1994; Darbyshire, 1999; Logan & Angel, 2011). As pre-registration nursing programmes moved from the hospital environment into tertiary education, the art (humanities and social science) and science (natural sciences) of nursing have come to co-exist as subjects in nursing education. Additionally, biological science subjects are now commonly taught by subject experts, rather than nursing lecturers (Craft, et al., 2013; Friedel & Treagust, 2005; Larcombe & Dick, 2003). However, the mere co-existence of such characteristically different knowledge forms in nursing education has done little to address the divide (Darbyshire, 1999; Davis, 2010).

The simultaneous use of different knowledge domains in nursing practice is a complex endeavour, yet it characterises nursing practice. Indeed, in an early theoretical paper on the art and science of nursing Hildegard Peplau eloquently noted that there is "a seamless quality, a graceful and delicately balanced movement, between art and science portrayed by experienced, expert nurses that transcends as it uses the differences between these two forms" (Peplau, 1988, p. 14). Learning how to use scientific knowledge in nursing practice requires the complex integration of knowledge forms to be explained and understood in the context of the nurses' role in patient care (Benner, Sutphen, Leonard, & Day, 2010). Yet the presentation of art and science as complementary subjects within nursing curricula places the responsibility of integration largely with the student, unless nursing lecturers are prepared to practice integrated teaching.

Progression of pre-and post-registration nursing programmes into higher education has contributed to content-laden, fragmented academic curricula that "leaves students to their own devices to piece together what they learn from a number of courses" (Benner, et al., 2010, p. 78). Whilst the issues of fragmentation are reported across curricula subjects and nursing programmes within many countries, limited integration of theory to practice is particularly problematic in the context of biological science application in nursing (Cangelosi, 2006; Dunnington Fenton, 2010; Friedel & Treagust, 2005). The full scope of *the bioscience problem* in nursing education will be discussed in the literature review presented in chapter two of this thesis, and related terminology will be clarified in a subsequent section of this chapter. However, in order to introduce the reader to the inquiry within the thesis, a brief explanation of the concept of integrated teaching and learning in biological sciences in nursing is outlined below.

Integrated learning in the biological sciences.

In nursing practice, knowledge of the biological sciences, or *bioscience*, encompasses foundational concepts of human anatomy, physiology, biochemistry, physics, pathophysiology, microbiology and pharmacology applied to clinical situations. Nurses require scientific knowledge from these domains to provide appropriate patient care, make sound clinical decisions and communicate their concerns to other health professionals (Dunnington Fenton, 2010; Logan & Angel, 2011; McVicar, 2009). However, the depth and scope of knowledge required for each clinical situation is almost as unique as each individual patient. Herein lies the problematic gap between bioscience theory and nursing practice that plagues many students, registered nurses and nursing lecturers (Cangelosi, 2006; Craft, et al., 2013; Danielson & Berntsson, 2007). Bioscience theory is often regarded as "an intense

subject in an intensive curriculum" that is characterised by extensive use of complex, and often unfamiliar, language (McVicar, 2009, p. 149). When taught in relative isolation from theoretical and practical nursing courses, many scientific concepts appear far removed from patient care and student notions of *being* a nurse. Yet students are expected to apply bioscience theory in their developing nursing practice. Their ability to do this is influenced by the degree to which nursing lecturers integrate bioscience knowledge in nursing courses (Fell & James, 2012; Wynne, Brand, & Smith, 1997).

Although the term *integration* is rarely defined, it is used in nursing education to refer to teaching and learning that is progressive, occurring across courses in the curriculum, spiral in nature, and grounded in the application of theory to practice (see for example Brandon & All, 2010; Jordan, 1994; Kantar, 2013; Thornton, 1997). From this perspective, the concept of integration reflects constructivist pedagogy in that students are active learners who construct new knowledge based on existing and prior experiential knowledge (Brandon & All, 2010; Kantar, 2013). Whilst exposure to foundational bioscience theory may contribute to students' knowledge base, nursing practice requires them be active problem solvers, learning to develop their knowledge through clinical application of scientific concepts. This is where nursing lecturers can facilitate problem-based learning and the application of bioscience knowledge to nursing practice, *if* they are prepared to practice integrated teaching.

Proponents of problem-based, learner-centred and constructivist approaches to nursing education advocate that these approaches facilitate students' ability to integrate knowledge from varied theoretical disciplines as they learn to become a nurse, or develop nursing practice (Candela, Dalley, & Benzel-Lindley, 2006;

Horsfall, Cleary, & Hunt, 2012; Kantar, 2013; Smith & Coleman, 2008). However, it is also acknowledged that such approaches to nursing education are in contrast to the conventional, linear, behaviourist pedagogies underpinning many nursing curricula (Brandon & All, 2010; Diekelmann, 2005; Horsfall, et al., 2012; Peters, 2000).

Additionally, several educationalists note that lecturers' own pedagogical assumptions influence their approach to teaching, and that many nursing lecturers uncritically adopt content-driven, behaviourist pedagogies through socialisation into dominant faculty perspectives (Diekelmann & Smythe, 2004; Goodman, 2013; Horsfall, et al., 2012; Kantor, 2010). Bioscience integration is, consequently, influenced by lecturers' and departmental perspectives on bioscience teaching and learning. Such perspectives are consistently reported to favour psychosocial knowledge (Friedel & Treagust, 2005; Jordan, Davies, & Green, 1999; Manias & Bullock, 2002; Thornton, 1997). Consequently, integrated bioscience teaching, whilst valued by students, is practiced inconsistently in contemporary nursing education (Fell & James, 2012; McVicar, 2009).

Nature and scope of the inquiry.

The term *preparedness* is used to refer to "the state of being *prepared*", to "make ready or suitable in advance for some use" (Collins Concise Dictionary, 2001, p. 1184). Integrated science teaching amongst nursing lecturers is reported to be limited and/or variable in terms of depth and consistency (Davies, Murphy, & Jordan, 2000; Friedel & Treagust, 2005). This study explored the phenomenon of lecturer preparedness with bioscience integration, enabling greater understanding of bioscience preparedness and the factors that influence it.

The study comprises an in-depth transcendental phenomenological exploration of experience in the context of learning and teaching biosciences in nursing in order to answer the research question: *How do teaching and learning experiences influence nursing lecturers' preparedness to integrate bioscience knowledge into their teaching practice?* The study was guided by Husserlian phenomenological philosophy and the notion of subjective consciousness as the primary source of intuition and insight (Moustakas, 1994; Spiegelberg, 1982). The experiences of ten nursing lecturers were explored in order that the universal experience of teaching and learning bioscience in nursing could be described. In-depth interviews were utilised to gather rich, thick data pertaining to participants' conscious experience and enable transcendental inquiry through phenomenological reduction and the epoché. Exploration of the ways in which participants' experiences came to be (*experiencing*) provided a deep understanding of subjective experience, enabling the influence of experience on the participants' preparedness to integrate biosciences in their teaching practice to be identified.

Significance of the Inquiry

The findings contribute to existing knowledge of the bioscience problem in nursing by describing the phenomenon of preparedness with bioscience integration amongst ten nursing lecturers in New Zealand. Whilst the findings represent a snapshot of experience for the participants at a particular period in time, the phenomenon has not been explored previously, nor have the influential relationships within teaching and learning experiences and preparedness been considered. Knowledge of experiential influences on teaching practice amongst nursing lecturers is lacking, yet it is acknowledged that integration of bioscience concepts with nursing practice, by nursing lecturers, positively enhances student learning

(Cangelosi, 2006; Clancy, McVicar, & Bird, 2000; Jordan & Hughes, 1998). Conclusions can therefore be drawn within the context of the study, enabling recommendations for future practice in nursing education and lecturer preparedness to be proposed.

Terminology.

Bioscience.

The terms *bioscience* and *biosciences* are used generically in the literature to refer to various combinations of human bioscience subjects such as anatomy, physiology, pathophysiology, microbiology, immunology, biochemistry, physics, genetics, and pharmacology (see for example Clancy, et al., 2000; Davis, 2010; McVicar, Andrew, & Kemble, 2013). In nursing education, the debate over appropriate bioscience curricula, and specific subject representation within, is a prominent concern within the bioscience problem (Courtenay, 2002; Jordan, et al., 1999; Wharrad, Allcock, & Chapple, 1994). Consequently, the scope and depth of bioscience education, and interpretation of *bioscience*, is extremely varied within nursing programmes, including those in New Zealand (Dunnington Fenton, 2010; Friedel & Treagust, 2005).

Bioscience in nursing.

The term *bioscience in nursing* has been used within this thesis to refer to bioscience subjects that are commonly included in generic nursing education and have been noted, by the researcher and participants, to be important for nursing practice: applied knowledge of human anatomy, physiology, pathophysiology, and pharmacology, and selected concepts from microbiology, biochemistry, and physics. The distinction between *bioscience* and *bioscience in nursing* signals the application

of bioscience theory in, and to, clinical situations that is reported to enable greater understanding of nursing practice (Prowse & Lyne, 2000; van Wissen & McBride-Henry, 2010). Thus, *bioscience(s) in nursing* is used throughout the thesis to refer to the bioscience knowledge that is used in clinical practice.

Preparedness.

The research question concerned nursing lecturers' experiences with bioscience application in nursing courses (theoretical and practical nursing courses that require bioscience rationales for practice and clinical decision making). As previously outlined, the term *preparedness* is used to refer to *the state of being prepared* to integrate biosciences in teaching practice. The phenomenon of preparedness is the focus of this inquiry, therefore further definition of preparedness is inappropriate at this point in the thesis.

Pre-registration and post-registration.

Many authors refer to undergraduate and post-graduate education to differentiate the programmes that prepare nurses for nursing registration from those undertaken as a registered nurse in order to extend generic or specialty nursing practice knowledge (see for example Birks, Cant, Al-Motlaq, & Jones, 2011; Nicol, 2002). However, the requirement for preparatory nursing education programmes to be delivered at degree (baccalaureate) level is not an international standard. There is also inconsistency across countries. For example 'prelicensure', 'associate degree', 'baccalaureate', 'undergraduate', and 'bachelor of nursing' all refer to education programmes that must be successfully completed to practice as a registered nurse. The term *pre-registration education* is therefore used to refer to education that is required for nursing registration. *Post- registration education* is used to refer to any

education programme undertaken by a registered nurse. The study explored lecturer experiences with pre- and post-registration teaching in order to understand preparedness in the broad context of nursing education.

Thesis Structure

This chapter has provided the background to the inquiry. Changes in nursing education, and the scope of the nursing lecturer, have been linked to the preparedness of nursing lecturers to integrate bioscience knowledge and concepts when teaching integrated nursing courses. The important role of the nursing lecturer for student learning in bioscience has been highlighted to emphasise the significance of this inquiry into experiential influences upon lecturer preparedness. The chapter introduced the reader to *the bioscience problem* in nursing education and the contribution that greater understanding of lecturer preparedness is able to make to nursing education.

Chapter two presents a critical review of the literature pertaining to biosciences in nursing education. Literature from 1970 to present is reviewed in chronological order to highlight the recurrence of certain themes throughout the decades. Key changes in nursing education are discussed in relation to their impact on the bioscience problem and preparedness of nursing lecturers to undertake integrated teaching practice. The review provides a synopsis of what was known about biosciences in nursing education prior to data collection so that the reader is aware of the context, rationale and potential assumptions underpinning the study. Additional literature that is subsequently used to support the study findings and recommendations is reviewed within the discussion and conclusions chapters in order to reflect the understanding that developed as a consequence of the study. This approach reflects the critical attitude of transcendental phenomenological philosophy

and the researcher's intent to present the findings in the unique context of the participants' subjective experience.

Chapter three discusses the philosophical foundations upon which the study is based. Husserlian phenomenology is explored in relation to the ontological and epistemological assumptions within the philosophy and their relationship to the research inquiry. Phenomenology is thus discussed as both a philosophy and a methodological approach to research. The researcher's choice of a transcendental phenomenological approach to the study is justified in the context of the research question and the role of the researcher in the inquiry.

The fourth chapter provides a detailed description of the research methods employed in the study. The maintenance of transcendental phenomenological philosophy is demonstrated throughout the researcher's approach to the research question with explicit attention to the phenomenological analytical processes of transcendental phenomenological reduction, the epoché and imaginative variation. The research procedures undertaken to identify textural and structural themes (*what* is experienced, and *how* experiences came to be, respectively) within the data are described to demonstrate the methods by which the researcher achieved a unified statement of the phenomenon of preparedness and greater understanding of the influence of experience on lecturers' preparedness.

The study findings are presented in chapter five. The outcomes of data analysis are presented and discussed in relation to the analytical procedures described in the preceding chapter. Eight core textural themes and related sub-themes are presented to describe the universal experience of learning and teaching biosciences in nursing for the participants in the study. Three core structural themes are then presented in order to describe the essential essence of experiencing (*how* experiences came to be).

The meaning of experiencing is discussed using verbatim statements from participant interviews to illustrate textural structural synthesis and the relationships between experience and the phenomenon of preparedness.

The key findings are discussed in chapter six in the context of the research question and the major implications of the study findings for nursing education. Intricate, interconnected relationships within personal values, experiential and reflective learning are shown to be important for bioscience learning as a student, registered nurse *and* nursing lecturer. Experiencing responsibility to know, and utilise bioscience knowledge in each of these roles influences individuals' self-learning capacity and the motivation to be, or become, prepared for integrated bioscience teaching as a nursing lecturer.

The final chapter concludes the study by considering the findings in relation to the research aim and wider context of bioscience education in nursing. The complex relationships between, and within, teaching and learning experiences and preparedness with integrated bioscience teaching in nursing highlight several epistemological and pedagogical bottlenecks affecting contemporary bioscience education for nurses. The conclusions drawn from the study underpin three key recommendations for future practice in nursing education and the preparation of nursing lecturers' practice in integrated bioscience teaching.

CHAPTER TWO

The 'Bioscience Problem' in Nursing Education – A Review of the Literature

Introduction

Knowledge of the biological sciences is recognised to be necessary for the competent practice of registered nurses. As such, bioscience education is a compulsory and integral component of pre-registration nursing programmes throughout the world. Indeed, successful completion of biological science courses within the first one to two years of nursing programmes is required in order for students to progress and ultimately gain registration. Despite this consistent requirement for bioscience education, biosciences have been a problematic area for student learning and application to clinical practice since the early 1970s.

Nursing lecturers are required to be registered nurses and, thus, have successfully completed some form of biological science education. Although there is significant variation in both content and hours relating to biosciences in pre-registration programmes, in order to gain registration, nursing lecturers must have achieved at least minimum levels of required bioscience knowledge. Yet, despite this requirement, literature and anecdotal evidence reveal that many nursing lecturers feel uncomfortable, unprepared or ill-equipped to integrate biosciences in their teaching practice. This issue has been reported since the early 1970s.

This chapter presents a review of the literature relating to biosciences in nursing education since its emergence as an area of concern. A chronological approach is adopted to present and discuss the literature as many areas of concern appear repeatedly in each era of nursing education explored. Recurrence of key issues throughout the decades demonstrates that, despite other notable advances in

nursing education, limited progress has been made in learning and teaching biosciences in nursing. The historical context of each era of nursing education is presented in order to highlight the influence of concurrent competing demands and epistemological perspectives on *the bioscience problem* in nursing education and practice.

To understand the research context, contemporary literature pertaining to biosciences in nursing education was located and critically appraised. CINAHL, Proquest Nursing, Health Source (Academic), Science Direct, PubMed, MEDLINE® and Web of Knowledge data bases were initially searched using the subject or topic terms: bioscience* and the boolean operator AND nurs*: and biological science* AND nurs* for articles published between 1990 and 2009. However, it became clear that several key studies conducted in the 1980s, and the context of nursing education in the preceding decade had a significant impact upon contemporary practice in nursing education. The search was therefore extended to include literature published between 1970 and 1990. Manual searching and specific article retrieval was also performed to locate secondary references and key pieces of literature that were identified through reading and appraisal of the literature search results. The same data bases were searched using the same search terms following data collection and analysis (undertaken in 2009-10) in order that current literature is also included in this review. The following section begins with the historical context of biosciences in nursing education that has undoubtedly influenced the evolution of this component of nursing education and practice over the years.

Historical Context

The biomedical revolt (1970-80s).

The late 1970s and 1980s saw what could almost be called a revolution in perspectives of nursing and what the professional practice of nursing actually encompassed. Traditional teaching and learning during apprentice type training for nurses was reliant on medicine, particularly in relation to the teaching of scientific concepts (Drew, 1988). Development of nursing roles during this time and the concept of nurses as professionals in their own right led many nurse leaders and educators to reject traditional biomedical associations in search of knowledge and practice that was uniquely nursing (Drew, 1988; Shaver, 1985).

The emphasis on caring versus curing is prominent in the literature, particularly as nurse theorists emerged and attempted to conceptualise the body of knowledge that epitomises nursing (Gortner, 1980; Holmes, 1972; Peterson, 1983; Starck, 1984). Many nursing theories emphasised the centrality of health, as opposed to disease, and the importance of the human response to health alteration. Psychosocial aspects of healthcare were acknowledged to exemplify nursing practice and offer a key distinction between nursing and medical knowledge (Holford, 1981; Phillips, 1977; Shaver, 1985; Watson, 1988). Whilst emerging theories and models presented a more integrated view of nursing knowledge that encompassed biological sciences, their adoption in practice triggered a swing away from medicine and biological science foundations to social and behavioural philosophies. This transition concerned some nursing leaders and educators as it was considered too extreme a rejection of fundamental bioscience foundation knowledge for practice (Akinsanya, 1984; Akinsanya & Hayward, 1980; Closs, 1987; Drew, 1988). This situation

spurred the bioscience faction to publish their concerns, emphasising the relevance and known issues associated with teaching and learning in biosciences.

A landmark study by Wilson (1975) explored the contribution of biological sciences to nursing practice by investigating the extent of registered nurses' (RNs') bioscience knowledge, pre-registration learning patterns, application of knowledge in practice activities (by RNs and student nurses) and doctors' expectations of RNs' knowledge and responsibilities. Wilson studied 532 nurses (RNs and student nurses) from three Scottish hospitals in order to: identify nursing practice activities that would form the basis of the study (through direct observation of a larger sample, approximating 1800 clinical practice hours); objectively test participants' bioscience knowledge (using a science test based on observed nursing activities, n = 532); and explore doctors' opinions and assumptions of nursing knowledge of bioscience in practice (via postal questionnaire, also based on observed nursing activities, n = 179). The study showed that nurses' had little knowledge of the relationships between biological science and their nursing practice; bioscience education was varied, lacked structure and application; and that RN knowledge was below doctor's expectations.

Wilson appropriately claimed that the deficit between doctor's expectations and nursing knowledge could endanger patients, proposing that RN knowledge and standards for pre-registration bioscience education needed to improve. Wilson's research was the first published study to examine biosciences in nursing education and identified issues relating to nurses' knowledge deficit, inconsistency in bioscience education standards, limitations in nursing tutors' own knowledge and poor application of bioscience in nursing. Each of these issues is still pertinent today.

(N.B. the term nursing tutors was adopted in this era of nursing education rather than nursing lecturers).

The 1980s' literature is dominated by the work of Akinsanya (1984, 1987a, 1987b; Akinsanya & Hayward, 1980) and his quest for nursing education to adopt a *bionursing framework* explicitly linking life sciences (anatomy, physiology, microbiology and pharmacology) to nursing practice. Akinsanya's research included exploration of: student nurses', student nurse tutors' (tutors in training) and nursing tutors' (directors of nurse tutor training) views concerning the role of life sciences in nursing education and practice; learner preparation in the application of life sciences to practice; and the usefulness of a bionursing model in nursing education.

Akinsanya's exploration into learner perceptions of life science knowledge and nursing practice provided evidence of nurses' difficulties with teaching, learning and applying biological science in nursing. Whilst many nursing educators at this time asserted that difficulties with bioscience learning were due to nursing's reliance on medical staff teaching and the inappropriateness of second-hand bioscience knowledge in nursing (Akinsanya, 1984, p. 40; Gortner, 1980; Holford, 1981; Wilson, 1975), Akinsanya's work provided new insight into the potential rationale for teaching, learning and practice problems.

Akinsanya's study was derived from two theoretical foundations relating to skill acquisition, performance and knowledge (Fitts' 1965 *three-phase theory* of task performance, and Demaree's 1961 *task analysis*) and sought to determine and define the life science basis for nursing practice and education (Akinsanya, 1987a). The preliminary exploratory study phase utilised tape-recorded interviews with student nurses from three English hospitals (n = 165) to describe their perceptions of the role of life sciences in education and practice and explore useful approaches to teaching

and application of knowledge to practice. A questionnaire was used to canvas the views of nurse tutor students (n = 324), and directors of nurse tutor courses (n = 12 throughout England and Wales) were interviewed regarding their perception of the role and relevance of life sciences in the curriculum and tutors' preparation for life science teaching.

The student nurse participants revealed that their experiences of teaching and learning in life sciences were essentially biomedical, poorly structured and disappointing. Whilst students realised the significance of, and desire for, biological science knowledge (particularly applied anatomy and physiology) in nursing, many expressed anxiety and uncertainty regarding their understanding of concepts and ability to apply theoretical knowledge to explain nursing actions. Nurse tutor students' (trainee nurse tutors) opinions similarly revealed that the life sciences were perceived to be useful and important for the needs of student nurses and their future teachers, yet the majority of participants expressed concern and anxiety relating to their own knowledge of the subject, their ability to simplify concepts for students, and the unsuitability of the medical model to explain a biological premise for nursing care. Subsequent interviews with directors of nurse tutor courses highlighted that, although life sciences were perceived to be important, there was considerable variation in student admission policy, perceived adequacy of pre-entry life science knowledge, life science teaching focus, teaching personnel (medical vs. nursing) and assessment requirements. Nurse tutors' preparation to teach life sciences was thus demonstrated to be poorly structured and haphazard (Akinsanya, 1987a).

Akinsanya's study supported Wilson's earlier work (1975) by demonstrating that bioscience knowledge is important and relevant for nursing practice. This evidenced its position in nursing education and highlighted inadequacies in existing

approaches to educational preparation of student nurses and their future teachers. Akinsanya's research underpinned a conceptual model illustrating the links between bioscience knowledge and distinct nursing actions (referred to as tasks). The *bionursing model* emphasises differences between traditional biomedical philosophy and the unique application of biological knowledge to nursing practice, offering a framework to guide nursing educators concerning the required depth and application of bioscience throughout pre-registration education programmes (Akinsanya, 1987b; Akinsanya & Hayward, 1980). Although Akinsanya's model contributed to the growing body of nursing theory, its emphasis on biological knowledge contrasted with the holistic biopsychosocial theories gaining wider acceptance at the time (Gortner, 1980; Holmes, 1972; Shaver, 1985). Reference is still made to Akinsanya's model (Casey, 1996; Kyriacos, Jordan, & van den Heever, 2005; Trnobranski, 1993) and his contribution to nursing education (Dopson, 2005; Johnson, 2005), however his work was not widely adopted and received little published criticism. Rather, the emphasis on health and caring in holistic models was perceived to offer more inclusive conceptions of nursing (Holford, 1981; Peterson, 1983).

The era of the new curricula (1990s).

The majority of the literature in the 1990s originates from the United Kingdom (UK) and United States of America (USA) where the philosophy of the *new curricula* dominated alongside the development and emergence of nursing theory throughout the 1980s (predominantly US based) (Allen, 1990; Bevis & Watson, 1989; Drew, 1988; Menke, 1983; Schumacher & Gortner, 1992; Wynne, et al., 1997). Whilst the Americans continued to promote nursing theory and models that were largely developed by American scholars of nursing, British, Australian, and Canadian authors published their experiences and concerns with new curricula

developments. The search for unique nursing knowledge and holism in nursing practice influenced new curricula structure towards a greater focus on critical reflection, caring and acknowledgement of other forms of knowledge (in addition to the traditional sciences) (Bevis & Watson, 1989; Courtenay, 1999; Jordan & Potter, 1999; Kramer, 1990).

The new curricula revolution was dominated by the perception that social and behavioural sciences were able to explain the phenomena of nursing practice that could not be explained by biological science, thus offering a more holistic basis for nursing (Allen, 1990; Peterson, 1983; Wynne, et al., 1997). The regulatory boards of nursing at the time (particularly the UKCC (United Kingdom Central Council for Nursing, Midwifery and Health Visiting)) envisaged that new curricula would embrace all forms of knowledge in nursing to enable the development of *knowledgeable doers*, reflective creative practitioners who could provide the highest quality nursing care (Jordan & Potter, 1999; Nursing Council of New Zealand, 1997; UKCC, 1986). However, the ensuing dominance of psychosocial theories of nursing was noted to undermine, rather than enhance the contribution of bioscience knowledge to nursing (Trnobranski, 1993; Wynne, et al., 1997). The concurrent move into higher education and exposure to distinct subject specialists also overcrowded the curriculum, creating tension around the relevance of new and distinct subjects (Arthur & Baumann, 1996; Clarke, 1995; Courtenay, 1991; Jordan, et al., 1999; Nicol, 1999).

Emphasis on nursing as a distinct profession undoubtedly influenced the transition from hospital-based training models to the delivery of pre-registration nursing education in higher education institutions and the introduction of diploma and degree programmes. This transition appears to have influenced curriculum

tensions in the UK and Australia during the 1990s, whereas several US states began the transition to higher qualifications for nursing registration as early as 1965 (Jacobs, DiMattio, Bishop, & Fields, 1998). Tensions in the US during the 1990s surrounded the debate over minimum entry-level qualifications for nursing registration as opposed to curriculum content (Hess, 1996; National Advisory Council on Nursing Education and Practice, 1996). Nonetheless, in each country the progression of nursing registration programmes into higher education required nurse educators to undertake higher qualifications in order to provide an appropriate level of theoretical and clinical learning for this new cohort of students. This development in nursing education also seems to have influenced the dominance of behavioural and social sciences within nursing faculty as most nurse educators situated their own education and research in these fields (Clarke, 1995; Jordan & Potter, 1999; Nicol, 1999; Trnobranski, 1993).

It is recognised that teachers are inclined to teach and promote their own disciplines (Jordan, et al., 1999; Thornton, 1997; Trnobranski, 1996), and that nursing lecturers holding graduate qualifications in biological sciences are scarce (Chapple, Allcock, & Wharrad, 1993; Clarke, 1995; Nicoll & Butler, 1996). Consequently, nursing bioscience proponents' opinions on curriculum development and delivery were somewhat subordinate. This situation was compounded by a relative lack of nursing and educational research concerning the contribution of bioscience education and knowledge of physiological phenomena in nursing practice (Closs, 1994; Cowan, Heinrich, Lucas, Sigmon, & Hinshaw, 1993; Mulhall, 1990). Bioscience proponents sought to demonstrate the value and relevance of bioscience in nursing by studying its contribution to practice rationale and decision making, professional responsibilities, patient safety, student perceptions and experiences,

teaching and learning problems and the impact of recent curriculum changes on nursing graduates.

The new curricula aimed to produce inquiring critical thinkers who could draw on multiple forms of nursing knowledge (including biosciences) in their practice. Yet a small number of studies reported that student and practising nurses showed limited knowledge of bioscience concepts and their application to practice (Courtenay, 1991; Ives, Hodge, Bullock, & Marriott, 1996; Wilkes & Batts, 1998). Nursing education's interpretation of concepts such as *intelligent practice* were also questioned as some educators believed that biosciences were under-represented in new curricula (Jordan, 1994; Trnobranski, 1993). This situation is analogous to that reported by Wilson (1975) and Akinsanya (1987a) prior to the curriculum revolution, suggesting that perceptions of bioscience in nursing education remained divided and bioscience education continued to be problematic.

Courtenay's (1991) survey focused on perceptions of students (n = 140) and nursing lecturers (n = 43) from three British nursing schools regarding the provision of bioscience education and their confidence in bioscience application. Just over one in four of all participants felt that their anatomy and physiology knowledge was adequate, with this figure dropping to one in ten for microbiology and pharmacology. The study highlighted that inadequate preparation of nursing lecturers in biosciences impacted negatively on perceived relevance of bioscience knowledge, curriculum time made available for bioscience, and effectiveness in teaching and learning.

Inadequacy of perceived and actual pharmacology knowledge was also identified by Ives et al.'s (1996) survey of 363 first year registered nurses in one Australian state. The study findings are potentially flawed by a low response rate

(25%), completion of graduate education programmes by some participants and the potential that actual knowledge questions could have been answered with the assistance of resources to support the nurses' own knowledge. Nonetheless, despite a wide range of scores relating to actual knowledge testing (16-92%), these nurses consistently reported that undergraduate pharmacology education was inadequate, poorly structured and that many lecturers were insufficiently experienced in teaching pharmacology for nurses. These findings are supported by Jordan's later (2000) evaluation study concerning students, nurses and service-users (patients) in mental health settings. Again, undergraduate preparation in pharmacology education was deemed inadequate, particularly by service users.

The most comprehensive published study of bioscience knowledge in registered nurse practice in the 1990s explored nurses' conceptions of physical science in practice, differences between nurses' and scientists' conceptions and the implications of findings for competency in science knowledge and curriculum development (Wilkes & Batts, 1998). This large Australian study used a three phase design incorporating: case-study-based multiple choice questionnaire to identify nurses' conceptions of physical science (162 participants); non-participant observation of registered nurses' practice in the ward environment of six metropolitan hospitals, followed by brief interview (sub-sample of 58 participants) to determine the physical science influencing nurses' everyday practice; and, finally, focused interviews with a sub-sample of ten nurses relating to physical science knowledge and nursing activities (as observed in phase two). Wilkes and Batts' study showed that, although clear examples of physical science knowledge base were observed relating to common nursing activities, most nurses were unsure or unable to articulate related scientific concepts. Participants showed little evidence of

meaningful learning in biosciences with practice decisions dictated by ritual or protocol as opposed to independent or critical thinking. The perception of nursing's subordination to medicine that new curricula and philosophies of nursing sought to eradicate is arguably reinforced rather than diminished by such evidence.

Additional qualitative data from Wilkes and Batts' (1998) study identified that the concept of shared experience and truth was an influential factor for nurses' understanding of scientific concepts. Nurses' perceptions differed from those of science educators and were reinforced by common, yet erroneous explanations of scientific concepts and ritualistic use of scientific data by practising nurses. Thus, whilst teaching by subject experts (such as biological scientists) might be seen to benefit nursing students, the absence of a common language and appreciation of contextual application of bioscience concepts in clinical practice would appear to negate much of the benefit. Wilkes and Batts, in conjunction with other authors, suggested that, to improve bioscience teaching and learning for clinical practice, course content, delivery and assessment must be grounded in nursing practice (Chapple, et al., 1993; Closs, 1994; Jordan & Reid, 1997; Thornton, 1997; Wharrad, et al., 1994; Wong & Wong, 1999; Wynne, et al., 1997).

Other studies support this proposal, reporting that post-registration education in biosciences positively influences patient outcomes and nursing care (Jordan & Hughes, 1998; Jordan & Reid, 1997). Any claims that educational intervention has the capacity to improve patient care and clinical outcomes are contestable due to the potential number of variables that may influence responses. However, two action research studies by Jordan and colleagues suggest that enhanced understanding of clinical nursing (Jordan & Reid, 1997), and positive role development with respect to interprofessional decision making and patient care direction (Jordan & Hughes,

1998) can be achieved following applied bioscience learning that is directly related to clinical practice and the experience of registered nurse students. In both studies, nurses reported that enhanced knowledge of applied physiology in particular enabled them to provide better care, question medical decisions or errors and communicate more effectively with medical colleagues. The shared experience of practising nurses and nursing lecturers with bioscience expertise as a means to facilitate bioscience learning and application to practice is supported by many other authors (Casey, 1996; Jordan, 1994; Jordan, et al., 1999; Mulhall, 1990; Nicol, 1999; Trnobranski, 1996).

Teaching and learning biosciences is difficult for nursing students (Andrew, 1998; Davies, et al., 2000; Efstathiou & Bailey, 2012; McKee, 2002). Several studies from the 1990s report specific issues of student anxiety and poor academic performance in bioscience (Chapple, et al., 1993; Jordan, et al., 1999; Nicoll & Butler, 1996). Difficulties with bioscience learning have been associated with: poor or limited pre-entry bioscience knowledge (Thornton, 1997; Trnobranski, 1993; Wharrad, et al., 1994; Wong & Wong, 1999); a shortfall of nursing lecturers and registered nurses with adequate bioscience knowledge to facilitate relevant application to practice (Clarke, 1995; Courtenay, 1991; Jordan & Reid, 1997; Trnobranski, 1993); inadequate emphasis or time allocation for bioscience teaching within the curriculum (Courtenay, 1991; Jordan, et al., 1999; Wharrad, Allcock, & Meal, 1995); and lack of clarity concerning the required level or depth of bioscience knowledge for nursing practice (Chapple, et al., 1993; Nicoll & Butler, 1996; Thornton, 1997).

The volume of evidence concerning difficulties with bioscience learning, coupled with the minority status of bioscience proponents in nursing faculties, and

subsequent dominance of behavioural and social science philosophies within nursing curricula further devalued the role of biosciences in nursing education. Indeed nurse educators favouring psychosocial approaches to nursing sanctioned a reduction in bioscience emphasis and requirements in curricula (Courtenay, 1991; Jordan, et al., 1999; Thornton, 1997). The literature reveals a tension between competing demands of new educational structures that are particularly characteristic of the studies undertaken in the UK and Australia. With the exception of Wong and Wong in Canada (1999), concerns relating to the bioscience problem are reported almost exclusively by British and Australian educators. In contrast, literature originating in the USA appeared to place greater emphasis on education in psychosocial contexts, referring largely to theoretical concept approaches to teaching (Heliker, 1994; Oermann, 1994). A relative lack of outcome-based reports pertaining to the holistic goals of new curricula is partially explained by those questioning the suitability of pre-existing approaches to curriculum evaluation for the new naturalistic paradigm (Chavasse, 1994; Cox, Bottoms, & Ramsey, 1998; Leino-Kilpi, 1993; While, Fitzpatrick, & Roberts, 1998).

One UK study did, however report student nurse performance outcomes during the unique period (1989) in which three different pre-registration nursing education programmes were offered (certificate, diploma and degree). The study by While, Fitzpatrick and Roberts (1998) used a complex triangulation approach to evaluate student outcomes within one geographical area of England (total n = 109). Despite many similarities between the programmes, the degree prepared nurses were shown to have greater client focus and systematic approach to information seeking in comparison to the professional focus of the diploma and certificate nurses. Such outcomes may be congruent with new curricula aims, yet the bioscience component

of nursing knowledge utilised was not explicitly explored, nor did participants score highly in relation to 'the holistic approach to care'. Indeed the authors conclude by questioning whether the recent developments in nursing education "will provide a satisfactory foundation for nursing practice in the next century" (While, et al., 1998, p. 196).

Differences in the perceived value of biosciences in nursing curricula (between students and lecturers) were identified in studies undertaken by Courtenay (1991 UK), Thornton (1997 Australia) and Jordan et al. (1999 UK). Jordan et al. (1999) conducted a large survey involving 339 pre-registration nursing students and 73 lecturers within one university department (response rate 84% and 78% respectively). Research questions included perceptions of difficulty relating to distinct subjects, potential solutions for learning difficulties in biosciences and justification for maintaining the position of bioscience in the curriculum. Results supported those of other studies by demonstrating that the majority of students found biosciences the most difficult of their nursing subjects. Although staff were aware of student difficulties there was a division between participants who felt that insufficient time and resources impacted on difficulty (only 4% of students felt that too much time was allocated to biosciences, whereas 44% of staff favoured a reduction in bioscience time and input), and those who felt that the required level of scholarship was too high (33% of staff and only 5% students). Despite the difficulties associated with learning, students found biosciences one of the most valued course components (second only to nursing interventions), reporting that they value practical, clinically based knowledge that they perceive to be most closely related to nursing. In contrast, staff generally considered bioscience to be less valuable than other subjects.

With similar intent regarding research questions and methodology Courtenay (1991) and Thornton (1997) both demonstrated a difference in perceptions of bioscience relevance between students and lecturers. Again, students associated biosciences with a higher level of importance and required depth of learning (in preparation for nursing practice) than their lecturers. In relation to lecturers placing less value and requirements on bioscience knowledge, the majority of lecturers in Courtenay's study also reported that their own knowledge in this area was inadequate. Courtenay's results also highlighted that many students were better qualified than nursing lecturers in behavioural and biological sciences, adding support to other concerns regarding the paucity of lecturers with appropriate bioscience backgrounds (Chapple, et al., 1993; Clarke, 1995; Jordan & Reid, 1997; Nicoll & Butler, 1996; Trnobranski, 1993; Wharrad, et al., 1994).

Support for increased emphasis on biosciences in nursing curricula and practice is provided by research demonstrating that students find biosciences easier to learn and apply when their lecturers and/or mentors are able to articulate theory and practice links using bioscience foundations (Jordan & Reid, 1997; Nicoll & Butler, 1996; Trnobranski, 1993; Wynne, et al., 1997). Indeed many authors at the time called for nursing schools to increase the proportion of staff holding bioscience qualifications in order to increase application of bioscience concepts in a more consistent and relevant manner (Casey, 1996; Clarke, 1995; Courtenay, 1991; Jordan, et al., 1999; Thornton, 1997).

Whilst the application of theory to practice requirement dominates the literature, several other perspectives have been offered to address difficulties in bioscience teaching and learning. Greater collaboration in teaching practice and questions of content relevance between science and nursing lecturers was proposed

by several authors as a strategy to increase content relevance and clinical application (Chapple, et al., 1993; Wharrad, et al., 1994; Wilkes & Batts, 1998; Wynne, et al., 1997), although this approach is potentially costly in terms of human resources. Approaching the bioscience problem from a more inclusive perspective, other authors called for timely reconsideration of Akinsanya's bionursing model as a conceptual framework for bioscience content and curricula planning (Casey, 1996; Trnobranski, 1993). Along similar lines, many authors concluded that greater clarity is required concerning the bioscience knowledge that is required for safe and competent practice, suggesting that research based curriculum guidelines were required (Courtenay, 1991; Jordan & Potter, 1999; Trnobranski, 1996; Wharrad, et al., 1994).

The era of the new curriculum (1990s) sought to prepare registered nurses with increasing capacity for creative, critical thinking and a greater understanding of the knowledge domains underpinning practice by broadening curricula content and promoting nursing's unique body of knowledge. The 1990s also saw a substantial increase in the publication and utilisation of nursing research in both practice and curriculum development. However, bioscience proponents continued to report that the *bio* component of holistic practice (that proclaimed to embrace biological, psychological and sociological epistemologies) was undervalued (Clarke, 1995; Thornton, 1997), and curriculum evaluation processes were reported to be problematic in the context of recent developments (Chavasse, 1994; Crotty, 1993). The intentions of the significant changes in nursing education throughout the late 1980s and early 1990s were thus only partially realised as nursing education moved into the next century.

Contemporary Opinions and Concerns (2000 to date)

Bioscience proponents continue to emphasise the value and relevance of bioscience knowledge for nursing practice development, practice rationale, clinical decision making, professional responsibilities and patient safety (Bradley, Blackshaw, & Nolan, 2006; Danielson & Berntsson, 2007; Davis, 2010; Kyriacos, et al., 2005; Logan & Angel, 2011; McVicar & Clancy, 2001; Skingsley, Bradley, & Nolan, 2006; Whyte, Madigan, & Drinkwater, 2011). In recognition of increasing evidence throughout the preceding decade concerning the difficulties associated with learning and teaching biosciences, the new millennium literature offers more suggestions as to how teaching and learning may be improved in an area that continues to be problematic for students and faculty (Johnston & McAllister, 2008; Kumar, 2005; Larcombe & Dick, 2003; Lim & Honey, 2006; McKinney & Page, 2009; Meehan-Andrews, 2009; Rogers & Sterling, 2012; van Rooyen, Dixon, Dixon, & Wells, 2006).

Despite such recommendations, contemporary research studies continue to demonstrate that many of the issues identified in preceding decades are still apparent. Studies specifically reiterate the differences between student, registered nurse and teacher perceptions of bioscience relevance (Clancy, et al., 2000; Davies, et al., 2000; Friedel & Treagust, 2005; Jordan, et al., 2000; Manias & Bullock, 2002) and how, despite appreciating the relevance, students struggle to learn and apply concepts when: limited time is spent on the subject (Birks, et al., 2011; Bradley, et al., 2006; Efstathiou & Bailey, 2012; Fell & James, 2012); teachers predominantly favour behavioural and social science perspectives (Bradshaw, 2001; Clancy, et al., 2000; Davies, et al., 2000; Manias & Bullock, 2002); and registered nurses in practice may not be capable of helping students to integrate bioscience concepts in

practice due to their own deficiencies in bioscience knowledge (Bradley, et al., 2006; Campbell & Leathard, 2000; Kyriacos, et al., 2005; Logan & Angel, 2011; McVicar, Clancy, & Mayes, 2010; Skingsley, et al., 2006; van Wissen & McBride-Henry, 2010). Despite the increase in nursing education research during the 1990s, and recognition that biosciences are problematic in curriculum and practice development, the persistence of certain issues and prevailing focus on approaches to teaching, learning and practice application in contemporary literature suggests that tangible progress to date is limited.

In the quest for more applied bioscience learning and practice relevance, several studies report the impact of distinct teaching approaches on student learning (Efstathiou & Bailey, 2012; Founds, 2009; Gresty & Cotton, 2003; Manias & Bullock, 2002; McKee, 2002; McKinney & Page, 2009; Rogers & Sterling, 2012). Davies et al., (2000) explored specific teaching strategies in relation to learning and clinical practice value. Study participants' (339 pre-registration students and 57 lecturers from one British institution) opinions concerning the usefulness of lecture, small group work and teaching laboratories were varied, yet a statistically significant difference was identified between students and staff concerning small group work ($p<0.01$). Findings suggest that whilst students value lecture format for factual information, they wanted more small group work in addition to lectures to integrate and reinforce lecture content to practice. In contrast, the vast majority of lecturers thought that small group work was of little or no use.

Davies et al.'s (2000) findings are consistent with other studies, suggesting that students require lecture-style teaching sessions and appreciate the structured nature of bioscience concept delivery in these sessions (Johnston & McAllister, 2008; McKinney & Page, 2009; Meehan-Andrews, 2009). However, over-reliance on this

method, overcrowding of lecture content and lengthy lecture duration are reported to be ineffective (Davies, et al., 2000; Efstathiou & Bailey, 2012; Fell & James, 2012; Kantor, 2010). Students appear to require additional practical applied sessions to support concept learning, and appreciate smaller group work, practical laboratory sessions, additional on-line resources and nurses (faculty and clinical) who can help them link theory to nursing (Cangelosi, 2006; Clancy, et al., 2000; Fell & James, 2012; Friedel & Treagust, 2005; Green, Jenkins, Potter, & Davies, 2000; Kumar, 2005; Larcombe & Dick, 2003; Prowse & Heath, 2005).Whilst contemporary research seeks to address practical issues associated with teaching and learning biosciences for nursing by exploring distinct approaches to educational practice and curriculum design, the foremost concerns in the field are still apparent.

In an attempt to gain wider insight into clinical relevance and application of bioscience concepts to inform future teaching practice several research studies explore the perspectives of practising nurses. A large Korean study, undertaken in response to RNs' criticism of their training in biosciences, used questionnaires to explore the perceived adequacy of bioscience education for clinical practice, why RNs thought they lacked knowledge and when, in clinical practice, they were most acutely aware of their knowledge deficit (Choi-Kwon, Song, An, & Choe, 2002). Degree and diploma level prepared RNs from three of the largest hospitals in Seoul completed the structured postal questionnaire (n = 559 of the 660 distributed). Clinical areas, roles and years of practice were adequately represented in the respondents and, although limited information is provided concerning some components of the questionnaire, descriptive analysis demonstrated an overwhelming opinion that bioscience knowledge was deficient for practice needs (94.9%).

RNs were most aware of their knowledge deficit when assessing patients (57.8%), communicating with other health professionals (15.2%), performing nursing interventions (11.1%), teaching patients (9.3%) and completing doctors' orders (4.8%). These findings are consistent with earlier studies (Akinsanya, 1987a; Clancy, et al., 2000; Jordan & Hughes, 1998; Jordan, et al., 2000; Wilkes & Batts, 1998). Choi-Kwon et al. (2002) report the most prominent reason for lack of bioscience knowledge was lack of content application to clinical settings (32.9%). Over 60% of respondents stated that emphasising the link between bioscience and nursing, and having courses taught by nursing faculty, would help to address their knowledge deficit. Additional responses indicated that increasing hours available for bioscience content and practical sessions would also be beneficial. Again, Choi-Kwon et al.'s findings are consistent with earlier recommendations (Casey, 1996; Chapple, et al., 1993; Jordan & Reid, 1997; Trnobranski, 1993; Wharrad, et al., 1994).

In a more generic approach to nurses' perceptions of their educational preparation for professional practice Danielson and Berntsson (2007) surveyed 327 Swedish RNs three years following graduation. The study sought to identify the most important domains of knowledge for RNs' work using a comprehensive design and descriptive statistical analysis of the data (70.5% response rate). Respondents rated various domains of knowledge according to their importance and area of clinical specialty. The most important domains were consistently identified as biological science (80.5-90.7%), medical science (68.3-93%) and nursing (60.4-90.2%). Biological and medical science collectively represented anatomy, physiology, health and disease, pathology and pharmacology. Lower importance was attached to

humanities (60.5-79.1%) and social science (34.9-58.1%), with research methodology receiving the lowest ranking (6.3-16.3%).

With regards to preparation for practice the majority of respondents felt adequately prepared for their role as care provider, however preparation for roles of health informer, adviser and nurse leader was reported to be inadequate. Inadequate preparation and confidence in communication and advisory roles in RN practice requiring bioscience knowledge is also reported by Clancy et al., (2000), Jordan et al., (2000), Kyriacos et al., (2005), Dyson, Hedgecock, Tomkins, and Cooke (2009), vanWissen and McBridie (2010), and Logan and Angel (2011). The finding that, in contrast, RNs felt prepared for care provider roles echoes the conclusions drawn by Wilkes and Batts' study (1998) and arguably those of Akinsanya (1987a), each suggesting that nursing practice appears to be influenced by actions, rules and ritual more than critical application of required bioscience knowledge. In contrast several studies report that patient care is improved when RNs are able to utilise bioscience knowledge in clinical decision making and rational practice (Considine, Botti, & Thomas, 2007; Jordan & Hughes, 1998; Leathard, 2001; Prowse & Heath, 2005; Prowse & Lyne, 2000; van Wissen & McBride-Henry, 2010).

An interest in knowledge levels and the ability to apply bioscience concepts to nursing practice amongst registered nurses is becoming more apparent in contemporary literature. Interest has arisen from student and faculty concerns over RNs abilities to facilitate bioscience learning and application in clinical practice placements for undergraduates students (Campbell & Leathard, 2000; Logan & Angel, 2011; McVicar, et al., 2010), and an apparent lack of RN preparation with regards to the bioscience knowledge required for RN practice (Davis, 2010; Friedel & Treagust, 2005; Jordan, et al., 2000; Mooney, 2007; Morrison-Griffiths, Snowden,

& Pirmohamed, 2002). This background of poor preparation is apparent in more recent studies exploring the perspectives of faculty and RN students in relation to post-graduate bioscience education, particularly in the field of advanced practice pharmacology education for nurse prescribers (Bradley, et al., 2006; Leathard, 2001; McVicar, et al., 2010; Skingsley, et al., 2006; van Wissen & McBride-Henry, 2010). The relationships between formal education, clinical learning and the ability to apply bioscience knowledge in clinical practice are receiving greater attention in today's literature as students and faculty continue to struggle with the bioscience problem and, consequently, seek alternative explanations and strategies to adequately prepare current and future nurses.

Logan and Angel (2011) recently published a comprehensive study that explored how, what they call "the science-nursing tension" impacts on nursing students studying bioscience (p. 407). The study explored factors impacting upon undergraduate students' bioscience learning in clinical practice placements and the use of RNs' reflections on experiences of bioscience learning and its use in nursing practice. The findings are particularly relevant for this thesis. One hundred RNs throughout Australia participated in the study that used a combination of focus groups (15 nurses) and survey (85 nurses) to explore the science-nursing tension with respect to RNs expectations of undergraduate students whom they mentored on practice placements. The first focus group discussion informed the survey design (nine nurses), and the latter focus group (six nurses) reviewed the survey results.

The results illustrate the complexity of individual perceptions of science in nursing practice. Eighty eight percent of the survey respondents saw nursing as an applied science, yet only 13% viewed themselves as a *scientist*. Scientists were perceived to be laboratory based researchers, whereas the perception of nursing

science was that of "bedside scientists" (Logan & Angel, 2011, p. 413). Whilst the majority of respondents saw that foundational science study was necessary for "accountable, credible, competent nursing care", 13% held the view that science study detracted from the nursing role and the priority of *caring* (p. 413). Respondents whose roles demand a high level of accountability and autonomy are reported to place greater value on a scientific base for practice and decision making. Yet it is clear that some nurses perceive the sciences to be the domain of other health professionals (medicine in particular). Foundational science knowledge was largely perceived to be facts that needed to be learned. Yet the need for such facts to be embedded in practice through contextualisation and problem-based learning in bioscience teaching was reported by 82% of survey respondents.

Discussion of the survey results amongst the second focus group concluded that, despite an overwhelming perception that science knowledge was valuable, the culture of practice in clinical areas has a significant influence upon the tension between science knowledge and its application to practice. The key role that mentors play in student learning was highlighted, as was the impact of mentors' own perceptions of science relevance and ability to demonstrate bioscience application in practice for students. Logan and Angel argue that task busyness, protocol-guided practice, perceptions of responsibility and the culture of practice can "erode bioscience confidence" and reinforce the unplanned, hidden curriculum for nursing students and registered nurses (2011, p. 415). Their findings emphasise the importance of situational bioscience knowledge in nursing practice and the current challenges facing nursing faculty, students and registered nurses seeking to embed bioscience knowledge in clinical practice and nursing decision making.

The literature of the contemporary era seeks to address many of the practical issues associated with teaching and learning biosciences for nursing by exploring distinct approaches to educational practice and curriculum design, yet biosciences continue to be problematic within nursing education and clinical practice. Despite years of debate, the essential bioscience knowledge required for safe nursing practice is poorly defined and burdened by contextual and philosophical interpretation. Despite continual requests for national guidelines (Akinsanya & Hayward, 1980; Clancy, et al., 2000; Dunnington Fenton, 2010; McVicar & Clancy, 2001; Wilson, 1975) and bioscience curricula review within many western countries (Birks, et al., 2011; Courtenay, 2002; Davis, 2010; Fell & James, 2012; Jordan & Potter, 1999; Wharrad, et al., 1994), controversy halts progress on the identification of *appropriate* scientific knowledge, its use in nursing practice, and how each may be facilitated within nursing education.

The New Zealand context.

New Zealand-based studies of bioscience education in nursing are sparse, and have been undertaken by science, rather than nursing lecturers (Casey, 1996; Dunnington Fenton, 2010; Friedel & Treagust, 2005; Nicol, 2002). The findings from each study echo those of the international literature, focusing largely on teaching, learning and curriculum problems in pre-registration nursing education in the tertiary sector. Each author notes that: the application of bioscience theory to practice is important for nursing students' learning; existing curricula are overcrowded, affording limited time for bioscience education; and that existing RN knowledge of biosciences is poor. Some suggest that greater collaboration between science and nursing lecturers could facilitate applied learning (Dunnington Fenton, 2010; Friedel & Treagust, 2005); whereas Casey (1996) believed that more nursing

lecturers with higher qualifications in science were required. Nursing lecturers' perspectives on bioscience value and personal knowledge of science concepts were included in two recent studies (Dunnington Fenton, 2010; Friedel & Treagust, 2005). Each study concluded that, although bioscience knowledge was valued by lecturers, their confidence with bioscience articulation in teaching was low. The reasons for this lack of preparedness had not been explored prior to this study.

Lessons from the Literature

The preceding text outlines historical and contemporary knowledge in relation to biosciences in nursing education, highlighting that similar issues and recommendations regarding applied learning in biosciences resonate in the literature reviewed, from 1975 to the present day. Students continue to struggle with bioscience learning, opinions of the value of biosciences in the curriculum are divided and nursing lecturers are reported to be underprepared with respect to bioscience integration in their teaching practice. This would suggest that, despite nursing lecturers and educational planners being aware of the bioscience problem, teaching and learning practices are either not being adapted appropriately, existing curricula are not adequately preparing nurses to use biosciences in the real world of nursing practice, or there is a lack of resource to enable the required changes in teaching and learning practice. What is clear is that RNs need to be able to apply bioscience concepts in clinical practice, thus pre- and post-registration nursing education should facilitate learning experiences that consistently illuminate relationships between bioscience theory and nursing practice.

The influence of the dominant faculty philosophy on curricula and teaching practice and the prominence of social and behavioural science philosophies in many nursing schools have, arguably, played a significant role in the struggle to achieve

tangible progress in bioscience education for nurses. Whilst recommendations to increase capacity within nursing faculty to teach biosciences in an integrated manner are offered, suggestions as to how to do this are scarce. It is acknowledged that many nursing faculty lack confidence in their own knowledge in biosciences and feel inadequately prepared to apply bioscience concepts in their own teaching. A similar situation is reported to exist in clinical practice, where nurses question their own knowledge or have limited ability to articulate bioscience knowledge use in relation to clinical practice. So far, little attention has been afforded to consider factors that contribute to, or influence the lack of bioscience preparedness experienced by nursing lecturers.

Study direction.

The literature reviewed raises the following questions: Why are there so few nursing lecturers with bioscience degrees? Does the difficulty in learning bioscience as a student transcend into registered nurse practice, creating barriers to the utilisation of bioscience knowledge in clinical practice? Are contemporary nursing faculties currently experiencing the product of years of struggle in bioscience education for registered nurses? Is the bioscience problem likely to abate with relatively limited advances in educational research in this field? And why do nurses and faculty feel poorly prepared to articulate bioscience application in nursing and teaching practice?

There is clearly a lot of scope for future inquiry and much that remains unknown about this particular area of nursing education. Experiences with teaching and learning appear to influence nurses' knowledge and confidence with respect to bioscience knowledge, yet this has not been explicitly studied in research to date. Recent literature does, however, give emphasis to the role and responsibility that lies

with the nursing lecturer with regards to bioscience knowledge and its integration in student learning (Bradley, et al., 2006; Davis, 2010; Morrison-Griffiths, et al., 2002; Smales, 2010). Exploration of the teaching and learning experiences of nursing lecturers has identified factors that influence nursing lecturers' preparedness to integrate biosciences in their teaching practice. This line of inquiry is particularly pertinent in New Zealand when it has been identified that many nursing faculty perceive their bioscience knowledge to be inadequate for current practice and lack confidence in their ability to explain basic bioscience concepts as they relate to nursing (Friedel & Treagust, 2005). Further, in order to adequately prepare the nurse of the future, it is recommended that nurses will need a sound understanding of the biosciences to enable them to understand and manage increasingly complex patient management and expanding roles (KPMG, 2001; National Institute for Health and Clinical Excellence, 2007; Nursing Council of New Zealand, 2007, 2011).

Conclusion

The biological sciences (anatomy, physiology, pathophysiology, microbiology and pharmacology) are an area of concern and difficulty amongst nursing students, practising nurses and nursing faculty despite many of the efforts and strategies that have purported to improve bioscience education in nursing. A persistent theme within the literature is that the ability of students and registered nurses to learn how to apply bioscience knowledge to nursing practice is enhanced when lecturers and registered nurses are able to demonstrate and explain bioscience application to patient care. Students in contemporary pre-registration nursing programmes receive tertiary level science teaching that is typically provided by lecturers with science, rather than nursing qualifications. This situation places the responsibility for theory-

practice integration with the student, clinical practice mentors and, largely, nursing lecturers.

This thesis represents a new approach to study the bioscience problem by exploring the teaching and learning experiences of nursing lecturers to better understand the influence of experience on preparedness to integrate biosciences in teaching. The successive chapters describe the methodology and methods chosen to answer the research question: *How do teaching and learning experiences influence nursing lecturers' preparedness to integrate bioscience knowledge into their teaching practice?* The theoretical foundation for the study and rationale for transcendental phenomenology as the philosophical basis for the inquiry is discussed in the following chapter. Chapter four then describes the methods employed to collect and analyse the data.

CHAPTER THREE

Transcending Experience - Research Methodology

> Philosophy is "a statement encompassing ontological claims about the phenomena of central interest to a discipline, epistemic claims about how those phenomena come to be known, and ethical claims about what the members of a discipline come to value." Philosophical inquiry thus seeks "the discovery of knowledge and truth, as well as the identification of what is important to members of a discipline." (Fawcett, 2005, pp. 11, 12)

Introduction

This chapter outlines the key areas of phenomenology as a philosophy and justifies the adoption of transcendental phenomenology as the theoretical foundation for the study. The beliefs informing phenomenological philosophy are first explored in order to outline the researcher's philosophical approach to studying the phenomenon of preparedness (to integrate bioscience knowledge in teaching practice) in the context of teaching and learning experiences amongst nursing lecturers. The central constructs of transcendental phenomenology are then discussed to exemplify the relationship between descriptive phenomenology and the methodological approach taken to explore the phenomenon in this study. A summary of the core methodological requirements of phenomenological inquiry is presented to highlight the key variations in methodological interpretation in the philosophy and research methods employed.

Alternative approaches to phenomenological inquiry are briefly considered in the context of the study before concluding with explicit consideration of the

relationships between the researcher, the research question and the need for transcendence within the research process. The latter further strengthens the rationale to utilise transcendental phenomenological inquiry to explore the phenomenon in question.

Phenomenology as a Means of Inquiry

Phenomenology is a method of philosophical inquiry that seeks to discover understanding of subjective human experience using description. Whilst first described in the late 19th Century within Franz Brentano's works on descriptive psychology, the philosophical refinement undertaken by Brentano's student Edmund Husserl (1859-1938) led to greater prominence of phenomenology as a philosophical movement, which aimed to uncover the essential essences of phenomena (Parse, 2001; Spiegelberg, 1982). The phenomenological approach to human science inquiry emerged through Brentano and Husserl's dissatisfaction with natural science methods due to their realism, objectivity and exclusion of the subjective experience as a legitimate means of discovering knowledge (Cerbone, 2006; Parse, 2001; Stewart & Mickunas, 1990). According to Husserl, the development of scientific knowledge must encompass subjectivity and self-experience as "the world is nothing other than what I am aware of and what appears valid in my cognitions" (Husserl 1975, p. 8, as cited in Moustakas, 1994, p. 45).

Phenomenology thus sought to offer an alternative, philosophical science approach to the study of human experience and the phenomena of subjective consciousness (that which appears valid in one's cognition). Experience, as lived, represents the phenomena of inquiry through which the phenomenologist seeks to discover meaning by exploring patterns and structures that ultimately enable a description of the essential essences of the phenomenon being studied (Parse, 2001;

Smith, 2003). Husserl's concern for phenomenology to be a legitimate and complete science underpins the central processes within the phenomenological method and the theoretical constructs that inform the philosophy (Cerbone, 2006; Crotty, 1996; Sokolowski, 2000; Spiegelberg, 1982; Zahavi, 2003).

Phenomenology as a philosophical discipline has undergone considerable refinement and adaptation as philosophical understanding of the central theoretical constructs has evolved and the fundamental beliefs of Husserl, and subsequent phenomenologists (such as Heidegger, Sartre and Merleau-Ponty), have influenced the phenomenological movement and manifestations of philosophical inquiry within. Nonetheless, the many and varied phenomenologists within the movement championed by Husserl derive their adaptations from a common core of understanding that enable their methods of inquiry to assume the common label of phenomenology (Crotty, 1996; Spiegelberg, 1982). According to Spiegelberg, Husserl comments that:

> What unites them is the common conviction that it is only by a return to the primary sources of direct intuition and to insights into essential structures derived from them that we shall be able to put to use the great traditions of philosophy with their concepts and problems; only thus shall we be in a position to clarify such concepts intuitively, to restate the problems on an intuitive basis, and thus eventually to solve them, at least in principle. (Spiegelberg, 1982, p. 5)

Whilst the criteria for belonging to the phenomenological movement may be perceived in such a broad sense, phenomenology in *the strict sense* includes attention to the ways in which objects essentially appear, or are *intended* in subjective experience (Sokolowski, 2000; Spiegelberg, 1982). Consequently, any person

practising phenomenology, whether it is philosophical inquiry or phenomenological research, must understand and honour the central ontological and epistemological beliefs of the philosophy. Expressions of traditional phenomenological inquiry may be characterised by the inquirer's observance of the essentials of the phenomenological method and its objective to broaden and intensify the exploration of the structures of phenomena. However, in the context of research it is vital that the researcher appreciates the fundamental distinction between phenomenology as a research method and phenomenology as a philosophy.

Adherence to methodological interpretations of the ways in which phenomenological research may be conducted may not embody the fundamental philosophical assumptions of phenomenological inquiry, and their situation within Husserl's transcendental phenomenology, if the researcher does not first appreciate phenomenology as a philosophy. Whilst the steps within the phenomenological method assist the researcher to systematically and reflectively undertake phenomenological inquiry, they must be cautious in order to avoid the false belief that truth may be attained through the procedures outlined within a particular method of inquiry. Indeed, Sokolowski warns that "confidence in method is part of the rationalism of modernity" (2000, p. 164).

Husserl's discontent with the rationalist approaches of the natural sciences underpins the development of phenomenology as a methodological approach and, more importantly, the philosophy of phenomenological truth. Thus, in order to undertake a philosophical phenomenological inquiry, the researcher must understand and embrace the ontologic, epistemic and ethical values of the discipline. The following sections describe the key areas of phenomenological philosophy and justify its use as the theoretical foundation for this research.

Phenomenology as Philosophy

Husserl opposed the realism and objectivity of natural scientific inquiry as the only means to discover truth. He, and Brentano, differentiated the natural sciences (physical phenomena) from the human sciences (mental phenomena) as the world of physical phenomena is but a context for all the things in the world. Physical phenomena are in the world, and can be identified as such, yet they are identified by humans (who are also in the world), and their conscious experience of phenomena (Cerbone, 2006; Sokolowski, 2000).

If one is to seek truth and knowledge in relation to human experience the subjectivity of experience must be explored within the experiencing person's consciousness of experience *and experiencing*. Any exploration of human experience thus necessitates a critical attitude to uncover the complexities of consciousness in one's mind by studying subjective experiences of objects within the world and the subjectivity within, and behind the individual experience. A change in focus is required to understand the manifold qualities of the world and worldly objects as they present to us subjectively, as they are consciously known (Smith, 2003; Sokolowski, 2000). According to Gould (1984), "consciousness is the greatest invention in the history of life; it has allowed life to become aware of itself" (as cited in Humphrey, 1992 p.12). The notion of consciousness is critical to the philosophy of phenomenology, underpinning several fundamental assumptions and the key doctrine of *intentionality*. However, before discussing these issues, it is necessary to outline the essential differentiation of what Husserl calls *the natural attitude* and *the phenomenological attitude*.

The natural attitude.

Our being in the world is ordinarily concerned with *doing* and *thinking* about *things* in the surroundings of our world without considering the possibility that *things* are anything other than how we experience them or what we believe them to be (Zaner, 1970). This way of being is what Natanson calls "common sense life". He goes on to say that we, as human beings, have a "built-in mechanism of protection" in our everyday life that discourages inquiry into our experience of being in the world, or our questioning of what is common sense life (Natanson, 1962, as cited in Zaner, 1970, p. 49). The acceptance of things in the world and their being just as they are is characteristic of the natural attitude that affirms the reality of common-sense life (Smith, 2003; Zahavi, 2003). The natural attitude assumes that things are the way they are; the world is always there and it is accepted to be exactly as it is given. Whilst *unusual* human experiences (that cause us to question our perception or common-sense belief as to how things are) occur, they are invariably characterised as being merely *unusual* (according to common-sense, taken-for-granted beliefs) (Zaner, 1970). Yet the natural attitude fails to question daily life as it is given to us, in our own subjective experience. It fails to explore the implicit realities of human experience by focusing on the objective and explicit realities that are immediately apparent. Husserl describes the natural attitude as "our ordinary conscious awareness of ourselves and the world around us" (Cerbone, 2006, p. 9).

The objectivity of the natural attitude aligns with the inquiry of the natural, positive sciences and the attempt to evidence the fundamental components of reality and their basic structure. Such components are *objects* that exist within the assumptions of the natural attitude and common-sense life (Smith, 2003; Zahavi, 2003). The natural sciences thus "presuppose a world of objects" and any attempt to

account for how we become aware, or experience such objects would be explained in terms of objects (Cerbone, 2006, p. 18). From Husserl's perspective, such an explanation "is no explanation at all" (Cerbone, 2006, p. 18). Questions of *how* things come to be given to us are consequently beyond the scope of the natural sciences. Husserl saw that the natural sciences were concerned with physical objects and their nature in a one-dimensional, or ordinary perceptual way. Physical objects and material things are thus accepted to be as they appear to be. *Is* and *seem* are one and the same. Scientific inquiry within the natural sciences is principally governed by the search to explain physical phenomena using laws and principles that relate to the object that is observed (Cerbone, 2006; Woodruff Smith, 2007). The measures of truth and empirical knowledge within this positive approach to scientific inquiry are thus unable to explain the subjectivity of human experience, or doubt the assumptions of the objective world. Such phenomena require a shift towards a more critical attitude that demands philosophical explanation (Stewart & Mickunas, 1990; Zahavi, 2003).

The phenomenological attitude.

Husserl upholds that, although the assumptions of the natural attitude appear obvious and even *natural* to accept, uncritical belief that "the existence of a mind-, experience-, and theory-independent reality" is valid is "philosophically unacceptable" (Zahavi, 2003, p. 44). Rather, the taken-for-granted realities of the common-sense world must be exhaustively tested in critical inquiry based on what is given, in place of what one expects to find based on the uncritical presuppositions of the positive sciences. Husserl's "ontology of essences" underpins his philosophical belief that objects in nature are essences of the natural attitude and natural sciences; experiences or acts of consciousness are "parts of a stream of consciousness" that are

intentional of conscious essences, thus must be studied as the first person experiences them using phenomenology; and cultural objects, such as what we are and what we do, are objects and activities with cultural essences that should be studied within the cultural and social sciences (Woodruff Smith, 2007, p. 165).

This distinction in attitude toward different phenomena is critical to the phenomenological attitude that predicates transcendental phenomenological inquiry. The phenomenologist must hold the epistemic belief that the essences and properties of such diverse phenomena are so different that they must be studied in philosophically appropriate ways (Cerbone, 2006; Smith, 2003; Sokolowski, 2000; Zahavi, 2003; Zaner, 1970). The researcher seeking an understanding of what and how experience of phenomena come to be requires a phenomenological attitude to explore experience as it is intended in consciousness from its noetic (moments and qualities of what is intended) and noematic (the sense in which objects are intended or *given*) subjective qualities (Smith, 2003; Woodruff Smith, 2007; Zahavi, 2003). Within this attitude, and phenomenological philosophy, the general and essential essences of phenomena as experienced may be intuited, analyzed, and ultimately described by the researcher.

The phenomenological attitude upholds that the immediately given elements of conscious life are meaningless if one assumes that their giving of themselves constitutes truth and understanding of the subjectivity of conscious life. Understanding can never be achieved if one does not look beyond the mere object of consciousness to explore the ways in which one and the same object can be intended in different, indistinct ways (Smith, 2003; Zahavi, 2003). Looking *at* something intended may yield descriptive accounts of what is present *in* consciousness, but Husserl asserts that this alone leads to inadequate, meaningless description that does

not "distinguish between a thing and its appearances" (Sokolowski, 2000, p. 50). Phenomenological inquiry requires deeper, philosophical contemplation of phenomena as they present *to* consciousness (Smith, 2003). It requires that the researcher explore the complexity of mental phenomena and the meaning *beyond* what is immediately given. This complex exploration of consciousness is the hallmark of intentionality and transcendental phenomenological philosophy. According to Husserl, intentionality (the consciousness of identity within the flow of subjective life) can only be achieved within the "duality" of noetic and noematic inquiry into consciousness (Smith, 2003, p. 68). Such transcendental inquiry goes beyond, rather than discounts, the possibilities of naturalistic inquiry.

Intentionality.

Philosophical inquiry within the phenomenological attitude uses intentionality as a way of thinking in which meaning emerges from the interaction(s) of humans (conscious subject) with their human world (object of the subject's consciousness). In this way an individual's experience, although distinguishable from the external world, is inextricably related to, or correlates to the objective world (Crotty, 1998; Smith, 2003; Sokolowski, 2000). For any *thing* to exist in phenomenal form (as an object or feeling, for example) it must be "represented by a mind" (Humphrey, 1992, p. 17). Its form may exist, yet the elements of the thing must be experienced by the mind in order to acquire meaning. Phenomena must therefore encompass elements of the world *and* one's subjective feelings relating to experience *of*, or *with* the element in order to exist. Every experience is therefore *intentional* in that humans are essentially conscious *of* or experience *something* (Moustakas, 1994; Sokolowski, 2000; Woodruff Smith & McIntyre, 1982). Thus being aware or being conscious of something encompasses the self and the relationship between the self and things

within the environment that each constitutes the physical world as it is experienced. "This relational character of being conscious is 'intentionality'…", it "characterizes that aspect of a person that is called 'consciousness' or mind" (Woodruff Smith & McIntyre, 1982, p. xiii). Consequently, the study of intentionality, the manifestation of consciousness and its objective correlates, is central to the philosophy of mind (Lyons, 1995; Smith, 2003; Woodruff Smith & McIntyre, 1982).

Husserl recognised that the connectedness of consciousness and its intended objective correlates, or "the mind and that of which it is conscious" offered significant possibilities within the study of phenomena (Moran & Mooney, 2002, p. 9; Stewart & Mickunas, 1990). Intentionality signalled a shift in philosophical inquiry from questioning the reality of the world to question "the meaning of that which appears to consciousness" (Stewart & Mickunas, 1990, p. 9). However, for Husserl's theory of consciousness and intentionality to be realised the researcher must suspend questions pertaining to the reality of the world in order to study consciousness, that which is intended, and the complex relationships within this dualistic reality. This concept of suspending beliefs requires the researcher to develop a deeper understanding of phenomenological inquiry by exploring and integrating the philosophical tenets of *the epoché* and *phenomenological reduction* within the phenomenological attitude.

Phenomenological reduction.

Husserl called the change in attitude from the pre-philosophical natural attitude to the philosophical, phenomenological attitude the *phenomenological reduction* (Smith, 2003; Stewart & Mickunas, 1990; Woodruff Smith, 2007). This shift in thinking contends our epistemic beliefs and natural presuppositions about the world to focus on the true nature of phenomena. Phenomenological reduction requires the

researcher to taper their attention to the essential nature of the phenomenon in question. In doing so, existing presuppositions about the world must be *suspended* or *bracketed* from the stream of consciousness to enable the researcher to see the thing (phenomenon) exactly as it is intended (present in consciousness). Suspension of beliefs in this way is referred to as *the phenomenological epoché* (Moustakas, 1994; Smith, 2003; Zahavi, 2003).

Whilst this term was derived from skepticism, Husserl's intent was not to renounce beliefs, but to suspend them temporarily whilst investigating particular phenomena in order that the belief (what and how things are) could be revisited with greater understanding and knowledge (Smith, 2003; Zahavi, 2003). In essence, assumptions are apprehended as merely assumptions whilst the phenomenon is explored from multiple dimensions and a *pure consciousness*, seeing and reflecting on the object of consciousness in its complex manifestations. "Only after opening oneself to all kinds of experience will a person be in a position to decide whether empiricism is a sufficient theory for explaining human knowledge" (Stewart & Mickunas, 1990, p. 26).

This presuppositionless state is outlined by Husserl as his *first methodological principle*:

> I…must neither make nor go on accepting any judgment as scientific that I have not derived from self-evidence, from experiences in which the relevant things and states of affairs are present to me as they themselves. (Cartesian Meditations, as cited in Smith, 2003, p. 17)

The attempting to doubt naturalistic beliefs within the epoché is what Husserl calls *bracketing*, to put our assumptions "out of play" (Smith, 2003, p. 21). Whilst

the researcher understands that phenomenological reduction leads to both the epoché and subsequent bracketing, the terms are used interchangeably within literature and are subject to subtle interpretive explanation by various phenomenologists and researchers. The epoché and reduction are also frequently used as synonymous anchors for the concepts of phenomenological reflection and reflexivity. In the context of this study phenomenological reduction first required the researcher to focus on the phenomenon of preparedness within her own conscious experiences of teaching and learning biosciences for nursing practice in order to become aware of personal presuppositions concerning the phenomenon and how it came to be. Identification of assumptions in this way facilitated the epoché as personal presuppositions were identified and bracketed prior to, and throughout data collection and analysis. The researcher regarded her own experiences, relationships and practice as mere assumptions about the phenomenon of preparedness, thus attempting to put these unfounded beliefs *out of play* in order to explore participant experiences exactly as they were intended within the participants' subjective consciousness.

Adoption of phenomenological reduction and the epoché to bracket presuppositions in this way enables the phenomenon to be revisited from a fresh, naïve perspective (pure transcendental ego) which allows the researcher to really see what lies before them. Moustakas' (1994) transcendental model provided a phenomenal framework for the study, encouraging the researcher to acknowledge and reflect on personal assumptions concerning experiences thoughts and actions related to the phenomenon (preparedness) using phenomenological reduction and the epoché prior to data analysis, and through continued reflexivity to observe and consider how her presence affected the research process. Acknowledgement,

doubting, and subsequent suspension of preconceived notions and assumptions concerning the phenomenon throughout the research process encourages the researcher to transcend presuppositions, enabling a fresh perspective on experience(s) to be upheld (Moustakas, 1994; Woodruff Smith, 2007; Zahavi, 2003). This approach to inquiry is consistent with Husserl's notion of intentionality in that; "the first thing we must do…is to take the conscious life, completely without prejudice, just as what it quite immediately gives itself, as itself to be" (*Crisis*, as cited in Smith, 2003, p. 83). By upholding these philosophical tenets the researcher strove to return *to the thing itself*, remain faithful to the phenomenon and reveal its greater subjective meaning.

Transcendence.

Whilst the above beliefs guide the researcher to examine objects of consciousness exactly as they are given, "the specific and unique *transcendental*-phenomenological question is: What are the conditions of possibility for appearance as such?" (Zahavi, 2003, p. 54 *original emphasis*). Husserl's transcendental phenomenological philosophy and theory of intentionality propose that there is often much more to an intentional object than one's conception of the intended object (Sokolowski, 2000; Woodruff Smith & McIntyre, 1982; Zahavi, 2003). As such, to truly understand the essence of phenomenon, one must transcend the mere appearance of the object in its immediate givenness. Husserl refers to transcendent objects as having many aspects or perspectives that may not all be evident within any given intention (consciousness) of the object (Sokolowski, 2000; Stewart & Mickunas, 1990; Woodruff Smith & McIntyre, 1982). Consequently, each individual perception is incomplete as it reflects only one perception of the object. The characters of that object according to one's intention thus reveal some, but not all

conceptions of the object. This does not suggest that our intended conceptions of objects are false, or that an object cannot be intended. Rather that our own conceptions of the object offer only one perspective, and that other perspectives exist yet are not specified by our conscious intention of the object. Transcendent entities have "…further detail, not 'determined' but 'determinable'…in every conception under which a transcendent object is intended" (Husserl, as cited in Woodruff Smith & McIntyre, 1982, p. 17).

From the perspective of this study, each participant's experience of the phenomenon has many aspects or elements that can be explored within phenomenological inquiry. Each participant's intention relates to the same object of experience, yet no single intention of the experience will completely transcend the phenomenon. Each participant offers different *horizons* of preparedness, and yet still further horizons or perspectives transcend each given intention. Husserl refers to the notion of horizon as a component of an *act* in "its relation to other actual and possible acts directed to the same object" (Woodruff Smith & McIntyre, 1982, p. 17). While each participant's experiential descriptions revealed noetic components of the object intended, other actual and possible intentions of the same object, other horizons of the experience transcended the experience they described.

The notion that "any given moment of experience involves more than what is being experienced as currently present indicates the 'horizonal' structure of experience" (Cerbone, 2006, p. 27). The researcher must therefore look beyond noetic structures within the experience described to consider actual and possible horizons *of* experience and *experiencing*. Husserl's concept of reflection is integral to the exploration of horizons in this way by encouraging the researcher to reflectively analyze phenomena of consciousness by "unfolding what is intentionally

'implicit' in experience"…*and* uncover "elements that are 'really contained' in consciousness, digging down into the infrastructure of everyday experience" (Smith, 2003, p. 84). Husserl refers to this discovery of preconditions within *anonymously functioning subjectivity* as a critical component of *transcendental* philosophy. "There is no possible experience that does not involve that 'meaning beyond' which is the hallmark of intentionality" (Husserl, as cited in Smith, 2003, p. 86).

Phenomenological inquiry yields unique and varied accounts of subjective experience and meaning that the researcher must openly explore from the perspective of a *pure* consciousness. This presuppositionless state facilitates the researcher to transcend participants' experience in order that they may uncover the complexity of meaning and multiple horizons within. In the context of this study participants' experiential accounts reflect the noetic functions of consciousness in that they represent the objects of consciousness of which they are aware (ultimately enabling a rich description of what is experienced). Such intentions are then transcended through the process of exploring noematic expressions and possibilities within participants' conscious intentions. This takes the researcher beyond the participants' immediate intended experience to explore the noematic structures that interdependently reflect the relational character of intentionality and enable a noematic description of how experiences came to be.

Through exploration of meanings and context, the researcher seeks to make sense of others' experiences of the world to inductively interpret general and essential essences of the complex phenomenon as a whole. This study uses Moustakas'(1994) framework for phenomenological analysis as a guide by which to explore participant experiences. Moustakas' inclusion of the researcher's search for textural and structural themes in the framework reflects Husserl's concept of noesis

and noema. Within Moustakas' method the researcher seeks to apprehend the essential essences of what is experienced (textural, noetic structures) and how it is experienced (structural, noematic structures) (Moustakas, 1994). Moments of individual experience and their particular horizons are ultimately fused through Husserl's notion of *synthesis* to reveal the essential structures of the experience (Cerbone, 2006). In this study, synthesis is undertaken as textural and structural essences are integrated to disclose the essential nature of the phenomenon (Moustakas, 1994).

Eidetic intuition.

The pure science of consciousness that Husserl demands seeks eidetic description of "those features by virtue of what any possible process of consciousness is what it is…without which it would not be that which it is" (Zaner, 1970, p. 132). Here the term eidetic suggests that description must be acutely accurate, providing a vivid representation of the essential features of conscious experience. Indeed, Husserl's use of the word transcendental refers to "the necessary conditions for experience" (Stewart & Mickunas, 1990, p. 38).This search for knowledge of generic and essential essences of phenomena extends beyond empirical knowledge by attempting to access eidetic possibilities and impossibilities through critical phenomenological inquiry. Consideration of eidetic possibilities requires the process of *imaginative variation*, in which the researcher systematically and reflectively varies the possible features of consciousing to clarify the invariant features and essential essences that make *the thing* what it is (Cerbone, 2006; Moustakas, 1994; Spiegelberg, 1982). This provides evidence of their essential possibility (Sokolowski, 2000; Spiegelberg, 1982; Zaner, 1970). Epistemologically, eidetic descriptions may become philosophical knowledge through the critical

disclosure of essential themes derived from rich manifestations of the possibilities of intersubjective experience.

Free variation of possibility within imaginative variation allows the researcher to separate idiosyncratic features of experience from those that are necessary to universally describe the experience (Cerbone, 2006). Such features are eidetic insights into general and essential essences of the *thing* being studied, offering a deeper understanding of meaning within the phenomenon (Spiegelberg, 1982; Stewart & Mickunas, 1990). Transcendental phenomenological philosophy contends that "everything found in human experience will also of necessity be found as essential themes in transcendental phenomenology" (Zaner, 1970, p. 194). Thus, through critical phenomenological inquiry the researcher is able to transcend experience to explore meaning, vary possibilities within essences of the phenomenon and identify the essential essences that make the experience what it is.

The concept of imaginative variation within phenomenological inquiry reflects another key construct within Husserl's philosophy. This component of Husserl's methodology seeks "possible meanings through the utilization of imagination, varying frames of reference, employing polarities and reversals, and approaching the phenomenon from divergent perspectives, different positions, roles or functions" to uncover the conditions that illuminate the experience (Moustakas, 1994, pp. 97-98). According to Husserl the "pure essence can be exemplified intuitively in the data of experience, data of perception, memory and so forth, but just as readily…in the play of fancy" (Husserl, 1931,p.57, as cited in Moustakas, 1994, p. 98). This variation in possibility requires imagination, reflection and intuition within one's exploration to consider every imaginable sense and yet *intuitively* identify and synthesise structures into essences of meaning relating to the experience studied.

Intuition is regarded as a central construct for any analysis and elucidation within phenomenological research, reflecting Husserl's "principle of all principles...to ultimately be guided by the things themselves" which are only given to the self through intuition (Smith, 2003, p. 101; Spiegelberg, 1982; Zahavi, 2003). Smith refers to imagination as giving the researcher an "as if reality*"* that requires intuition to explore a *thing* from multiple perspectives as closely as if one were originally experiencing it (2003, p. 102). The exploration uses imagination and perception to intuitively yield a fulfilling, "illustrating or clarifying function" (Smith, 2003, p. 102; Spiegelberg, 1982) that, for Husserl, affords a particular mode of givenness that is "intuitively present" (Zahavi, 2003, p. 30). The researcher is then in a position of enlightened cognition and philosophical knowledge that surpasses the possibilities of empirical knowledge, of the same phenomenon, as derivable from natural scientific inquiry. This fullness of understanding and progression from what Husserl calls *empty* intention (the object as intended) to *intuitive fullness* is a central component of intentionality, and of philosophical knowledge (Moustakas, 1994; Smith, 2003; Sokolowski, 2000; Woodruff Smith, 2007; Zahavi, 2003).

Reflexivity – the self as transcendental.

According to Husserl intuition can also be realised by the phenomenological researcher through the process of phenomenological reflection. Reflection enables the researcher to "grasp the structure of intentionality" in experience by attending to each form of experience, the apparent characters of each type of experience and intuitively analysing the noematic meaning within (Woodruff Smith, 2007, p. 62). Yet "being human inextricably engages one in 'taking a stand', making up one's mind, choosing among alternatives" (Husserl, as cited in Zaner, 1970, p. 175). Thus a critical phenomenological attitude is required in order to explore experiences and

phenomena relating to individuals' experience from a presuppositionless stance. Experiences are shaped by our being human, by our own presuppositions, values and beliefs and by our choices prior to, during and following any experience. Thus the researcher must extensively explore, intuit and reflect on consciousness, intentionality and its meaning for the individual, *and* of oneself, in order that experience as an inextricable component of mental life can be critically examined (Woodruff Smith, 2007).

Transcendental phenomenology is characterized by this continuous reflexivity on the self, a rigorous and detailed process of *thinking over* or reflectively apprehending one's experience with evidence (Zaner, 1970). In this study the researcher first adopted phenomenological reduction to think over decisions, presuppositions and possibilities relating to personal experience that may have shaped implicit and hidden preconditions of subjective experience and conscious intentions. Apprehension of the noetic and noematic structures of personal experience in this way then enabled continuous researcher reflexivity to ensure, as far as possible, that participants' experiences were intuited, analysed and described within a critical phenomenological attitude. Adoption of transcendental phenomenological philosophy to first explore the researcher's own experiences and the phenomenon of her own preparedness is extremely valuable to the study as a perceptible contrast between the researcher's own preparedness and that of many nursing lecturers was the fundamental inspiration and motivation for this study.

The phenomenon of preparedness (to integrate bioscience knowledge in teaching practice) amongst nursing lecturers was the phenomenon of investigation for this study. Adoption of a phenomenological approach to the inquiry sought to uncover the true essences of the phenomenon as it is experienced by nursing

lecturers, beginning with the processes of *phenomenological intuiting* in which the researcher concentrated entirely on her own conscious experiences (the object intuited) to look deeply to comprehend the uniqueness of the mere phenomenon. This process of self-exploration enabled the researcher to acknowledge her own experiences and explore their relationship to the phenomenon of preparedness, endeavouring to then place such presuppositions *out of play* and be conscious of her own subjective influence on the research through continuous researcher reflexivity.

Achieving phenomenological reflexivity and reduction.

Husserl's phenomenological reduction and the associated concepts of the epoché and bracketing have received much critique within the various methodological interpretations of phenomenology as a discipline (Moran & Mooney, 2002; Stewart & Mickunas, 1990; Zahavi, 2003). Critique predominantly surrounds the notion that one can never truly suspend personal beliefs about the world as it appears in consciousness. Yet, when reduction and bracketing within the epoché and transcendental phenomenology are examined from the perspective of Husserl's theory of intentionality, it becomes clearer that the phenomenological reduction is neither ontological nor epistemological in its intent. Objects within the world are not annulled in terms of their existence or reduced to mental thoughts, nor is knowledge of the world reduced to knowledge of consciousness as some critics may suggest (Woodruff Smith, 2007; Zahavi, 2003). Rather Husserl's notion of the epoché serves to enable the researcher to bracket their consciousness *of* a *thing* (or object) in order to attend to their consciousness of *experiencing* the thing in the world. This method of practising phenomenology facilitates the study of "the experience and its content or meaning, not the object represented by the meaning" (Woodruff Smith, 2007, p. 243).

In this study the researcher gained greater understanding of the experience of preparedness with bioscience integration in teaching practice as a nursing lecturer by exploring how learning and teaching experiences influence the phenomenon. It was therefore important to bracket personal presuppositions by looking beyond what was experienced to the hidden meaning within the experience. Bracketing was practiced first within the phenomenological reduction and epoché (as previously mentioned and discussed in the subsequent methods chapter). The concept of bracketing was also practiced through the processes of temporarily suspending belief in what participants described in order to look beyond the *object* of experience, to explore the *meaning* of their experiences, and through continuous researcher reflexivity upon her subjective influence on the research process and the way in which the phenomenon was developing, or *constituting* in consciousness.

Characterisation of experience from a phenomenological perspective consequently involves an appraisal of the content or meaning of the experience and the intersubjective relationships between content, meaning and the way the experience came to be presented (to the person's consciousness). Exploration beyond what is immediately given requires phenomenological reflection and analysis to enable the meaning within an experience to be uncovered (Woodruff Smith, 2007). Use of the terms transcendental and transcendence within Husserl's later philosophy reflects the emphasis on, and significance of phenomenological reduction, bracketing and reflexivity in the researcher's quest to look beyond the *thing*, to transcend its immediate givenness in order to uncover true meaning and knowledge of experience.

Further criticism of Husserl's concept of bracketing and the epoché claims that complete transcendence is rarely achieved as one can never truly bracket or suspend personal beliefs (Moran & Mooney, 2002; Moustakas, 1994; Stewart & Mickunas,

1990). Yet this critique views the epoché as a means to bracket all assumptions, in a similar vein to the notion of Cartesian doubt. Even Husserl contended that "one cannot bracket everything", asserting that the intent of the epoché is to doubt *only* the bias of everyday assumptions based on the natural attitude (Moustakas, 1994; Stewart & Mickunas, 1990, p. 35). It is precisely the taken-for-granted beliefs and unproven, accepted truth of the common-sense world that Husserl guides the phenomenologist to temporarily suspend in order to internally reflect on the phenomenon and its true meaning. Husserl saw the epoché as the means to discover new knowledge that can only be achieved from the perspective of a new consciousness and the presuppositionless state (Moustakas, 1994). Within the epoché the natural world does not cease to exist; our prereflective beliefs are retained yet put out of play during the inquiry in order that the phenomenon can be seen from a new, pure consciousness.

The epoché suspends conscious beliefs about the world as given in order to reveal a transcendental consciousness that "is neither subjective or objective but embraces both" (Stewart & Mickunas, 1990, p. 36). This is also referred to as *the transcendental ego* or *transcendental subjectivity* in recognition that the ego cannot be conceived in isolation from its conscious life (Cerbone, 2006; Stewart & Mickunas, 1990; Zahavi, 2003). Indeed employment of the epoché and bracketing of immediate consciousness implies that consciousness itself cannot be bracketed. Husserl acknowledges that the epoché is a radical process of creating "a unique sort of philosophical solitude", going on to discuss the fundamental role of "I" as the transcendental ego (Husserl, 1970, as cited in Moustakas, 1994, p. 87). As such, the subjective *I* remains in any act of consciousness, reflective or prereflective, philosophical or prephilosophical.

The nature of being human means that our interpretation of meaning contains subjectivity. Whilst this may be the truth upon which critique of Husserl's epoché is founded, the practice of reflexivity within transcendental phenomenological inquiry exists to support the researcher to openly perceive presuppositions as they enter one's consciousness. Assumptions and prephilosophical judgments are identified, acknowledged and released from consciousness in order that one's usual ways of seeing, thinking and judging are removed (Moustakas, 1994). The object of one's consciousness is then open to transcendence, enabling the researcher to see what really lies before them.

Woodruff Smith's interpretation of bracketing as more of a process of "quotation" than parenthesis provides a clearer illustration of the purpose of bracketing within Husserl's transcendental philosophy (2007, pp. 244-252). In contrast to critical appraisal of bracketing as a form of denial of the world, the image of placing assumptions about the world into "quotation marks" to enable reflection on our consciousness of "the world as quoted" demonstrates the shift in attention that is required by the researcher to move beyond *what* is said to look at the words used and the meaning or *sense* of the expression. Bracketing thus effects "the phenomenological shift away from the object of my consciousness to my *sense* of that object" (Woodruff Smith, 2007, p. 256 *original emphasis*). This perspective enables the researcher to focus on the noematic sense in experience by moving beyond content to uncover how content is represented.

In this study, the researcher used bracketing to transcend the object of participants' experience (what they were describing) to explore the ways in which the object *is* experienced. Participants were asked to describe their experiences of learning *and* teaching biosciences for nursing practice. Consequently, from a noetic

perspective, they described distinct *objects* of each experience, yet the practice of phenomenological reduction and bracketing enabled the researcher to look beyond what was experienced to explore how such experiences came to be. This reflected the noematic structures of the experience of teaching and learning and its intimate relationship to the phenomenon of preparedness with bioscience integration in teaching.

Transcendence thus enabled the researcher to look beyond her own experience to explore the noetic and noematic structures within participant experiences of the same phenomenon. This process facilitates greater understanding of what is experienced and how it came to be (Moustakas, 1994; Woodruff Smith, 2007). The concepts of noesis and noema are reflected in the researcher's method as *textural* and *structural* essences of experience (respectively).

Reflexivity in data collection.

Zaner discusses the apprehension of experience in the context of the self as transcendental, yet the notion or process of *stepping back* in order to reflect on oneself (as the object of experience) can also be applied to the research process during participant interview as the researcher guides and encourages participants to reflect on their own experience *and* their reflection of the experience *as the experiencing self*. Husserl's critique of Descartes' incomplete phenomenology leads him to make the following statement:

> I know, when I stop and think, that all my knowing, perceiving, willing, and so on, goes on within me; all the distinguishing between genuine and deceptive experiences also goes on in me as part of what I call my

> thinking. Every truth, every object, every event, is something I myself experience in myself. (Husserl, 1960, as cited in Zaner, 1970, p. 179)

To explore participants' thinking upon, and around their experience and encourage their differentiation between what Husserl refers to as *genuine* and *deceptive* experiences, the researcher carefully questioned and probed the participants to reflect on their experience in order to bring it into their consciousness and also to consider why and how the experience came to be. Although the participants' first conscious recollection of the experience may indeed be *just as it was*, reflection on the immediate response and how that came to be offers greater depth of thinking, and the consideration of context and subjectivity in experience and one's recollection of it. Husserl's use of the term deceptive portrays an inaccuracy in the individuals' account of their experience, yet the researcher encouraged participant reflection in order to gain further clarity, to extend the participant beyond immediate givenness to consider the qualities and characteristics surrounding the experience. This is not to imply that immediately given experiences are deceptive, rather that there is always meaning beyond one's immediate consciousness. The researcher's role during participant interview was to guide the participant to reflect on, and stand back from their experiences in order to gain greater depth of inquiry so that she could ultimately intuit, analyse and explicate the essential nature of the phenomenon.

During the interview the researcher guided participants to shift their attention first to the objects of their experience, to think back over something once experienced. Zaner (1970) describes *thinking back* as a process of recollection, but goes on to say that a quite different shift in attention can occur whilst thinking back. For example we may go on to wonder why we had or have particular feelings or

recollections that are associated with the object of our thinking. Thus our thinking is not merely remembering; the process of stopping and thinking can bring to our attention thoughts of the subjective experience of the object (of our attention) and also the subjective experience of the experience i.e. focusing on oneself and one's individuality within the experience. Zaner refers to such pauses to "think back over" as being autobiographical, referring to the individual and their "biographical situation, knowledge at hand, particular habits, style, beliefs…" (Zaner, 1970, p. 181). In order to transcend participants' preliminary description of their experience to uncover deeper, more reflective thought, the researcher guided participants to stop and think about their recollections by posing questions during the interview that openly encouraged reflection, yielding greater depth within their experiential accounts.

A second point within the philosopher's transcendence of self is that of "disengagement, neutrality, and the critical attitude" (Zaner, 1970, p. 182). Again, whilst Zaner's discussion pertains to the methodological rigour with which the phenomenologist must practice, the concept of dissociation to facilitate a critical indifference and openness to *whatever presents itself* can similarly be considered from the perspective of the participant. If the researcher aims to study the complexity within autobiographical accounts of an experience it is necessary to take the participant beyond the taken for granted assumptions of the immediately recollected experience. To encourage participants to step back and think over the subjectivity within their experience, the researcher in essence encouraged them to disengage somewhat from the immediate, recollective account of an experience to consider the subjective presuppositions that may have influenced their account. This process of "making explicit what is implicit" involves "a regressive uncovering of layer after

layer" by guiding the participant through progressive reflection (Zaner, 1970, p. 187).

Zaner's account of methodological processes within the transcendental philosophy pertains to *disengagement* by the philosopher in order to uncover what is mental life (1970), yet one would argue that the researcher is also encouraging the participant to step back from their initial description of their experience and reflect on what they have said. By stepping back from *it* (their immediately voiced response) the participant is encouraged to *see* it, consider their response, and go on to describe their experience in refined detail and elaborate on how they believe the experience came to be. Thus a transcendental approach was also adopted during participant interviews by the approach taken to question and elicit experiential descriptions from the study participants. Transcendental phenomenology goes beyond the critique of knowledge to a broader, deeper criticism of human experience (Zaner, 1970). Self criticism is foundational, and whilst essential for the researcher, can also be encouraged within participants' experiential accounts to provide rich data for phenomenal analysis.

Phenomenology as a Research Methodology

Herbert Spiegelberg is regarded as a leading historiographer of the phenomenological movement, frequently sourced and cited by those wishing to understand and convey their grasp of this complex and challenging philosophy and the plethora of available methodological interpretations (see for example Cohen & Omery, 1994; Dowling, 2007; McConnell-Henry, Chapman, & Francis, 2009; Streubert & Carpenter, 2011; Wimpenny & Gass, 2000). Variation in research methods employed within phenomenological inquiry appear to arise from researcher interpretation of the philosophical and theoretical constructs within phenomenology

as a philosophical discipline and methodology. Husserl strove to convey phenomenology as a rigorous science with the positive objective of returning to the things themselves through systematic and complete inquiry (Sokolowski, 2000; Zahavi, 2003; Zaner, 1970). However, one might cautiously suggest that the focus on systematic inquiry within Husserlian phenomenology may inadvertently influence researchers to afford their attention to phenomenological methods at the expense of philosophical understanding and appropriate methodological interpretation (see for example Barkway, 2001; Crotty, 1996; Giorgi, 2000; Jasper, 1994; Paley, 2005).

Speigelberg provides a comprehensive description and discussion of the steps that essentially characterise phenomenological methodology, from which variations in phenomenological research methods may have arisen. Derived from the philosophical foundation of phenomenology, the following steps reflect a series of methodological requirements that Husserl prescribed to be necessary to "return to the unadulterated phenomena" (Spiegelberg, 1982, p. 670). The core requirements are presented below as a précis of both Speigelberg's discussion and the research methods employed within this study (discussed in the following chapter) (Spiegelberg, 1982, pp. 679-717).

1. ***Investigating particular phenomena.***

Encompassed within this step are the processes of; *phenomenological intuiting* in which the inquirer concentrates entirely on the object intuited to look deeply to try to comprehend the uniqueness of the mere phenomenon; *phenomenological analyzing* as the inquirer seeks to analyse a distinct phenomenon to outline, but not separate, the constituents and structure of the phenomenon, rather than the expressions of the phenomenon; and *phenomenological description* of the phenomenon as it is intuited and analysed. This lengthy process requires the inquirer

to explore experiential properties with the aim of faithfully describing experiences of the phenomenon and considering its characteristics.

2. ***Investigating general essences.***

Also referred to as *eidetic intuition*, in this step the inquirer perceives and/or imagines the particulars that embody the intuited essences as a means to progress towards the *apprehension of the general essences*. Reflection surrounds the inquirer's exploration to consider what is happening to illuminate and look through the particulars of a phenomenon to observe clusters or sequences of the phenomenon. The general essence to which particulars have a *natural affinity* cannot be seen without such detailed exploration, from the general to the particular and then intuiting how the *structural affinity* of particulars appear as essences of the phenomenon. Essences or elements of the phenomenon are then analysed to identify general essences and their related elements that may be described as such.

3. ***Apprehending essential relationships.***

The general essences of the phenomenon are explored in the context of the phenomenon as a whole to determine essential connections or associations within and/or between essences. *Free imaginative variation* requires the inquirer to consider whether essences, as described, are truly *essential* to the phenomenon. Relationships or connections that appear to the imagination are explored and possibilities contemplated as the essences within appearing connections are examined as *possibly, relatively* or *absolutely* essential to the phenomenon of inquiry. Consequences of altered relationships are *imaginatively varied* in order to seek insight into essential relationships.

The three steps above represent the core elements of what Speigelberg calls *the phenomenological method* (1982, pp. 678-715). Whilst the adherence to, or interpretation of the following steps vary amongst phenomenologists, steps four to six are prominent within Husserl's work and the transcendental phenomenological philosophy within this study.

4. ***Watching modes of appearing.***

The inquirer pays particular attention to the ways in which objects appear within consciousness by exploring different perspectives of the object as it is given. The aim is to reflect on all *authentic* phenomena, regardless of the contribution its knowledge may offer. Reflection on the ways in which objects are given creates doubt which serves to question the inquirer's initial perception of the things themselves and contributes to the verification of their understanding.

5. ***Watching the constitution of phenomena in consciousness.***

The inquirer explores the way in which a phenomenon develops or *constitutes* in our consciousness. Exploration in this way facilitates the inquirer to identify characteristic structures and essential relationships within the phenomenon.

It is important to note that phenomenology in the *strictest* sense refers to phenomenology arising from Husserl's concept of phenomenological reduction and the ways in which objects appear to, and are constituted by consciousness (Spiegelberg, 1982). As previously discussed, the researcher's ability and intent to uphold phenomenological reduction is contentious within the movement and thus not universal within manifestations of the phenomenological method. Husserl's phenomenology however, explicitly includes phenomenological reduction as the cornerstone of the phenomenological attitude (Moustakas, 1994; Smith, 2003;

Sokolowski, 2000). Consequently the following step has been integrated into the researcher's approach to study the phenomenon of interest.

6. ***Suspending belief in the existence of phenomena.***

This component of the phenomenological method occurs prior to, and throughout any inquiry adopting Husserl's philosophy and direction. However, as phenomenological reduction is not characteristic of all phenomenologies, this step is presented to the reader *following* the more typical phenomenological method steps outlined above. Phenomenological reduction requires the inquirer to detach their experience and presuppositions from the context of inquiry to bracket and suspend belief in its existence so that they may concentrate on the phenomenon entirely and exclusively as it is intended, considering all that it has to offer to the inquirer's consciousness in an unprejudiced manner (Spiegelberg, 1982; Stewart & Mickunas, 1990).

Speigelberg's discussion also includes reference to a seventh step that reflects the key point of divergence between transcendental phenomenology, the existentialist movement and interpretive phenomenology (Spiegelberg, 1982, pp. 712-715). Here, phenomenological reduction is replaced by *interpreting concealed meanings.* Whilst this is not characteristic of Husserlian phenomenology, it is important to outline the fundamental points of discrepancy in methodological interpretation and their implications for this study in the following section.

Alternative Approaches to Phenomenological Inquiry

The beginning of this chapter alluded to the plethoric refinement and adaptation that has occurred within phenomenology as a discipline as Husserl and other phenomenologists' philosophical understanding of the central theoretical constructs have evolved to influence various manifestations of philosophical inquiry within the discipline. Successive phenomenologists have utilised Husserl's theory of intentionality to further explore and also question some of the fundamental beliefs within transcendental phenomenology. One of the most striking adaptations to Husserl's eidetic phenomenology is championed by existential philosophy and the emphasis on being-in-the-world as the ontological basis of philosophical inquiry. Eidetic phenomenology's concern for essences, the achievement of transcendental subjectivity and subsequent exclusion of the presumptions of the natural attitude was perceived, by existentialists, to reflect idealistic philosophy (despite Husserl's insistence to the contrary) (Stewart & Mickunas, 1990).

Existentialist philosophers contend that consciousness cannot be separated from its being-in-the-world, challenging Husserl's principle of phenomenological reduction and his claim that phenomenology should be a science of essences (Cerbone, 2006; Stewart & Mickunas, 1990). Existentialism argues that "the world is not the only correlate of consciousness but that without which there would be no consciousness", illustrating that the world contextualizes and delimits human reality (Cerbone, 2006; Stewart & Mickunas, 1990, p. 64). Consequently, existentialist phenomenologists oppose Husserl's concept of phenomenological reduction to favour an extensive inquiry *beyond the things themselves* to meanings which are not immediately given, and the question of existence (Cerbone, 2006; Spiegelberg, 1982). Existentialist phenomenology thus seeks to interpret the *sense* of phenomena

that are not explicitly apparent from the inquiry of intuiting, analyzing and describing.

Martin Heidegger, a student of, and academic successor to Husserl, is regarded to be one of the most prominent existentialist philosophers. Heidegger claimed that Husserl's philosophy overlooked the fundamental ontology of existence and being-in-the-world (Cerbone, 2006; May, 1994b; Sokolowski, 2000). Husserl's methodological epoché signifies the foremost point of departure from transcendental phenomenology to existentialism and interpretive phenomenology as Heidegger believed Husserl's quest to describe phenomenal essences exceeded the more pressing question of existence (Cerbone, 2006). This signifies a fundamental discrepancy in ontological and epistemological notions of reality and the source of phenomenological truth. Husserlian eidetic phenomenology is regarded to be epistemologic whereas Heideggerian hermeneutic phenomenology's primary concern is ontologic (May, 1994b). Whilst phenomenologists are united in their search for meaning within consciousness of *the things themselves*, transcendental and existential interpretations of the theory of intentionality clearly differ (Cerbone, 2006; Crotty, 1996).

Husserl's phenomenology is descriptive in its purpose, seeking to evidence original experience through reflective intuition. Phenomena are described in terms of the essential essence of their apperception from pure consciousness (May, 1994b). According to Cerbone "a phenomenological description…confines itself entirely to how things are manifest in experience, the activity *as* experienced" (2006, pp. 74, *original emphasis*). In relation to the research question, this study sought to describe the essential essence of the experience of preparedness as it presents in consciousness and transcends the object of one's consciousness. The fundamental

search for truth and meaning in relation to this phenomenon is thus more epistemological in nature as the researcher seeks greater understanding and enlightenment regarding the meaning of preparedness in this context. The motivation to investigate the phenomenon arose from the researcher's own preparedness and the fundamental question of how experience may have influenced this, the question of how it came to be. The assumption that learning and teaching experiences influence the phenomenon of preparedness necessitated that the researcher lay such presuppositions in abeyance through phenomenological reduction in order to explore the phenomenon exactly as it presents itself to participants in their experiences of learning and teaching biosciences for nursing. The transcendental presuppositionless approach and continuous reflexivity were therefore considered to be integral to the researcher's philosophical inquiry and quest to discover the influential meaning of experience in its relation to the essence of preparedness.

Conclusion

This chapter described phenomenology as a discipline, a guiding philosophy and a research methodology. Exploration of the key theoretical constructs of intentionality, phenomenological reduction, transcendence, intuition and reflexivity within Husserl's transcendental phenomenological philosophy and the context of the study highlighted the fittingness of this approach to the research question and phenomenon of interest. Whilst Husserl's notion of the phenomenological reduction is not consistently upheld within phenomenological philosophy or research, the researcher's appraisal of prominent critique regarding his epistemological and ontological claims served to refute such claims in the context of this study.

The following chapter provides a detailed description of the methods by which the researcher used transcendental phenomenological inquiry to address the research

question. The core philosophical tenets of Husserl's transcendental phenomenology are represented in the transcendental phenomenological framework offered by Moustakas (1994, pp. 120-122), providing fundamental structure for the methods. The following discussion details the precise procedures within the researcher's method, reflecting the transcendental phenomenological philosophy outlined within this chapter.

CHAPTER FOUR

Research Methods

Introduction

This chapter describes the research design and the procedures undertaken during the study. Underpinned by transcendental phenomenological philosophy, this chapter will describe and justify the researcher's approach to method selection in order to explore the phenomenon in question. Research procedures are detailed to reflect the core processes of transcendental phenomenological reduction, the epoché, and imaginative variation and include: indicative interview design; pilot study phases; methodological refinement; study population; sampling; and interviewing. The processes utilised to collect and analyse data are outlined and justified with respect to adaptations made to fully explore the research question from a transcendental philosophical stance, and achieve a synthesis of meanings and essences of the phenomenon. This integrated description encompasses what is experienced and how it is experienced, offering a deeper understanding of the phenomenon.

Transcendental Phenomenological Approach

A transcendental phenomenological approach requires the researcher to be disciplined and systematic in their approach to identify and acknowledge personal presuppositions surrounding the phenomenon being studied before exploring the phenomenon from the perspective of the research participants (Moustakas, 1994; Sokolowski, 2000). The first component of the study thus required the researcher to engage in deep thought and reflection in order to describe her own experiences of learning and teaching biosciences in nursing practice as *they* (the experiences)

appeared within her consciousness. Phenomenological reduction and the epoché enabled the researcher to identify experiences, thoughts and actions that may have contributed to her own preparedness to integrate biosciences in her teaching. Becoming aware of one's own experiences and the relationships between experience, learning and practice enabled the researcher to acknowledge and reflect on personal assumptions concerning the phenomenon of *preparedness* and assisted her to transcend presuppositions as far as possible in order to begin and conduct the study with a fresh and open perspective towards the participants' experience(s).

The following section provides a summary of the researcher's presuppositions surrounding her own preparedness with bioscience integration. Written in the first person, the account depicts the researcher's reflection on learning and teaching experiences as they presented to conscious thought and appeared to relate to the phenomenon. The implications of each presupposition for the study are also outlined to highlight the researcher's considerations with regards to transcendence within the study.

Researcher Presuppositions

Reflection on my own approach to teaching and being prepared to integrate bioscience concepts when teaching registered nurses highlighted that my belief, prior to the study, is that the type and level of integration that I practice in nursing and teaching is integral to the development of nursing practice. As a nurse, I want to understand what is happening for patients and be able to work through the implications of pathophysiology and physiological responses in order to, not only understand, but pre-empt what patients in my care may experience, and identify rationale for the medical and nursing care that may be, or is, provided in each unique context. This belief is affirmed when the nurses I teach appreciate and respond

positively to the detailed explanations that underpin their practice and what they have seen in patient assessment. Enlightenment in this way appears to highlight the relevance of biosciences for nursing practice for these nurses and is acknowledged by their comments. This positive reinforcement influences my assumption that nursing lecturers can help nurses understand what is happening to and for patients in their care by illustrating the links between bioscience knowledge and their actions as nurses.

Clearer articulation of my assumption that biosciences are integral for nursing practice and that nursing lecturers are in an influential position to promote or devalue bioscience knowledge application in nursing highlighted a need to look beyond this belief whilst interviewing participants, listening to their stories and undertaking data analysis. Researcher reflexivity was practiced by constantly questioning my approach by checking; “am I guiding their story to support what I believe?”, “am I responding more positively to comments that align with my assumption?”, “am I really seeing what they are saying, or am I seeing what I believe to be true?” These concerns undoubtedly influenced the intensity of reflexivity undertaken as the study progressed, influencing my decisions to integrate detailed verification procedures (discussed later in this chapter).

Whilst beginning teaching practice is associated with uncertainty as to whether one is teaching the right things, my beliefs are founded in clinical practice experience and the assistance that bioscience knowledge has offered my nursing practice over the years. Testing the water as to whether my beliefs aligned with what nurses wanted to know in the early years of my teaching practice yielded positive responses. Nurses reported that they had more successfully communicated with doctors and felt more confident to challenge and, or discuss patient management

decisions when armed with greater knowledge and understanding of biomedical concepts and terminology. Hearing that what they learned facilitated their growth as a practising nurse reinforced that my beliefs and personal approach to understanding nursing practice were helpful for others. This affirmed that biosciences weren't just something that I was interested in; rather that the associations I made between bioscience knowledge and clinical practice could be used to positively influence nursing practice and patient care.

Awareness that beginning teaching practice is associated with uncertainty and questioning of personal assumptions about what is important for nursing, and that personal experience influences these beliefs, was important to note when considering participant stories of their practice and the years of teaching experience they had. I needed to be aware that teaching experience may influence the relationships between what participants assumed to be vital for nursing and their confidence in articulating this knowledge in their teaching practice. My responses whilst listening to their stories during data collection needed to minimise acquiescence and/or concern regarding the context of participants' teaching experiences in order that my role remained that of researcher (rather than colleague or mentor). It was important to explore participant beliefs about nursing practice, how experiences shape these underpinning values and how they translate into teaching practice.

Deeper reflection on how and why my beliefs came to be led me to reflect on how and why I learn the way I do, and how this manifested in my learning and practice development as a nurse. My personal approach to learning and being (as an individual) resonates throughout recollections of learning experiences in nursing. If I do something I want to be able to do it well and always strive to understand enough to be able to achieve this. Curiosity and a deep-seated desire to know, be ahead of

the game and at least achieve, if not exceed others' expectations of me appear to underpin and drive this desire. I tend to avoid, or not pursue the things that are less interesting to me, or that I do not have a natural affinity for*, if* this is an option.

Learning to be a nurse was associated with experiencing a need to understand anatomy, physiology, pathophysiology and pharmacology in order to achieve training requirements, yet I also wanted to learn for my own satisfaction and ambition. I find biosciences interesting, enlightening and relatively easy to understand and relate to nursing practice. Understanding helped me to identify rationale for what I saw, did and needed to explain to doctors, patients and family members, and doing this well resulted in positive feedback from nursing and medical peers, but more importantly from patients and their families. Feedback like this made me want to do more, learn more, be a better nurse and help others. Thus there is a personal assumption that understanding biosciences has the potential to improve nursing practice and patient care. An awareness of the factors that influence my own approach to learning and affinity with particular subject areas served to inform reflexivity by recognising that learning and integrating what one perceives to be *difficult* subjects can be challenging, potentially influencing one's preparedness to embrace and facilitate bioscience application in nursing.

Learning biosciences was part of my training as a nurse, but I applied and extended this basic knowledge for each clinical area during my training and ongoing practice. If I came across anything I didn't understand or hadn't heard of before I would ask others and read about it until I did understand. My recollections reveal that knowing was an expectation of student nurses at the time, I was expected to know about what was happening for patients in my care from a nursing duties perspective but also from a bioscience perspective and what the current thoughts

were in terms of medical treatment plans. That is how it was, and because I wanted to do well I did more work, but I didn't find it difficult, the extra learning helped things make sense. When questioned in practice I would usually know and people appeared to be impressed with my achievements, deeming it possible to give me extra responsibility and extend my abilities. We were constantly questioned by many registered nurses, tutors, senior nurses and doctors. The hospital where I trained was the largest teaching hospital in Europe at the time, we all knew this and there was a strong teaching ethic in practice. People seemed to be proud of this and expect graduates to reflect high standards of practice. Consequently, this expectation influenced my assumption that nurses should understand and be able to provide rationale for the care that they provide or facilitate.

Awareness that this assumption was not only present, but closely influenced by the environment in which I was working and learning highlighted a need to explore the context of participant learning in order to more fully uncover their learning experiences and perceptions of the value of biosciences in nursing. This involved asking myself questions during data collection and analysis to consider; "does this particular clinical experience make bioscience knowledge in nursing more overt?", "how did the participant's experience of certain environments potentially shape their experience, preparedness or values pertaining to biosciences?", "what attracted the participant to work in the areas they chose?", and/or "how might this relate to their beliefs about nursing and teaching?".

As someone who liked to do well, positive feedback and the responsibility of caring for more challenging and complex patients influenced where I chose to practice as a registered nurse. I wanted to grow as a professional, the complex care situations intrigued me and I learned that understanding relevant biosciences made it

easier to understand practice and improved my confidence in assessment, decision making and communication. I chose to work in areas where there were high expectations and high practice standards as I wanted to practice at this high level. Increasingly complex patient care situations highlighted how much more there was to learn and influenced my decisions to undertake formal as well as personal study in biosciences and nursing to advance my practice. Achieving personal expectations and those of others led to promotion to senior roles and a recognition that I could help, guide and teach others. Here my understanding of biosciences enabled me to teach others what I perceived to be relevant, based on my own experiences and professional growth. Such experiences utilised my knowledge in a way that was positively perceived by other nurses seeking to develop their knowledge and practice, undoubtedly affirming the personal assumption that bioscience knowledge can improve practice and empower nurses in their professional roles.

Acknowledgement of the significant influences upon this assumption enabled me to be aware of personal bias concerning the positive relationship that I perceive between bioscience knowledge and practice development. I needed to check that, whilst interviewing participants and undertaking data analysis, this bias was not being imposed on participants through my approach to questioning, verbal and non-verbal cues, or my considerations during data exploration to identify meaningful statements and themes. It was important to fully explore both personal and contextual influences upon participant accounts of their experiences and perspectives surrounding the value of biosciences in nursing practice and practice development.

Bracketing presuppositions.

Whilst it is acknowledged that bracketing preconceived notions and assumptions concerning personal experience and the relationships between experience and practice through phenomenological reduction is difficult, if not impossible to achieve completely, the researcher's extended awareness and acknowledgement of personal influential factors and structural essences served to increase rigour within the research process by stimulating continued reflexivity and questioning during data collection and analysis to ensure as far as possible that data reflected the participants' conscious experience rather than that of the researcher. Awareness of personal values and presuppositions enabled the researcher to hear and see the conscious experiences of participants' as their own unique experience in order to fully explore and come to understand the meaning within.

Research Methods

This study sought to illustrate and better understand the phenomenon of preparedness with bioscience integration in the teaching practice of nursing lecturers through the central research question:

How do teaching and learning experiences influence nursing lecturers' preparedness to integrate bioscience knowledge into their teaching practice?

In order to explore the research question and ultimately describe the phenomenological influences upon preparedness in this specific context, the study explored nursing lecturers' experiences with teaching and learning biosciences in nursing using in-depth interviews to collect data. The primary objective of the study was to understand how experiences with learning and teaching influence participants' preparedness to integrate biosciences into their teaching practice. Semi-

structured interviews were selected as the data collection method to gather rich qualitative data relating to participant experiences and the phenomenon being studied. This approach enabled the researcher to explore ideas and perceptions of the participants through dialogue and reflection to gain more detailed information about their experiences in relation to the phenomenon (Marshall & Rossman, 2011; Wimpenny & Gass, 2000). Participant interviews were loosely structured and guided by the following subsidiary questions within an indicative interview guide (Appendix B).

i. What were participants' experiences in relation to learning biosciences?

ii. What influence do these experiences exert on current approaches to bioscience integration in teaching practice?

iii. What are/were participants' personal experiences in clinical practice relating to bioscience application and clinical learning?

iv. How do participants perceive the relevance of biosciences for nursing practice?

v. How do participants perceive their own knowledge in bioscience concepts and their application to clinical practice?

vi. How do participants perceive their own ability to integrate biosciences in their teaching practice?

Use of an indicative interview guide enabled the researcher to address the research questions using specific topics and issues as a guide whilst also enabling participants' experiential accounts to determine the format and flow of questions during the interview (Fraenkel & Wallen, 2008; Patton, 2002; Wimpenny & Gass, 2000).

Pilot Study

Preliminary discussion of lecturer experiences with learning and teaching biosciences in nursing was first undertaken amongst a pilot group of nursing lecturers whose characteristics closely reflected those of the intended participants. Although the group approach differed from the chosen method of data collection for the study, open discussion of experiential accounts and the concepts within the proposed indicative interview guide in a group environment enabled any additional or alternative topics and issues to be highlighted prior to data collection. Through a process of personal reflection and group discussion, the researcher was able to explore lecturer experiences and evaluate the utility of the interview guide and planned approaches to interviewing with several individuals with similar characteristics to the intended research participants. Group discussion enabled potential experiences that may be associated with the phenomenon of preparedness with bioscience integration in teaching to be explored, providing an opportunity to refine the indicative interview guide if required. Cohen et al. (2007) note that interviewers should be knowledgeable and familiar with both subject matter and interactive communication. A pilot interview was also undertaken as a means to trial the indicative interview guide, enabling the researcher to be more familiar with potential questions before engaging in interview discussion with the study participants.

Phase 1 – group discussion.

Conduct.

The researcher's tertiary institution was used as the setting for the pilot study following approval from the Head of School for Nursing and Human Services and

the Christchurch Polytechnic Institute of Technology (CPIT) Academic Research Ethics Committee. Nursing lecturers whose teaching practice required some links to be made between biological science knowledge and nursing practice were invited to participate in a pilot group discussion with the researcher about their experiences with learning and teaching bioscience concepts in nursing. This preliminary phase also included discussion of the indicative interview guide within a group environment to gather opinions and perspectives on the proposed questions.

Participation in the pilot group discussion was entirely voluntary. Preliminary invitations (Appendix C) and information sheets (Appendix D) were distributed via internal mail to all nursing lecturers meeting the criterion above, based on their area(s) of teaching practice in CPIT nursing programmes. The pilot group discussion was conducted in a private, quiet room within CPIT away from work-related distractions or disturbances. Participants were informed that the discussion process would encourage reflection and exploration of thoughts and feelings that may be highly personal and unpredictable in terms of the information they may share with the group. Consequently they were also reassured that the researcher's experience would enable her to acknowledge and respond to issues and/or ethical dilemmas that may be raised as a consequence of the discussion. Participation in the group discussion meant that any contributions were public (within the group), therefore each participant was required to complete a confidentiality agreement form (Appendix E). Every possible attempt was made to ensure that data collected remained confidential to the researcher, research supervisors and the pilot group participants. Consent was obtained in order to audio record the pilot group discussion and enable note taking by the researcher to facilitate researcher reflection and potential refinement of the indicative interview guide prior to use for data

collection. Other than the documentation required for consent and basic demographic details to enable a description of the group characteristics (Appendix F), personal identification data was not collected or accessible to anyone other than the researcher and supervisors, nor is it identifiable within this discussion.

Participants.

Nine nursing lecturers whose characteristics closely reflected those of the intended study participants participated in the group discussion. For the purpose of the study, *characteristics* refers to the participants' gender, experience in years of nursing, experience in years and area(s) of teaching nursing, requirements to integrate biosciences in current teaching practice and personal perspectives on the value of biosciences in nursing education. Pilot group participants were also asked to provide a rudimentary rating concerning their own bioscience knowledge, confidence and ability using a five point Likert scale to further define group characteristics.

Pilot group participants had between 17 and 45 years' experience in nursing and a range of 18 months to 16 years' experience teaching nursing in various fields including health assessment, acute nursing, pharmacology, family and community and socio-political contexts of nursing at both pre- and post-registration levels. Their requirements to integrate biosciences in current teaching practice ranged from very low for two participants, to high, by way of the "need to apply bioscience concepts for students" in theoretical and clinical practice nursing courses for the remainder of the group. Participants rated their knowledge, confidence and ability at *low*, *average* and *high* levels, with some participants rating their confidence and ability higher than their knowledge. One participant was male; the remainder of the group was female.

Data collection.

Individual perceptions that may arise from reflection on one's experience are central to the process of developing understanding of the experience and the complexities involved. Therefore, to encourage personal reflection and exploration within the pilot group environment, the researcher commenced the discussion with individual time for reflection upon the factors that influence each participant's experience and meaning surrounding their teaching and learning experiences with bioscience integration in nursing. A simple concept map highlighting the central experience of *teaching and learning* with associated relationships of nursing lecturer and bioscience integration within teaching practice (Appendix G) was given to each participant to encourage and facilitate personal exploration of conscious experience. Participants were encouraged to reflect upon, and note what appeared to them when they considered the experience; what they perceived, felt, thought, saw, or were conscious of as they reflected.

According to Husserl, such inward reflection can yield the most original information concerning one's perceptions and what is meaningful for the individual in relation to the experience (Moustakas, 1994). The concept map's central *experience* provided a focal point for personal exploration and a way of capturing conscious thoughts and descriptions as participants were able to note reflections and conscious thoughts on the paper provided. Self-evidence was thus generated by each participant prior to open discussion within the group, reflecting the underpinning philosophy of the study.

Phenomenological reduction involves deliberate, conscious exploration of phenomena, beginning with one's own immediate perception, then moving into deeper reflection and a new awareness as we view a particular phenomenon from

different perspectives, becoming conscious of its different parts and of the parts as a whole (Cerbone, 2006). Each participant's reflective notes provided a means of reducing their immediate perceptions of experience into texturally meaningful components. Whilst the time afforded for individual reflection could only facilitate a superficial level of reflection, it provided a base for the group discussion that followed and some direction for deeper exploration through a process that Moustakas calls "correction" (1994, p. 72). Whilst a more appropriate term might be *clarification*, Moustakas describes correction as something that occurs as a consequence of becoming aware of alternative perspectives and meaning surrounding the same experience, or understanding of the experience.

Within the pilot group environment deeper exploration of the participants' self-evidence was facilitated through exposure to other participants' descriptions of their conscious experiences of teaching and learning biosciences. This process of correction, or clarification, can enhance the exactness of reflection as, what did appear before us in our conscious perception of the experience is challenged through comparison and reconsideration when new perspectives are presented. Listening to each other's perceptions and textural meanings offered new dimensions to the phenomenon that participants may not have been conscious of, yet, on deeper reflection, did feature in their experience. Immediate perceptions are explored by becoming aware of new dimensions, stimulating deeper reflection and consideration of one's perspective, consequently confirming or nullifying the initial conscious experience.

The move from individual reflection and generation of rudimentary self-evidence using the concept map (Appendix G) into group discussion encouraged the pilot group participants to reflect more deeply upon their original perceptions to *look*

beyond the phenomenon. Indeed, as the group discussion proceeded, thoughts and ideas presented by individual participants appeared to highlight both similar, and contrasting memories and experiences to other participants that had not been previously acknowledged. Several participants remembered similar experiences with teaching and learning, particularly in reference to *learning on the job* in clinical practice and *being responsible* for knowing, and thus personal learning.

Group discussion of experience appeared to deepen participants' individual exploration as they listened, then reflected on their own experiences. After brief periods of individual reflection participants would re-join the group discussion to confirm their perspective on the experience, and add personal detail for further discussion. Conversely, some participants recalled experiences that were different to those of the majority of the group. Again, following reflection on their thoughts, they re-joined the discussion, offering their account or perspective of the experience under discussion. The presentation of an alternative perspective appeared to stimulate deeper reflection by the participants as they reconsidered their own perspective, openly questioned their ideas and offered examples in, what appeared to be, an attempt to somehow draw out similarities or explain differences.

Becoming aware of the perspectives of others encouraged self-reflection and perceptual exploration of the experience and how one's own perception came to be. The reciprocal discussion observed by the researcher during the pilot group phase served to highlight common ideas, perceptions and meaning to the researcher as she listened to discussion and observed participants' thought processes, interaction and participation in the group. This process emphasised the importance of phenomenological reduction in the study as varied perspectives of similar experiences were revealed by the group. This phase of the study was particularly

useful to encourage the researcher to continually look beyond participants' experiences and facilitate their reflection on how experiences came to be.

Refinement.

The topics highlighted in the group discussion were closely aligned to the indicative interview guide prepared by the researcher. Whilst further analysis of the discussion comments and audio recording was undertaken by the researcher at a later date, the opportunity was taken to utilise the group participants' opinions regarding the suitability of the indicative interview guide for the research questions. Group participants were asked to peruse the questions whilst reflecting on the recent discussion in order to consider whether the questions were likely to encourage study participants to fully discuss their experience when used in an individual interview situation. The group concluded that the research questions and interview guide were appropriate and had no suggestions with regards to refinement. This conclusion was consistent with the researcher's review of the recorded discussion and reflective notes made by participants during the group discussion. The indicative interview guide was therefore not altered prior to the pilot interview.

Phase 2 – Pilot interview.

As previously outlined, the content and quality of research data collected via interview is heavily dependent upon the interviewer's ability to carefully conduct the interview and expertly guide communication in order to address the research question and also explore individual participant's experiential accounts (Cohen, et al., 2007; Jasper, 1994; Patton, 2002). It was therefore considered appropriate to undertake a pilot interview to become more familiar with the indicative interview guide and interview conduct before undertaking data collection.

Conduct.

One nursing lecturer whose teaching practice required some links to be made between biological science knowledge and nursing practice was sought, via invitation, to participate in a pilot interview with the researcher about their experiences with learning and teaching bioscience in nursing. This preliminary interview focused on the participant's experience, and also the researcher's use, and ultimate suitability of the indicative interview guide.

Participation in the pilot interview was entirely voluntary. Invitations (Appendix H) and information sheets (Appendix I) were distributed via internal mail to all nursing lecturers meeting the criterion above. Lecturers who participated in the pilot group discussion were excluded from interview selection as they were familiar with the topics, had undertaken some reflection as a consequence of the group discussion and would therefore not truly reflect the situation of the intended study participants.

The pilot interview was conducted in a manner consistent with the ethical considerations outlined within the pilot group discussion. The study information sheet was explained to the participant before obtaining consent to audio record the interview and enable note taking by the researcher to facilitate researcher reflection and potential refinement of the indicative interview guide prior to use for data collection. The interview began with demographic questions in order to establish rapport and researcher/interviewee comfort with the discussion before moving into experiential questions concerning the participant's learning and teaching experiences with biosciences in nursing. The interview enabled the researcher and interviewee to discuss each experiential component of the semi-structured indicative guide. The

interview recording was not transcribed, nor has the data been used in data analysis for the study.

Pilot study outcome.

Completion of the pilot study enabled the researcher to appraise the suitability of the indicative interview guide for data collection and exploration of the research questions. Researcher reflection upon both recorded data and notes taken during the pilot interview indicated that the guide was indeed suitable and that data collection had yielded rich descriptions of the participant's experiences with learning and teaching biosciences in nursing. The semi-structured approach enabled the researcher to ask questions that naturally followed on from the participant's own stories, encouraging reflective comment and the exploration of feelings that are associated with one's experiences. Further refinement of the interview guide prior to data collection was not deemed necessary.

The Study

Participants

The research question concerns preparedness with bioscience integration in nursing courses, and nursing lecturers' experiences with learning and teaching biosciences in nursing. Participants were thus nursing lecturers whose theoretical teaching involved some bioscience concept application. Nursing lecturers who teach only biosciences were excluded as, to do this, it is assumed that they are confident and prepared to undertake bioscience teaching. Conversely, nursing lecturers who are not expected to teach bioscience concepts were excluded (e.g. sociology, research). Lecturers whose teaching comprises clinical learning supervision only were also excluded.

The study population comprised lecturers from 17 schools of nursing throughout New Zealand. Following ethical approval for the study (Massey University Human Ethics Committee (MUHEC): Southern A - Appendix A), baseline population data (location of nursing lecturers meeting the sample criterion above) was gained via telephone and e-mail communication with the programme leaders for pre- and post-registration nursing programmes within each school. This enabled the population to be more accurately defined and decisions made concerning suitability and geographical location of individual participants within the sample (Sturgis, 2008). Seven schools of nursing met the criterion of offering pre- *and* post-registration nursing programmes (excluding the researcher's own school), six of which are based in the North Island. The requirement for pre- and post-registration education programmes sought to gain a broader perspective of the phenomenon being studied. An explanatory letter was sent to each head of school to gain permission to undertake the research study within the teaching institution and enable

the researcher to invite nursing lecturers meeting the criterion to participate in the study (Appendix J). Six schools provided consent to approach staff with several heads of school offering to circulate the invitation to their staff via internal email (Appendix K). Other schools provided the email addresses of staff meeting the study criterion in order for the researcher to contact potential participants directly. One school declined participation at the request of the institutional chief executive officer.

Participants were recruited to take part in individual interviews with the researcher by written invitation (via email) with the provision of further explanation relating to the study. The aim to recruit between eight and ten subjects for in-depth interview is consistent with recommendations by Cresswell and Plano Clark (2007), Onwuegbuzie and Collins (2007) and Morse (1994a). Identification of potential participants from the eligible schools (with respect to experience with bioscience integration in teaching practice) enabled selection of a purposive sample to maximise experiential accounts and understanding of the phenomenon (Creswell & Plano Clark, 2007; Onwuegbuzie & Collins, 2007). In acknowledgement that some individuals meeting the sample criterion may not wish to participate, the recruitment invitation was initially extended to all lecturers meeting the sample criterion within six schools of nursing. Two schools did not provide an indication of their total number of potential participants to the researcher, rather they circulated the invitation flyer (Appendix K) to all potential staff independently. Forty seven potential participants were identified within the remaining schools with a positive response to the invitation gained from four of the six schools, totalling 13 potential participants. Responses were gained from direct and indirect invitations (sent by the researcher or via heads of school, respectively).

Upon further screening by email or telephone conversation two lecturers did not meet the study criterion. Ten suitable participants were then selected from four schools within the North Island to ensure that the research question could be adequately explored, experiential accounts were not limited to any one school, and to rationalise researcher travel. The purposive sample represented a spread of teaching areas, experience in nursing, teaching experience and gender. The remaining potential participant was geographically isolated from those selected, thus inclusion would have necessitated further travel. The characteristics of this potential participant were adequately represented by the remaining participants therefore it was decided not to include that person. The person was thanked for their willingness to participate and the time taken to read the study information. Kemper, et al. (2003) acknowledge that the qualitative researcher uses strategies to focus and minimise the sample. The rationale above was considered to be one such strategy.

Participant characteristics.

Ten nursing lecturers participated in the study. The participants had between 25 and 50 years' experience in nursing and a range of 18 months to 32 years of experience teaching nursing. The participants had an expansive rage of clinical experience in various roles within their years of nursing including staff nurse, charge nurse, nurse specialist, nurse manager and nurse educator positions. Participants' clinical fields included hospital based nursing within general surgery, medicine, cardiology, paediatrics, obstetrics, emergency department and critical care; and community nursing in general practice, district nursing and primary health care specialist nursing. The participants' current teaching areas included theoretical and clinical pre-registration nursing courses in foundations of nursing, chronic health care, primary health care, acute nursing, health assessment, child health; with

additional teaching occurring within theory subjects such as ethics, cultural safety and professional issues. One participant taught mainly in applied science at pre-registration level and within post-registration nursing courses with applied science components (this was not established until the commencement of data collection, therefore the participant was not excluded from the study). Several participants also taught theoretical courses at post-registration level requiring bioscience integration to advanced nursing practice (specific details have been omitted in order to protect participant confidentiality). Those participants with many years' teaching experience in nursing also had prior experience teaching in a variety of subjects within pre- and post-registration nursing programmes. Participants' nursing qualifications included hospital certificate, diploma, degree and masters in general, specialty nursing and nursing management. All participants had, or were completing masters degrees, three participants had, or were completing doctoral degrees. One participant was male; the remainder of the group were female.

Ethical practice.

Interviews are extremely personal in nature, particularly when the researcher seeks to explore the participant's experiences, feelings and understandings around particular phenomena. The interview process encourages reflection and exploration of thoughts and feelings that the researcher *and* participant may not have previously been aware of. It was important to recognise that reflective thought, and the consequences of such, extend beyond the interview period and have the potential to raise ethical dilemmas for the researcher and participant (Patton, 2002). In accordance with Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants (2010) and MUHEC approval (Appendix A), the following measures were adopted to acknowledge and minimise

any psychological distress or ethical challenges that may have occurred as a consequence of interview participation:

i. Potential participants received a detailed study information sheet at the time of the researcher's initial recruitment invitation. This outlined the purpose of data collection, the method of collection (interview process, location, estimated time involved, number of interviews expected, brief outline of the question topics to be covered), how data would be recorded and stored, personnel access to recorded, transcribed and analysed data and the intended use of outcome data e.g. publication.

ii. Each participant was assigned a pseudonym to protect their identity and ensure confidentiality. Geographical location of participants has not been included as the relatively small community of nursing lecturers in New Zealand means that it could be possible to identify participants. Exclusion of this information from data analysis and publication ensures participant confidentiality. Such measures to maintain confidentiality were explained in the participant information sheet and verbally during the consent process prior to the commencement of the preliminary interview.

iii. The possible risks and benefits that could be associated with study participation were outlined in the participant information sheet prior to recruitment and repeated at the commencement of the interview process. Patton (2002) acknowledges that qualitative interview inquiry can be intrusive, highly personal and unpredictable in terms of the information participants may share with the interviewer. Whilst it is difficult to predict any potential consequences, the researcher's experience in the field of

inquiry enabled her to respond to issues raised during participants' exploration of the topics and experiences.

iv. Participation was voluntary, and participants signed an informed consent form.

Data Collection

The primary objective of the study was to explore nursing lecturers' experiences and perceptions of bioscience teaching and learning to identify and describe any influence(s) that personal experiences may have upon their preparedness to integrate biosciences in current teaching practice. Semi-structured interviews enabled the collection of rich qualitative data relating to the research questions. Preliminary topics and themes to be explored during the interview relate to the research questions and are illustrated in the indicative interview guide (Appendix B).

Participants were interviewed in a location of their choice (workplace or other) provided that the setting was private, quiet, and away from work-related distractions or disturbances wherever possible. It was expected that the duration of each interview would be approximately 50-60 minutes. Where further data was required, participants were given the options to i) extend the interview if convenient, or ii) arrange an additional interview appointment in order to respect the participants' time. One interview exceeded the expected timeframe by 15 minutes, however the participant was comfortable to extend the interview time in order to complete the discussion.

In order that data of sufficient depth to address the research questions could be collected, it was explained during the consent process that more than one interview

may be required (this information was also provided in the initial invitation to participate). To gain the participants' trust and build rapport the interviews began by focusing on background, demographic questions, knowledge (factual) questions pertaining to bioscience experience and preparedness. As the researcher and participant became more comfortable with conversation and discussion the researcher moved into more detailed, descriptive questions concerning the participants' experiences with both learning and teaching biosciences in nursing. Structuring an interview to take the participant from background and knowledge questions into more detailed descriptive questions as the interview progresses is a recommended approach in qualitative inquiry (Cohen, et al., 2007; Patton, 2002; Seidman, 1998). The subsidiary topics for demographic and factual questions were identified through existing research and the researcher's experience with the pilot phases of the study and included; participants' teaching domain(s) and expectations to integrate bioscience; participants' teaching experience and qualifications; personal perspectives on biosciences in education and nursing practice; personal preparedness factors such as knowledge, confidence, ability and expectations; and potential relationships between value and preparedness. Specific questions for each participant were constructed by the researcher during the interview whilst dwelling on the participant's account of the experience and acknowledging the researcher's presuppositions concerning the phenomenon (in order that the data reflected the participant's experience) (Parse, 2001).

Each interview was digitally recorded using a Dictaphone that enabled recording, electronic storage, coding and backup copies of each interview to be made and verbatim transcription to be undertaken following the interview. The interviews were all conducted by the researcher who also made notes during the interview to

facilitate the flow and direction of questions, the pursuit of relevant and interesting threads and data analysis emerging during the interview (Parse, 2001; Seidman, 1998).

Data management.

The researcher's interview notes were word processed following each interview, assigned a participant pseudonym and stored electronically. Each participant interview recording was professionally transcribed verbatim into a word processed document with the designated pseudonym. Transcribers were required to sign a confidentiality agreement (Appendix L). Word processed documents were stored electronically within a nominated, password protected file and also uploaded into the qualitative research analysis software programme Nvivo (9) to store data and facilitate data analysis (also password protected).

Rigour.

It was vital that any description and discussion of participants' perceptions and experiences gathered during interview were represented as accurately as possible. This minimised threats to reliability from potential researcher bias and enhanced the validity of inferences made (Fraenkel & Wallen, 2008). The following measures were taken to enhance rigour (adapted from Fraenkel & Wallen, 2008; Patton, 2002; Punch, 2009; Seidman, 1998):

i. Epoché and transcendental phenomenological reduction processes endeavoured to set aside researcher assumptions and their influence upon data collection and interpretation (Moustakas, 1994).

ii. Reflexivity to explore and acknowledge the researcher's personal assumptions, thoughts and opinions was undertaken prior to, and during data collection and analysis (Lichtman, 2010; Parse, 2001).

iii. The researcher is familiar with the language used by nursing lecturers concerning biosciences, teaching and clinical practice. This minimised misrepresentation of responses and also enabled the researcher to acknowledge potential assumptions through the process of reflexivity.

iv. All interviews were conducted by the same researcher, thus facilitating engagement and consistent depth in exploration of participant experiences.

v. All interviews were audio recorded to facilitate contextual data interpretation and precise question response relationships.

vi. Questions asked and corresponding answer(s) were both recorded to facilitate contextualisation of responses and data interpretation. Demographic data was also collected during the interview to enable description of relevant participant characteristics to facilitate data analysis.

vii. The researcher recorded personal thoughts following each interview (researcher reflexivity (Fraenkel & Wallen, 2008)) to facilitate any follow-on questions, response interpretation and data analysis.

viii. Each participant was given the opportunity to check the transcription of their interviews for accuracy (Giddings & Grant, 2009; Minichiello, Aroni, & Hays, 2008). Each transcript was confirmed to be accurate. One disclosure that a participant did not wish to be included in analysis or publication was altered at the participant's request. This request surrounded the disclosure of a previous clinical role that could allude to the

participant's identity. The omission of this specific data did not detract from the participant's experience of the phenomenon being studied.

Data Analysis

Guided by the notion of intentionality (Moustakas, 1994; Sokolowski, 2000), the researcher's aim was to understand lecturers' integrated teaching preparedness by exploring their experiential accounts of teaching and learning biosciences in nursing. Data analysis aimed to identify common themes and experiences by repeated exploration of interview transcripts to reveal the essence of meanings and actions (Fraenkel & Wallen, 2008; Miles & Huberman, 1994). These essential characteristic(s) of the experience were identified through exploration of multiple interview transcripts relating to the same phenomenon to identify commonalities within participants' descriptions of experiences and perceptions. A phenomenological analysis framework was used to guide data analysis via the data reduction procedures of horizonalizing and clustering meaning units into common themes (Moustakas, 1994). Textural descriptions of the experience were developed from clustered themes so that structural and complete descriptions of the phenomenon could be constructed (Creswell, 2007; Moustakas, 1994). Lichtman describes this as a reductionist process of extracting the essence of the experience rather than reducing the phenomenon to discrete components (2010, p. 79). Maintenance of a phenomenological stance enables the researcher to "look at what we normally look through" during data analysis to provide an appropriate description of the phenomenon (Sokolowski, 2000, p. 50).

Data analysis framework.

Analysis of the study data was guided by Moustakas' modifications of two phenomenological analysis frameworks originating from the works of: Van Kaam (1959, 1966); and Stevick (1971), Colaizzi (1973) and Keen (1975) (Moustakas, 1994, pp. 120-122). Each author provides an outline of the analytical steps required in *their* interpretation of an appropriate approach to phenomenological data analysis. Moustakas then offers his own modifications by adapting and, or, merging the works of the aforementioned authors. The plethora of phenomenological analytical frameworks and researchers' adaptations of them signify that, as the intent of phenomenological inquiry is to make sense of others' experiences of the world, analytical approaches to facilitate researcher interpretation of the essences of such subjective phenomena invariably require adaptation in accordance with the research question and phenomenon of interest. Whilst critics of qualitative research question the rigour of the abstract nature by which the qualitative scientist knows or comes to understand the phenomenon when "intuition and creativity may lead to insight", May (1994a) argues that "rigorous implementation and explication of method alone never explains the process of abstract knowing". Further, she calls researchers to "consider elements that transcend methods" (1994a, p. 14) in order to embrace creativity and intuition within appropriate analytic techniques, thus acknowledging that the researcher's decision to follow intuitive "hunches" within data analysis can lead to "powerful explanation" surrounding the phenomenon of interest.

The phenomenological analysis frameworks presented by Moustakas (1994, pp. 120-122) have, consequently, been adapted by the researcher prior to, and during data analysis in order to fully explore the data and come to know the meaning of the participants' experiences. The researcher's analytical framework (presented in Table

4.1 below) contains a composite of methodological procedures that are derived and adapted from each of Moustakas' modified methods (modification of the van Kaam method and modification of the Stevick-Colaizzi-Keen method, (1994, pp. 120-121 and 121-122 respectively)). Whilst the discrete analytical steps outlined within Moustakas' modification of the Stevick-Colaizzi-Keen method most closely reflect the researcher's approach to data analysis, this method begins with an analysis of a transcription of the researcher's own experience. As the researcher's preparedness appeared to differ from that of many nursing lecturers prior to commencement of the study it was decided that detailed description of her own experience would not be included in data analysis. The inclusion of researcher experience in data analysis would compromise her ability to uphold a critical phenomenological attitude throughout the study. This would detract from the study aim to explore the subjectivity within experience as the means to enhance knowledge and understanding of the phenomenon. The researcher believes that this decision is more consistent with the philosophy of transcendental phenomenology by enabling the researcher to shift from the natural, prephilosophical attitude to a critical, philosophical attitude.

The researcher also integrated components of Moustakas' modification of the van Kaam method within the framework used in the study (Table 4.1). The modified van Kaam method reflects the researcher's approach to data analysis as it includes data that is solely derived from the participants. However, although the fundamental components of the phenomenological philosophy are reflected in this method, the researcher believed that the overall approach was overly reductive and insufficiently considerate of the importance of phenomenological reduction, bracketing or researcher reflexivity. As the researcher's experience had the potential to align

closely with those of the participants continuous researcher reflexivity and validation were considered to be particularly important for the study. The researcher's adaptations to each of Moustakas' methods are outlined in Appendix M and N (respectively). The refined, composite analytical framework used in the study is presented below (Table 4.1).

Table 4.1 Data Analysis Framework

Stage:	**Adapted phenomenal analysis framework** (from Moustakas, 1994)
1.	Listen to each interview recording making reflective researcher notes, adding context, comments and noting any particularly meaningful statements.
2.	Read each transcript in detail to obtain a general sense of the whole interview and experience for each participant (making notes for each as above).
3.	**Horizonalising**: re-read each transcript along with researcher notes – coding meaningful statements (as relevant statements) and contextualise where needed (here all relevant statements have equal value). Code emerging meaning units into themes taking care not to impose emerging themes on other participant's statement coding or be influenced by researcher presuppositions (researcher reflexivity). Note and code common statements (for further analysis).
4.	Extract relevant statements for each participant to identify **Horizon Statements** – include only non-repetitive, non-overlapping statements that add meaning to the participant's identifying experience (invariant constituents of each participant's experience are identified).
5.	For each participant's individual horizon statements – craft statements into related units of meaning (clusters derived from invariant constituents identified through coding above). Look *at* statements in the context of the interview and researcher notes to see what we normally look through. From clusters of related units of meaning craft descriptive statements into an **individual textural description** for each participant (learning is... / teaching is...).
Con-current	Preliminary theme identification occurs during the process of writing individual participant's textural description (common and invariant themes emerging).
6.	Using each textural description – **identify themes** within the experience. Identify common and invariant themes – link themes (via coding and tagging) to descriptions of the experience for each participant (for further analysis). Present emerging themes in visual form to facilitate reduction and deeper analysis.
7.	**Early validation check**: for each transcript check that statements tagged with emerging common themes *align* to assigned theme. Do particularly relevant statements occurring within the transcript identified (tagged) as being clustered into a theme make sense when considering the context of the interview as a whole?

	Does it fit with the participant's experience? Does it fit with the sense of the whole? Cross check against researcher notes. Do additional themes emerge with closer analysis of the individual's experience and textural description?
8.	Check that statements tagged with common themes *align* to the theme (across transcripts). For each theme and relevant horizon statement note researcher analysis and interpretation of what is being experienced (tag relevant participant verbatim statements). Identify **textural themes** – elements of what is being experienced. Concurrently - obtain a deeper sense of the *common* experience.
9.	**Composite textural description:** from each individual textural description craft a summary of *what learning is* in relation to the participant's experience. Across textural descriptions compile a composite textural description of what the experience of learning biosciences in nursing is. From each individual textural description craft a summary of *what teaching is* in relation to the participant's experience. Across textural descriptions compile a composite textural description of what the experience of teaching biosciences in nursing is.
10.	During the process of composite description development identification of **emerging themes** occurs (relevant clusters of meaning units occurring across participants + disparate and negative themes). Different – deeper / more experiential themes are identified...then verified. Present emerging theme names visually to facilitate further analyses re common themes & essential features (confirmation / addition / adaptations as required). Preliminary identification of **essential themes** (occurring across every transcript), variant themes tagged for deeper individual structural analysis.
11.	**Verification of essential textural themes**: review all transcripts and horizon statements to check emerging and essential themes are present within in each textural description and the appropriateness of emerging theme names (extracting the essence of the experience). Identify any disparate meaning units or clusters (horizons or themes not consistent with emerging essential themes). Identify any negative meaning units or clusters (horizons or themes that do not appear in other transcripts). Confirm essential themes and recode textural descriptions with appropriate names.
12.	Re-read researcher notes and transcripts / horizons containing disparate or negative themes to explore contexts and rationale for emerging differences.
11.	Re-read researcher notes & transcripts / horizons containing negative themes to explore context and rationale for emerging difference.
12.	**Identify valid textural themes** from above stages, add / confirm valid theme node name in participant horizons and identify as essential, disparate or negative. Restructure individual textural descriptions according to themes to facilitate composite textural description writing and structural analysis.
13.	Craft textural descriptive statements across participants into a **composite textural description** of what is being experienced.

14.	**Imaginative variation:** revisit each participant's individual textural description to contemplate structural descriptions of the phenomenon (focus on meanings and use researcher intuition to explore *how* the experience came to be (note researcher interpretation notes and rationale). For each participant's textural description use imaginative variation to consider multiple possibilities for the experience to explore; meaning, context, underlying themes, potential universal structures and instances of structural themes.
15.	For each participant re-listen to the interview recording making notes on how things were experienced. Use textural descriptions of learning and teaching to begin writing a structural description of each participant's experience (using imaginative variation, researcher reflexivity and cross-checking emerging structural theme codes against textural descriptions to explore context and possible explanations as to *how* the experience came to be).
16.	Craft **individual structural descriptions** for each participant.
17.	Consider and code **emerging structural themes** within each person's experience. Across participants – identify and code common structural themes across participants. Review each participant's structural description to identify fundamental themes for each participant (coding as identified). Run coding query within and across participant structural statements to identify common structural themes across participants. Review and condense common themes into core themes and sub-themes (essences) by cross checking against structural descriptions, horizon statements. Present visual illustration of common and core themes to facilitate further analysis.
18.	**Validate core structural themes** by checking against individual participant structural descriptions.
19.	Craft core structural descriptive statements across participants into a **composite structural description** of how the experiences of learning and teaching came to be.
20.	Review composite structural description to evaluate core structural themes and essences (create visual illustration of core and sub-themes and relationships).
21.	**Intuitive integration**: review composite textural and structural descriptions to explore the meanings and essences of the phenomenon. Identify universal qualities, components and meanings that are the experiences. Identify universal essences (create visual illustration to facilitate intuitive integration). **Synthesise** essential textural and core structural themes and descriptions into a statement of the essences of the phenomenon as a whole.
22.	Reflect on the research process, presuppositions & researcher role in the process Review and adapt composite structural description as required.
23.	**Essences of the phenomenon are presented for discussion.**

The continued process of researcher reflexivity enabled the researcher to be aware of her experiences, acknowledge presuppositions and thus strive to ensure that framework adaptations were consistent with the underpinning philosophy and research question rather than merely the researcher's subjective interpretation of meaning. Reflection on the role of self and subjectivity of the researcher throughout the research process contribute to rigour (Koch & Harrington, 1998; Lichtman, 2010), whilst adaptation to Moustakas' data analysis framework enabled the researcher to enhance credibility and contribute to auditability within phenomenological research (Beck, 1993, p. 264).

Beck describes credibility in the context of qualitative research as "how vivid and faithful the description of the phenomenon is" (Beck, 1993, p. 264). The need to faithfully describe the participants' experiences supports the researcher's decisions to adapt the phenomenal framework during data analysis to more fully explore the meaning of the textural accounts of participants' experience and identify textural, structural and textural-structural statements and themes.

Auditability relates to the "decision trail that encompasses all the decisions made by the researchers at every stage of the research process" (Beck, 1993, p. 264) which, in this study have been consistently guided, and questioned by the processes of the epoché, researcher reflexivity and the maintenance of a research journal to enhance rigour in the study. Judicious use of prescriptive frameworks for research methods and data analysis and critical consideration of approaches to the evaluation of trustworthiness within qualitative research and are supported by qualitative researchers such as Avis (1995), Koch & Harrington (1998), and Sandelowski (1986). Discussion of the resultant analytical framework within the study is provided in the following sections to justify the researcher's approach to data analysis.

Data Analysis Procedures

The researcher listened to each participant's interview recording to obtain a preliminary sense of the whole interview and experiences for each participant. General and reflective notes were made whilst listening to each recording. Each participant transcript was then read in detail to obtain a general sense of the whole interview and then re-read in conjunction with corresponding researcher reflective interview notes to contextualise statements and comments as required and note any particularly meaningful statements. A *sense of the whole* summary document was then created for each participant to facilitate validation and phenomenological reduction as analysis progressed. Repeated reading of the transcripts with an awareness of one's own presuppositions aids the phenomenological researcher to tease out relevant meaning statements within the participants' account of their experience and perspective (Miles & Huberman, 1994).

Moustakas (1994, p. 97) refers to the identification of meaningful statements as "horizonalizing". This means that, in the first instance, each statement within the participant's transcript is considered to have equal value. Repeated reading by the researcher enabled the statements that were irrelevant to the research question to be identified. Repeated or overlapping statements were also identified, leaving only statements that were relevant to each participant's experience. This included statements relating to the same experience that were repeated at various points in the interview. In this instance, the statements that reflected the richest and most descriptive detail were retained. Meaningful statements were coded as *relevant statements* within each transcript data set using Nvivo (9) software.

Textural analysis.

The relevant statements represent the *horizons* of each participant's experience, the texturally meaningful statements that represent the invariant constituents of *what* the participant experienced (Moustakas, 1994). As the research question pertains to experiences with learning *and* teaching biosciences, relevant statements were further coded as *learning experiences* or *teaching experiences*. Any statements that pertained to both learning and teaching experiences were double coded. Familiarisation and coding of the relevant statements through repeated reading of the transcripts and sense of the whole documents enabled the researcher to tentatively identify preliminary themes within each participant's description of their experience by clustering statements relating to similar discussion points together. Preliminary theme names were kept deliberately broad at this stage as a strategy to avoid or minimise any researcher bias or the imposition of personal presuppositions. As Crotty (1996, p. 23) discusses, the researcher must be aware of "the danger of imposing interpretations on the data", striving to ensure that themes and categories arise from the data rather than the researcher. Researcher reflection on the epoché assisted the identification of broad textural themes that were relevant for each participant and their personal experience, and enforced the judicious identification of emerging common textural themes across participants' horizon statements.

Each participant's horizon statement was then crafted into a more cohesive individual description of what they experienced by structuring statements into themed paragraphs (coded as *participant 1's horizons* for example). The maintenance of a transcendental phenomenological stance in order to *see* what we normally look through by moving beyond the immediately pre-reflective conscious awareness to reflect on what each participant experienced enabled the researcher to

"look and look again" as a means of discovering "deeper layers of meaning" to more fully understand what the participants' experienced (Moustakas, 1994, p. 96).

Following deeper reflection upon the participant's experience the researcher was able to craft an individual textural description for each participant using clustered meaning units and themes that reflected the *what* of each person's experience. As previously discussed, as the research question explored experiences of learning *and* teaching biosciences in nursing, each individual textural description comprised two distinct sections; *learning is*…, and *teaching is*… This enabled the researcher to further explore and understand what participants experienced in these different contexts within the phenomenon of preparedness and was expected to be beneficial for structural analysis. Each written textural description and the preliminary individual themes identified through reading, re-reading and textural description composition was used to note common themes across participants' experiences of learning, and their experiences of teaching. Relevant statements within each participant's textural description were then coded as per *emerging* theme names. The common emerging themes across transcripts were then portrayed in visual format to facilitate validation and deeper analysis (Appendix O). As per earlier discussion, the broad nature of common theme names was maintained as a strategy to remain true to the experiential accounts of the participants.

Early validation of emerging textural themes was undertaken by checking that relevant statements coded as each emerging theme aligned to the researcher's developing understanding of that textural quality. Each participant's individual transcript was evaluated in this way for each of the twelve emerging themes. The validation process involved the researcher asking the following questions of the relevant statements clustered into each emerging theme: do particularly relevant

statements that have been coded as this emerging theme make sense when the context of the whole interview is considered?; does the theme fit with the participant's experience?; does the theme *name* reflect the cluster of textural descriptions?; does the theme and relevant statement(s) fit with the researcher's sense of the whole summary document and researcher notes?; do additional themes emerge with this, more detailed analysis of the individual's experience and their textural description? As a consequence of this process, the presence and identification of textural themes was confirmed (invariant constituents), *variant* or less common themes present within *some* participants' textural descriptions, but not all, were identified for further analysis, and any themes occurring for only one participant were also identified for further analysis.

The process of looking and re-looking at the participant horizons and dwelling on relevant statements facilitated a deeper sense of the common experience across participants. A beginning composite textural description surrounding the emerging textural themes was crafted, using relevant statements from individual textural descriptions of *learning is*… and *teaching is*… and, what Husserl refers to as "reflective intuition to describe and clarify experience as it is lived and constituted in consciousness (awareness)" (Husserl 1970, as cited in Morse, 1994b, p. 118). Using the participant's own words, the emerging themes, the context of the interview as a whole and phenomenological reduction, the researcher was able to utilise relevant statements within a beginning composite description to reflect the constituents of what was experienced.

The composition of this description contributed to a greater understanding of the emerging themes within, and across participant textural descriptions. In order to gain further clarity and understanding regarding the appropriateness of emerging

themes, and their names, the researcher extracted all relevant statements within each individual textural description according to the emerging textural theme to which it had been aligned (through the process of coding). Statements were then presented in a word document under the heading of each emerging theme to better understand the types of statements that participants were discussing within each theme during the interview. Each individual textural description was then re-read whilst referring to the relevant statements assigned to each of the twelve emerging core themes in order to more openly *see* the essence of what participants were describing. This enabled any overlapping themes to be considered and the researcher to contemplate more specific and/or appropriate theme names as greater understanding of participants' individual and common experiences developed. As a result of this process, ongoing phenomenological reflection and reduction, eight core themes and associated sub-themes that more accurately reflected the essence of the participants' experience were identified. Individual participant horizon statements and textural descriptions were then re-read and re-coded according to the more appropriately named themes to ensure that core themes were accurately identified and sub-themes appropriately reflected the individual constituents of the experience. The process of reading and re-coding also enabled the researcher to verify essential themes across the participant experiences. As each horizon and textural description was explored, the presence of the core themes and associated sub-themes within each transcript was confirmed, as was the appropriateness of assigned themes to the relevant statements and meaning units clustered into each theme.

To further validate that core themes were indeed essential (to the experiences of the participants), the researcher utilised the coding chart facility within the Nvivo programme to illustrate the presence of, and coding distribution of core themes for

each participant (Appendix P). This enabled visual confirmation that all eight core themes and two prominent sub-themes were present within each participant's transcript. This process also provided a visual illustration of the dominant themes within each participant's experience. This was cross checked against the sense of the whole for each participant to ensure that coding of core and sub-themes truly reflected the whole experience of the participant.

Several phenomenological researchers recommend that disparate themes are explored during data analysis in order to explore negative cases, the rationale for emerging differences and to deepen the understanding of the phenomenon (Fielding & Thomas, 2008; Morse, Barrett, Mayan, Olson, & Spiers, 2002; Moustakas, 1994). As outlined previously, some themes within the participant's individual textural descriptions were *variant*, in that they appeared for some participants, but not all. Distinct constituents of some participant's textural descriptions also appeared to occur only within their experience. These instances were explored further by re-reading researcher notes, transcripts and horizons in order to look at contextual influence and/or rationale for the emerging differences. More detailed consideration of what initially appeared to be disparate textural themes suggested that, in the context of the interview transcript and reflective notes, individual variations contained more *structural* than textural constituent variation, in that differences relate to *how* the experience came to be, rather than *what* was experienced. Consequently, these emerging differences were explored in more detail during structural analysis and textural-structural synthesis.

The phenomenological processes of reflective intuition and phenomenological reduction enabled the researcher to identify key constituents of the experience of *learning biosciences for nursing practice* and the experience of *teaching biosciences*

for nursing practice that were then verified as the core textural themes (as illustrated in Appendix Q). The preliminary composite description of the key constituents of each experience was then reviewed in conjunction with re-reading of each participant's individual textural description in order to describe, in textural language, the qualities of the experience that reflect *what* is experienced in relation to the phenomenon. Composite descriptions of *learning is*… and *teaching is*… were refined to more accurately reflect the verified themes, using relevant statements from participant horizons within each theme and sub-theme description to support the researcher's interpretation and understanding of the experience as a whole. The composite textural description of the phenomenon was then used within structural analysis and intuitive integration, using verbatim participant statements to support the researcher's interpretation of participants' experiences of the phenomenon (Creswell, 2007; Moustakas, 1994).

Structural analysis.

Structural analysis seeks to describe "the underlying and precipitating factors that account for what is being experienced" that enables the essential structures of an experience to be identified (Moustakas, 1994, p. 98). In this stage of data analysis the researcher revisited each participant's individual textural description to contemplate and explore multiple possibilities and perspectives for the textural essences of their experiences. Dwelling with the participants' descriptions of what they experienced, and reviewing contextual information within their horizon statements and interview transcripts, built the researcher's understanding of how experiences came to be by moving analytical focus from the features of textural description toward meanings and essences that add "body, detail and descriptive fullness" to the researcher's understanding of the experience (Moustakas, 1994, p. 99).

The use of researcher intuition is a prominent feature within the transcendental phenomenological method espoused by Husserl (Morse, 1994b; Moustakas, 1994; Spielberg, 1982) and supported by phenomenological researchers such as May (1994a) and Crotty (1996). The researcher used the process of imaginative variation to begin to see the structures that underpin what is experienced to identify structural constituents, preliminary themes and essences within the experiences of learning, and of teaching, biosciences in nursing. Whilst reading each participant's textural descriptions and referring to transcript data the researcher noted structural constituents and preliminary rationale for interpretation. Reading multiple descriptions across participants at this point also enabled the tentative identification of structural themes and essences of how teaching and learning experiences came to be. A constant awareness of the epoché and researcher reflexivity was maintained throughout structural analysis to achieve as faithful an interpretation of participants' experience as possible.

The second phase of structural analysis comprised the researcher re-listening to each interview recording to further contemplate how experiences came to be, focusing on meaning, context, underlying themes, tentative universal structures (constituents and themes occurring for all participants) and structural themes. Again, multiple possibilities were considered and cautious researcher intuition and imaginative variation were employed. Individual participant and reflective researcher notes were taken whilst listening to recordings and emerging structural themes within, and across, participants were noted for further analysis. The researcher then re-read individual participant textural descriptions in conjunction with reflective notes to begin to craft individual structural descriptions for each participant. Whilst textural analysis was able to differentiate the *what* of learning biosciences from that

of experiences with integrating biosciences in teaching practice, consideration of *how* experiences came to be suggested that structural elements of participants' teaching experiences were entwined with, and shaped by, how learning experiences came to be. Emerging structural themes consequently appeared to relate to both experiences within the phenomenon and were therefore not classified as either teaching or learning experiences to reflect this.

The emerging themes were used to structure the preliminary written structural descriptions with the inclusion of meaningful and verbatim statements to link descriptive writing to participant transcripts (by theme coding in Nvivo), facilitate subsequent validation of themes and support the researcher's interpretation of the data. Emerging structural themes were cross-checked against participants' textural descriptions to confirm instances of each structural theme within the individual textural descriptions, assign theme codes within Nvivo, and further explore the context of what was experienced to consider possible explanations for how the experience came to be for that person. Individual structural descriptions were again reviewed and considered by referring back to the sense of the whole document and researcher notes.

When multiple possibilities for each structural constituent had been explored for each participant's textural description, the beginning individual structural descriptions were revisited; adding, adapting or removing preliminary researcher interpretation according to her evolved understanding of how each participant's experience came to be. Whilst researchers are urged to consider as many possibilities as are possible within their imagination (Casey, 1977, as cited in Moustakas, 1994, p. 99), Spiegelberg also advises that "it is impossible to exhaust all the properties…of any object or phenomenon" (Spiegelberg, 1982, p. 664). Spiegelberg goes on to say

that researcher "selection" encourages the extraction of central characteristics that reflect and inform the essences of the phenomenon of study (p. 664).

Following expansive exploration of possibilities as to how distinct experiences occurred for participants, the researcher carefully selected what appeared, in her consciousness, to reflect essential structural constituents of the participant's experience. The process of dwelling deeply with potential and actual essences of the participants' experiences also initiated the exploration of themes and relationships and how they may be connected to constituents of adjoining phenomena (Spiegelberg, 1982). This depth of thinking is required for the researcher to select essential characteristics within individual experiences and go on to identify essential constituents for each participant and common structural themes across participants. Husserl refers to such intentional reference as *intentional analysis*, where the researcher identifies the basic structure in the phenomenon on which the researcher concentrates their attention (Spiegelberg, 1982).

Completion of the individual structural descriptions in this way enabled the researcher to then review each text to identify relevant statements of meaning that could be further or correctively coded according to the emerging themes identified. The coding stripe facility within Nvivo enabled the researcher to ensure that each participant's whole experience had been explored in detail by way of visualizing coded segments of data within textural descriptions and horizon statements. Any segments that had not been coded were explored to consider their relationship to emerging themes and the researcher's understanding of how experiences came to be. Common themes within the completed individual structural descriptions were then able to be identified by looking across participants' structural descriptive statements for the themes that were present for all, or most participants. Common themes were

again, assigned broad names as a strategy to avoid or minimise the imposition of personal presuppositions by the researcher.

Verification of the eight emerging common themes occurred initially by running coding queries within Nvivo against each theme across all participants' structural descriptions. Verification in this way enabled the researcher to see each statement that had been coded as distinct themes for each participant in one document. Visualisation of statement and theme relationships enabled the researcher to critique the appropriateness of coded statements to both the theme category and the overall context of individual participant structural descriptions. This deeper level of exploration also enabled the researcher to evaluate the appropriateness of theme names across participant descriptions and consider the reduction of emerging themes into core and sub-themes within the structural constituents identified. As the constituents of several themes were explored in this way, overlapping and interlinking of some themes became more apparent.

The review and evaluation process above enabled the researcher to gain a deeper understanding of the structural essences of the participants as a group and begin to craft a composite structural description as insights and particularly relevant statements emerged. This process facilitated further insight concerning the relationships between similar themes and the potential identification of core and related sub-themes within the participants' experience. In Spiegelberg's account of Husserl's *Wesenszusammenhänge* or *apprehending essential relationships* within phenomenological essences, he concludes that these *essential insights* represent "synthetic knowledge" that may be confirmed by considering whether the essence is a fundamental structure that is essential to the phenomenon (Spiegelberg, 1982, p. 701). The crafting of the composite structural description and repeated reference

back to individual structural descriptions required to do this enabled essences within the original themes to be clustered into and synthesised into three fundamental core themes and their associated structural essences. The composite description was subsequently restructured to reflect this and ultimately portray the fundamental themes and essential structures that enable one to know the meaning of learning and teaching biosciences for nursing from the internal perceptions and images of the participants (Moustakas, 1994 p.142).

A visual illustration of the core structural themes, sub-themes, contextual references and emerging relationships was created to facilitate verification of core structural themes and sub-themes and to aid further analysis within structural textural integration (Appendix R). Each participant's individual structural description was re-read to note and ensure that each of the core and sub-themes were present within each description and to confirm that individual statements relating to the theme were appropriate considering the participant's whole experience. The preliminary composite textural description was then re-read to evaluate how this description reflected the experiences of the participants as a group. No further changes were deemed necessary. Structural analysis should be an exhaustive exploration of the possibilities that may explain how things came to be, thus knowing when to stop is a challenge for the phenomenological researcher (Crotty, 1996; Spiegelberg, 1982). Reflective strategies to consider this dilemma included the researcher asking whether the composite structural description was "really characteristic of the phenomenon as precisely this phenomenon, distinguishing it from other, perhaps similar phenomenon?" (Crotty, 1996, p. 168). Relating this query to the structural essences of participants' experiences the researcher felt satisfied that analysis could progress

towards the synthesis of textural and structural description that reflects the essence of the experience as a whole.

Textural-structural synthesis.

In the final stage of phenomenological analysis the researcher used the process of intuitive integration to synthesise textural and structural descriptions into a unified statement of the essences and meanings of the experience of learning and teaching biosciences in nursing and the phenomenon of preparedness with bioscience integration. This analytic aim, according to Husserl, is the "guiding direction of the eidetic sciences, the establishment of a knowledge of essences" (Husserl, 1931, as cited in Moustakas, 1994, p. 100). Intuitive integration requires the researcher to interweave essences of what appears to participants in their conscious experience with the hidden structures that underpin and are intimately bound to the experience.

The researcher reviewed the composite descriptions of textural and structural themes to explore the meanings and essences of preparedness and the experience of learning and teaching *as it is* for participants. In order to do this the researcher needed to remain open to see what was before her, as it appears in the experiencing person's consciousness, and to understand the experience in its own terms (Moustakas, 1994). The researcher looked for essential and universal qualities, components and meanings that *are* the experiences of learning and teaching biosciences for nursing practice for this group of participants. The process of exploration involved the researcher asking the following questions of the composite descriptions: What is the nature of the phenomenon? (What are the experiences of learning and teaching biosciences for nursing?); what are its qualities? (How were these experiences experienced?); what appears at different times and under different conditions? (What and how do experiences vary with context?). Potentially universal

essences that appeared within the composite descriptions were highlighted, reflective researcher notes made, and particularly meaningful statements were extracted to form a beginning textural-structural description.

Selected meaningful statements were then traced back to the original transcripts in order to use verbatim participant statements to illustrate the synthesis of these essences of the phenomenon. Selection of participant statements was undertaken using researcher intuition and the reflective recollection of conversations that particularly highlighted each universal essence as they appeared within the researcher's consciousness. The process of tracing statements back to the original transcripts served to validate that fundamental essences were indeed drawn from participants' stories, rather than researcher imposition. The essences that had been identified as potential universal essences were also reviewed within transcripts to confirm that they were indeed reflected across participants. The analytical aim of statement selection and tracing was to identify essential essences that are "the condition or quality without which a thing would not be what it is" (Husserl (1931), as cited in Moustakas, 1994, p. 100). Consequently, those statements identified to reflect contextual variation were explored in greater detail to uncover the hidden structures that underpin and are intimately bound to the experience. The researcher contemplated relationships within and between structural and textural essences to explore how they may be connected (Spiegelberg, 1982). The conditions identified informed and contributed to the essential essence of preparedness to integrate bioscience knowledge in teaching practice as it is shaped by participants' teaching and learning experiences.

The universal essences identified through the processes above were displayed in a visual illustration that served to validate universal essences within the composite

descriptions and illustrate relationships that were appearing to the researcher (Appendix S). This enabled the researcher to explore and understand with greater clarity how universal essences interweave between what appears to participants in their conscious experience and the hidden structures that underpin and are intimately bound to the experience. The researcher's intuitive integration and synthesis of fundamental textural and structural themes could then be visualised and the beginning textural-structural statement reviewed and developed further. Here imaginative and reflective exploration enabled the researcher to understand and integrate the qualities and meaning of teaching and learning experiences as they relate to the phenomenon of preparedness (with bioscience integration in teaching practice) into a unified description of the phenomenon as a whole.

The integrated description was reviewed in the context of the research process, the epoché and the ability of the researcher to transcend the experiences of the participants in order to analyse the phenomenon of study. Again, the challenge of knowing when phenomenological analysis has been achieved is perplexing for the researcher. Indeed "Only he who has experienced genuine perplexity and frustration in the face of the phenomena when trying to find the proper description for them know what phenomenological seeing really means" (Spiegelberg, 1982, p. 693). Whilst the essences of phenomenon are "never totally exhausted", Moustakas advises that "the fundamental textural-structural synthesis represents the essences at a particular time and place from the vantage point of an individual researcher following an exhaustive imaginative and reflective study of the phenomenon" (1994, p. 100). Crotty also notes that "we describe the phenomenon in the way that we do because we feel compelled to understand the phenomenon in the way we do" (Crotty, 1996, p. 169). After a period of reflective contemplation on the above, the

researcher believes that the synthesis of textural and structural essences of participants' teaching and learning experiences presented within the integrated description reflects her understanding of the phenomenon of their preparedness to integrate biosciences knowledge into their teaching practice at the time of this study.

Conclusion

This chapter demonstrated how the researcher upheld a transcendental phenomenological philosophical approach to research design and procedures undertaken during the study. The core processes of transcendental phenomenological reduction, the epoché and imaginative variation discussed within the study methods enabled the research question to be fully explored from a transcendental philosophical stance and a synthesis of meanings and essences of the phenomenon to be achieved. Individual participant interviews with ten nursing lecturers whose teaching practice required bioscience knowledge integration provided rich, descriptive data that was explored to identify core textural and structural themes within their experiences of learning and teaching biosciences in nursing. Reflective textural and structural descriptions derived from this exploration were then synthesised into a complete description that encompasses what is experienced and how it is experienced. Phenomenological analysis culminated in a unified statement of the phenomenon as a whole, reflecting the researcher's understanding of these experiences and their relationships to integrated teaching preparedness. The findings and outcomes of data analysis are presented and discussed in the following chapter.

CHAPTER FIVE

Findings

Introduction

This chapter presents the study findings. Whilst the aim of the study was to understand how teaching and learning experiences influence lecturer preparedness with bioscience integration in nursing, this deep understanding cannot be achieved without first understanding what is universally experienced in learning and teaching by the study participants. The core textural themes presented in the first section of the chapter describe the universal experience. Eight core themes are described with reference to sub-themes that illustrate individual and contextual variation within the experience. This description of *what* is experienced underpins subsequent exploration and understanding of *experiencing* (*how* experiences came to be).

Section two of the chapter goes on to describe the essential essence of *experiencing* teaching and learning in the study context. Here the universal qualities of the experience are explored to reveal *how* experiences came to be and the meaning of experiencing as it appeared to study participants and the researcher. Three core structural themes are discussed using verbatim statements to illustrate the essence of *experiencing contrast*, *experiencing responsibility* and *experiencing reflection*. These core themes represent the essential essence of experiencing. Discussion of each theme reveals the complexity of experience and how experience is influenced for the participants in this study.

In the third section of the chapter, the emerging relationships within and between essences of experience and experiencing are discussed to reflect the synthesis of core textural and structural themes. The essential essence of learning

and teaching biosciences in nursing is presented, and illustrated, in order that the influence of experience upon participants' preparedness with bioscience integration as a nursing lecturer can be described. Preparedness is shown to have two distinct qualities as essences of experience influence participants' willingness or *preparedness to* integrate biosciences on the one hand, whilst their *preparedness for*, or perceived ability to integrate biosciences is influenced by other, yet interrelated essences of experience. The phenomenon revealed in this study is presented in the concluding section of this chapter and lays the foundation for discussion in chapter six.

The Experience of Learning and Teaching Biosciences in Nursing

The universal experience of learning, and subsequently teaching, biosciences in nursing contains eight core textural themes. Each participant's experience reflects their *ideals of nursing,* a *need to know, wanting to know, motivators, negative motivation, ways of learning, ideals of teaching,* and *realities of teaching* (illustrated in Figure 5.1). Within each theme several sub-themes are identified, illustrating the varying ways in which participants' experiences reflect the core theme (see Figure 5.2). Verbatim participant statements are integrated throughout the chapter using quotation marks, italic font, uppercase P: to identify the participant number, and lowercase p. to identify the page number of the participant's interview transcript.

Core textural themes.

The experience of learning and teaching biosciences in nursing encompasses three distinct, yet interrelated contexts. Participants recall *past experiences* of learning biosciences as a student and practicing nurse that contribute to, and influence their *experience of integrating biosciences in clinical and theoretical*

Figure 5.1 Core Textural Themes

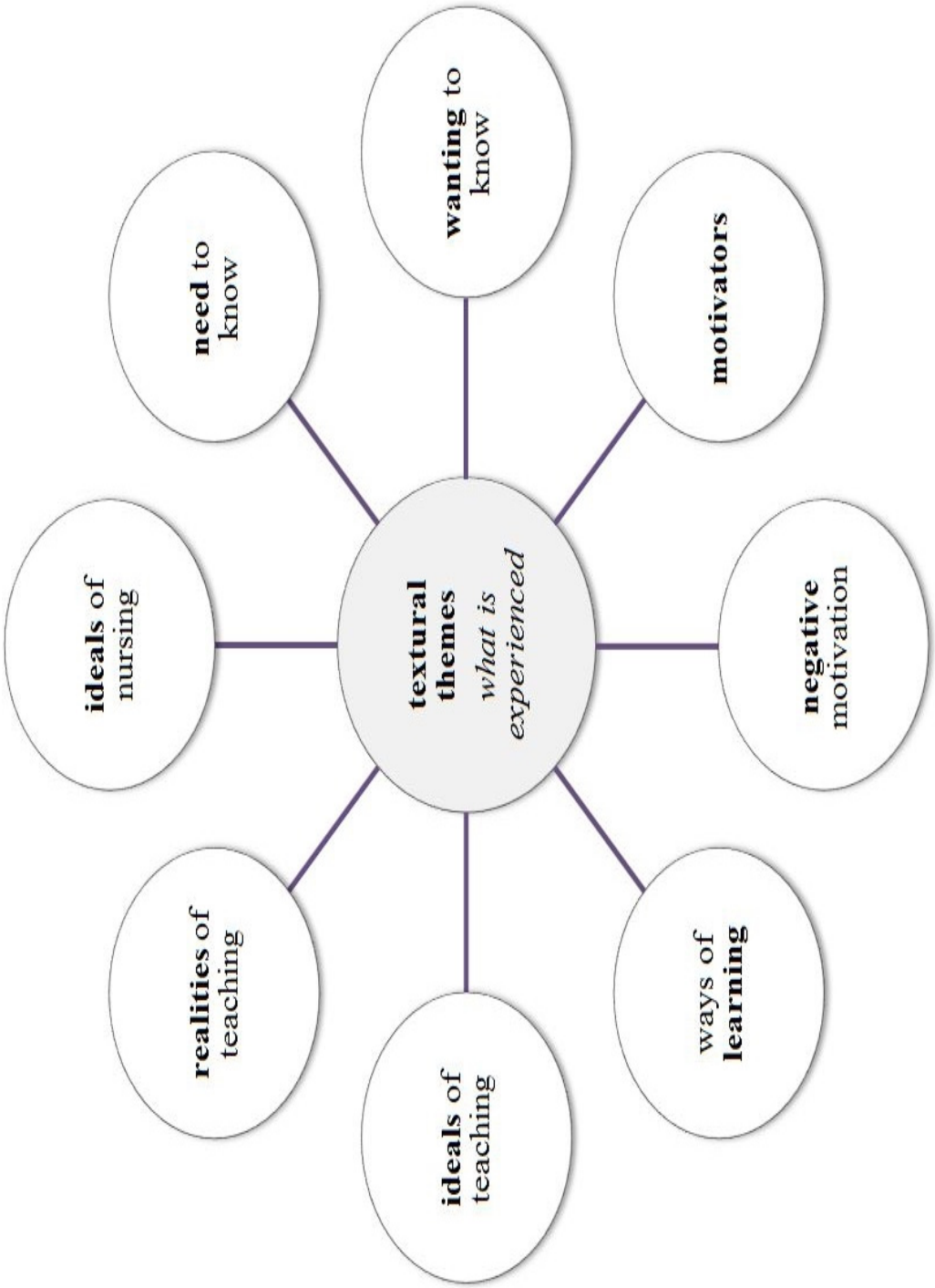
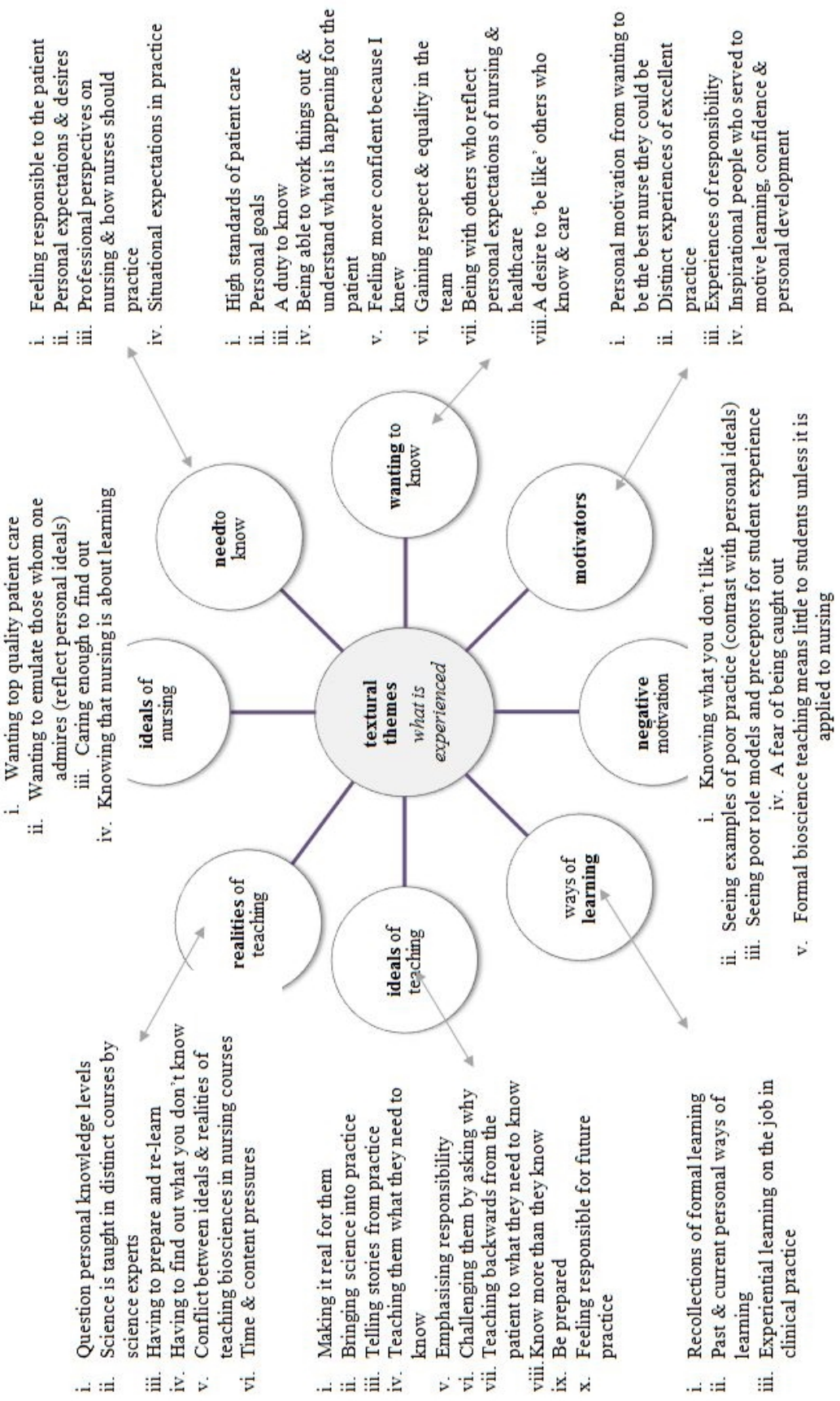


Figure 5.2 Core Textural Themes and Sub-themes



teaching practice as a nursing lecturer. They also experience *learning as a nursing lecturer* with respect to learning how to teach and, more specifically re-learning biosciences in order to be prepared for their teaching practice. Whilst the study findings reveal a complexity in the way distinct experiences contribute to what is universally experienced, core themes are present, representing the essential essence of the experience. Each core theme is presented below, illustrated with excerpts from participants' experiences.

Ideals of nursing.

Experiences of learning biosciences, and teaching bioscience within nursing courses, are permeated by personal perspectives of what nursing is and how nurses should practice. The notion of what it means to be a nurse or one's personal *ideals of nursing* is experienced in various ways and contexts that underpin the majority of core textural and structural themes identified. Ideals of nursing are expressed through four sub-themes: (i) *wanting top quality patient care*, as personal perspectives of quality nursing practice dictate the standard of care that one expects, and seeks to provide; (ii) *wanting to emulate those whom one admires* reflects personal ideals of what it means to be a nurse as examples of what one perceives to be excellent practice are viewed as a goal; ideals of nursing are also reflected through examples of (iii) *caring enough to find out*; and (iv) *knowing that nursing is about learning*.

Each participant's ideals of nursing include a desire for (i) *top quality patient care:*

"I love nursing and… I want top notch care... I get very upset when I see people doing mediocre nursing." [P9:p11]

For participant seven, the desire for (i) *top quality patient care* is underpinned by a sense of duty and responsibility:

"I have a vocation for nursing and the patients depend on me to be there for them… it's my duty." [P7:p10]

As a student nurse, the experience below was seen to epitomise ideal nursing for this participant and, subsequently influence their ideals of nursing and professional aspirations by (ii) *wanting to emulate those whom one admires*:

> *There was one sister who had been on all night…she just put us in our areas. Told us exactly what to do… I remember spending the shift looking at her and she was just so good. So controlled, so clever, I thought to myself, "I want to be like her".* [P7:p2]

Ideals of nursing are also experienced in the context of (iii) *caring enough to find out* as one's perspective on what nurses should do and know influence aspirations for nursing knowledge and standards of care:

"If you care enough for the patients … it's a moral imperative…that's what makes you learn." [P1:p10]

This example also encompasses (iv) *knowing that nursing is about learning*. If one perceives that nursing and being a nurse is about learning, this becomes embedded in, and guides, nursing practice, experiences of learning and, ultimately, experiences of teaching bioscience in nursing. Participant nine's story reveals that their ideals of nursing encompass (iv) *knowing that nursing is about learning*, and that this is integral to their goal of (i) *wanting top quality care*:

> *I wanted to know why things were happening to my patients and I wanted…to be able to be up there knowing what we needed to do next,*

rather than waiting to be told what to do next... for me, that was important… I used to really spend quite a lot of time trying to find out why we were doing things. [P9:p6]

Personal *ideals of nursing* typify participant stories of learning and teaching as what one believes a nurse should know and do serves to guide learning, nursing practice, teaching practice and the ways in which constituents of experience are evaluated. The impact and influence that distinct experiences have upon the individual are attributable to their perspective of what ideal nursing is, and how it may be attained. Whilst individual perspectives of ideal nursing vary among participants, ideals of nursing and each of the sub-themes presented above are apparent within, and therefore essential to the universal experience.

Need to know.

Participants each experience a *need to know* biosciences in order to care for patients and strive to be the best nurse. This need to know is fundamentally underpinned by their ideals of nursing and, more specifically, what they believe nurses should know in order to be the ideal nurse. These perspectives of nursing are apparent within their experiences of needing to know biosciences as a registered nurse in relation to four sub-themes: (i) *feeling responsible to the patient*; (ii) *personal expectations and desires*; (iii) *professional perspectives on nursing and how nurses should practice*; and (iv) *situational expectations in practice*.

The need to know encompasses (i) *feeling responsible to the patient* in the following account of *need*ing *to know* biosciences in the context of patient assessment, communication and fulfilling the (ii) *personal expectations and desire* to advocate for the patient. When discussing their experiences of needing to understand

bioscience to communicate effectively with medical staff in the context of clinical decision making, participant seven states:

> *If I just twitter on saying, "Oh the patient's poorly," to the doctor, no one's going to be coming along. But if I say, "I've just examined this patient, this, this, this and this…accumulatively the doctors know you know your biscuits, so if you ask them to come, they'll come… to do your nursing job properly you have to be a caring person, you have to understand the sociological side of what's going on, but you have to know the facts of what's going on in the patient's body.* [P7:p10]

The following example illustrates how (ii) *personal expectations and desires*, underpin the belief that a need to know biosciences is integral to (iii) *professional perspectives on nursing and how nurses should practice*:

"You have to understand the nursing implications of the physiology of what's happening to that person, absolutely… without it the patient might as well be at home with Mum, or Nana… that's the absolutely critical difference" [P1:p14]

This participant also reveals an implicit sense of (i) *feeling responsible to the patient*; as their (ii) *personal expectations and desires* for their practice, and that of their students, underpins their perceptions of ideal nursing and nursing knowledge:

> *"I've said that to students, "Why do you think this person's in hospital, why aren't they at home with Mum looking after them, what's the difference? Don't you dare tell me it's just common sense, this is nursing knowledge."* [P1:p14]

In the context of working in a new clinical environment as a registered nurse, participant six's story reveals how both (ii) *personal expectations and desires* and

(iv) *situational expectations in practice* contribute to the experience of *need*ing *to know* biosciences:

> *It was very much the rapid changes that were taking place, like someone would be really well one day and even within that day they could go downhill very quickly... trying to understand why that happened and how that happened … that was probably a big wakeup call at that point that my knowledge wasn't as honed as it needed to be… there was a whole lot of things I needed to relearn.* [P6:p13]

This excerpt reflects the participant's *personal expectations and desire* to know as their knowledge was evaluated according to what they believed nurses should know and do in the context of patient care (*ideals of nursing*). Whereas the situational expectations of the practice environment emphasised the responsibility to know that was experienced due to the autonomy and solitude of the particular clinical role discussed.

The *need to know* and one's *ideals of nursing* both evolve over time as perspectives of what nurses should know develop from clinical experiences that highlight patients' expectations of nurses. Each sub-theme of need to know underpins this participant's experience as a sense of (i) *feeling responsible to the patient* developed from patients' asking questions that they were initially unable to answer:

> *"I think I came into nursing … with that thought, "I can do this skill," and the actual science behind it probably wasn't hugely important."* [P8:p5]

The (iv) *situational expectation in practice* of needing to know the science underpinning practice to answer patient questions caused the participant to reflect

upon (ii) *personal expectations and desires* as they considered their (iii) *professional perspectives on nursing and how nurses should practice* to alter their perspective on what nurses need to know:

> *If I had a really clear understanding of it so...I could explain it to my patients, then I thought I had enough...that's probably where I saw it...*further reflection revealed that*...I think I probably would have liked to have known a lot more than I knew.* [P8: p12]

This story begins to illustrate the differences identified in participants' experiences of *need to know* and *wanting to know.* Whilst the need to know is underpinned by a perceived expectation to know, wanting to know is more personal, surrounding a desire to fulfil personal *ideals of nursing*. Each participant experienced both the need and want to know in order to understand biosciences for their clinical practice, making each core theme essential to the experience.

Wanting to know.

Participants experience a desire, or *want to know* and understand biosciences as they relate to the patient and the care that can, or should, be provided. The experience of *wanting to know* is influenced by personal aspirations that surround the sub-themes of: (i) *high standards of patient care*; (ii) *personal goals*; experiencing (iii) a *duty to know*; (iv) *being able to work things out and understand what is happening for the patient;* (v) *feeling more confident because I knew;* (vi) *gaining respect and equality within the health care team*; (vii) *being with others who reflect personal expectations of nursing and health care*; and (viii) *a desire to be like others who know and care*.

Wanting to know within each of these sub-themes is underpinned and driven by personal *ideals of nursing* and the experiences that shape perspectives of what constitutes good nursing. Ideals and perspectives evolve with experiences in learning and clinical practice, yet each participant's experience reveals a fundamental notion of what it means to be a nurse that encompasses a desire to understand nursing practice and patient care. The theme of *wanting to know* to enable *high standards of care* is associated with *ideals of nursing* and *wanting top quality care* as participants want to do their best for the patient. However, in the context of wanting to know, (i) *high standards of patient care* reflect the experience of associating bioscience knowledge with high standards of care. Here knowing is seen to enable better care, emphasising the relationship between learning and high standards of practice.

A desire for (i) *high standards of patient care* and the (ii) *personal goals* that developed as this participant became more experienced underpinned the want to know biosciences:

"What made me want to? … I just wanted to be the best nurse…have… some good knowledge behind me." [P8:p10]

The following excerpt illustrates the same sub-themes but also incorporates a sense of experiencing a (iii) *duty to know,* (iv) *being able to work things out and understand what is happening for the patient*, and (v) *feeling more confident because I knew:*

> *I always had a notebook that I'd write in everyday if there was something I didn't understand and I'd go home and I'd always read up about the science around it. I wanted to have the knowledge, to understand, and I didn't want to be found wanting. It made me a better*

nurse because it makes me safer when I understand what's going on. [P7:p6]

For participant six (iv) *being able to work things out and understand what is happening for the patient* is linked to ideals and (ii) *personal goals for nursing* in relation to the responsibility they experience for patients in their care. When discussing the desire to do their best for the patient their experience of wanting to know is described as:

> *What's the point of just being there as a nurse and having to wait an hour, two hours, three hours, for the house resident to turn up and all the time your patient's going downhill…if you can do something that's going to benefit your patient, you jolly well get on and do it and if that's because you know something then you…get on and know it.* [P6:p11]

Participant three's experience of *wanting to know* surrounds the sub-theme of (v) *feeling more confident because I knew,* but here, the experience relates more closely to wanting to know as a means of (vi) *gaining respect and equality in the team.* For this participant wanting to understand biosciences means:

"You have got more confidence in what you're doing, you can explain to the patient…properly what is happening…equally…with your colleagues and the doctors you can make sensible conversation and therefore help your patient." [P3:p8]

Participant five's story reveals that wanting to know is also influenced by (vii) *being with others who reflect personal expectations of nursing and healthcare* as they reflect on learning and *wanting to know* in the clinical environment:

On the job… you want to know what's going on with your patients… I'd always just look it up and link it…we often used to do case studies on the patients and present them, and go to the ward rounds and you'd hear the doctors all talking… I think probably that environment really made you learn the pathophysiology. [P5:p7]

Clinical experiences can impact on the experience of wanting to know through a (viii) *desire to 'be like' others who reflect personal expectations of nursing and healthcare*. If personal ideals of nursing encompass high expectations of knowledge application in clinical practice, the experience of seeing care that reflects this can encourage a desire to know:

I've worked with a lot of people that were always motivated and knowing and [wanting to understand] *why… that's why I'm a bit the same really…you are all interested in that type of pace of work and... knowledge and finding out new things*. [P9:pp13 &16]

Whilst the sub-themes presented may be experienced in different ways and contexts, *wanting to know* is essential to the universal experience of learning and teaching biosciences in nursing. This core theme is influenced by personal ideals of nursing and also the following core theme of motivators.

Motivators.

The experiential accounts presented thus far reflect how participants each experience *motivators* that push and encourage them to learn biosciences for their own nursing practice and, subsequently, to help students learn through their teaching. Motivators are experienced in relation to four interrelated sub-themes: (i) *personal motivation from wanting to be the best nurse they could be;* (ii) *distinct experiences*

of excellent practice; (iii) *experiences of responsibility*; and (iv) *inspirational people who served to motivate learning, confidence and personal development*.

A fundamental motivation to learn is provided by participants' (i) *personal motivation from wanting to be the best nurse they could be* as previously discussed. If personal ideals of nursing encompass learning and understanding this serves to motivate learning and underpins the sense of wanting to know. A desire to understand practice is experienced as a motivator for learning and the development of personal standards of nursing practice across participants. However, participant stories reveal that both personal ideals and personal motivation are influenced by experiences that illustrate *excellent practice*, *responsibility*, and/or exposure to *inspirational people.*

This participant's story captures the influence that (ii) *experiences of excellent practice* and (iv) *inspirational people* (nurses) can have upon the motivation to learn:

> *I had amazing mentors when I went onto that ward… one in particular… she was an absolutely amazing nurse, I kind of emulated her, I thought that's what I want to be, was highly knowledgeable...somebody who you kind of go, "That's the kind of nurse that I want to be." … she had a thorough understanding of disease, the nursing care relating it to disease and then can look at the impact that a disease had on the body. So it wasn't… that the doctors knew about the physiology and the nurses carried out the nursing care, she was as knowledgeable as… at least registrar level doctors, regarding the underlying processes*… [P10:p7]

The relationship between personal ideals of nursing and (iii) *experiences of responsibility* motivates participants to learn bioscience:

I think of the implications for the patient, "Okay so…given that this has happened, or might happen… what does that mean for that person?"…that's always been my spark... my incentive to know what's going on, because each person has a particular something happening for them and as a nurse you need to anticipate, a huge amount of nursing is anticipation. So you've got to know what should be happening, what could be happening, what might happen, how to recognise it and what to do about it. And you've got to understand the pathophysiology in order to do that… it was the curiosity to get that right for the patient. [P1:p7]

Whilst the example above reflects the generic experience of responsibility that this participant felt as a nurse, responsibility is also experienced as a motivator in situational contexts. When working as a specialty nurse, participant two's learning was motivated by (iii) *experiences of responsibility* in the clinical role:

"I had to…build up all the history around it and put all that together, if I was going to refer…you had to know what you were talking about...It was a lot of responsibility." [P2:p16]

Here responsibility for the patient motivated learning through a personal desire to know more. Although responsibility can create a sense of *needing to know* that may motivate learning through the expectation for knowledge, responsibility is also experienced as a motivator via ideals of nursing and the personal desire to know.

Negative motivation.

Participants also experience motivation to learn and develop their practice in nursing and teaching as a consequence of experiencing what they perceive to be poor practice. Themed as *negative motivation*, this core textural theme surrounds

participants' exposure to learning, practice and teaching in nursing that conflict with personal *ideals of nursing*. Such experiences are evaluated according to personal values and also shape evolving perspectives of nursing as participants' progress in their nursing and teaching careers. The experience of negative motivation is expressed in sub-themes that include: (i) *knowing what you don't like*; (ii) *seeing examples of poor practice*; and (iii) *seeing poor role models and preceptors for student experience*. For some, motivation to learn was also driven by: (iv) *a fear of being caught out* if one's knowledge was not at the level expected by others. The perception that (v) *formal (distinct) bioscience teaching means little to students unless it is applied to nursing* also motivates participants to integrate biosciences in their teaching to help students link bioscience to patient care.

The following participant's story illustrates (i) *knowing what you don't like* as they discuss their perception of *"mediocre nursing"*:

> *They don't show the care and interest and the desire to learn and they're too worried about being busy… for me the nursing knowledge journey never stops…I don't think all nurses are, I think they're there to pay the bills, go and do their shift and they'll whinge and moan…* [P9:p16]

Knowing that experiences like this aren't what one perceives to be good nursing influences participants' personal goals for learning and development as nurses and lecturers. Experiences of what is perceived to be poor nursing also motivate individuals to share knowledge and teach well. Participant two describes the impact that (ii) *seeing examples of poor practice* had upon their practice:

> *When I worked as a… specialist…I was doing a lot of education…because that was something that I saw that nurses weren't*

doing… they didn't know what the hell they were doing essentially…so I developed a whole thing around the… anatomy and physiology and the pathophys, and I taught that regularly. [P2:p7]

For some participants, the experience of (iii) *seeing poor role models and preceptors for student experience* motivates learning and teaching practice in relation to bioscience rationale*:*

"In the hospital with students and working with some of the staff, they're like little robots and they don't know what they're doing…some of the stuff you see in clinical...they've no idea what they're doing." [P5:p4]

Negative motivation is also experienced through the absence of fundamental nursing knowledge amongst students. This observation contributes to the perception that (v) *formal (distinct) bioscience teaching means little to students unless it is applied to nursing*. The following example illustrates the responsibility that nursing lecturers experience towards student learning in applied bioscience:

[The science teacher] *wouldn't have a story of the clinical picture that the patient showed, because she hasn't nursed for years… just taught sciences…doesn't like doing nursing stuff…a good teacher… but…you still have...the situation where you've got students coming up into the third year…and you're in the clinical situation with them and the patient isn't well and everything like that, and they cannot seem to even talk or think about the science behind it, 'cause it's all been taught in blocks.* [P7: p17]

Here formal science learning in pre-registration education is seen to be taught without clinical context, making student learning more difficult. Negative

perceptions of science teaching such as this encourage participants to facilitate applied learning for students in their teaching practice. Both negative and positive experiences motivate bioscience learning and understanding amongst the participants. Experiences of learning as a nurse and as a nursing lecturer underpin participant notions of applied learning as the following core theme illustrates.

Ways of learning.

Participants experience various *ways of learning* as a student, practicing nurse and as a lecturer learning to teach others about nursing. Throughout these experiences participants discussed the following sub-themes: (i) *recollections of formal learning*; (ii) *past and current personal ways of learning*; and refer to (iii) *experiential learning on the job in clinical practice*. Formal bioscience learning is largely assumed, by participants, to be something that they must have done, whilst learning on the job was made real by seeing and experiencing patients' illness, treatment, care and recovery. Participants' stories show that past experiences of successful learning underpin their current approaches to learning and teaching as a lecturer.

When recalling (i) *formal* and (ii) *past ways of learning* as a student and beginning staff nurse participant nine says:

> *I remember very little about that* [formal learning]. *I know we did a lot of anatomy and physiology 'cause I remember knowing very well all the systems and the body from...the nurses, nursing lecturers and a lot of self directed learning, I worked quite hard and… when you're working, caring for people, you would go and read it all up… And I remember the*

medical staff, we used to talk a lot with, we used to go and find out things. [P9: p4]

The prominence of clinical learning memories in the above example is universal amongst participant stories of their learning. *Experiential learning on the job in clinical practice* (iii) dominates participant accounts of (ii) *past and current personal ways of learning.* Participant three's story illustrates how learning in practice can enable biosciences to be an integral part of nursing practice:

Our tutors were very good… they visited us in the wards...in the neonatal ward the tutor told us that… when a baby has just been fed you must put them on the right side so that the liver doesn't push on the stomach. So I had this baby screaming because it was hungry, so I put her on the left side so that the liver made the tummy tense (laughter) so then it wasn't so hungry. [P3: p9]

Past and current personal ways of learning (iii) are characterised by the notion that bioscience understanding develops through 'reverse learning' as participants work from practice to the science underneath the clinical situation. In order to do this *personal* strategies and *ways of learning* develop to facilitate theory-practice application. What participants see in practice triggers a need to read, relearn, ask questions, learn from others, have conversations and look things up in order to make sense of experience. Successful strategies are then reflected in teaching practice. The concept of reverse learning as a means to understand and explain practice is discussed explicitly by participant ten:

A lot of my true understanding comes from actually the reverse learning…for example… when I did paediatrics, diabetic acidosis was a

big thing…so I kind of reverse learnt…I looked back and looked at it in terms of… what's happening in acidosis? what are the mechanisms within the body?...So I understand… it's not...foundation learning and building upon that. It's like, "Hey that's interesting," and going back to it. [P10: p4]

The presence of clinical practice in learning characterises positive (i) *recollections of formal learning* and (iii) *experiential learning on the job in clinical practice*. Teachers or mentors who championed clinical application of biosciences to patient presentation and associated care are perceived to be the people who made it real:

I remember [name] *was a master in the classroom… she was so clever. She'd begin the class with the facts I guess, but then she'd tell us a story, she'd relate it to a real person, you know, this is nursing, this is what it's about.* [P1:p22]

Working with inspirational individuals impacts on (iii) *experiential learning on the job in clinical practice* and the ability to see the relevance of bioscience learning for nursing. Inspirational people encourage and facilitate participants to establish links between what they may see in practice and related science knowledge:

When I started in coronary care… one of the senior nurses… was fantastic… also the charge nurse, probably were some of the first nurses that I had experienced who actually… sat down and said, "Right we've got a spare half an hour, let's go through ECGs and what is that ECG about, so it's all these wavy lines on a bit of paper and there's twelve different wavy lines, what are they?"...going through that and making

that make sense...but I…can't remember instances of it from my training as such. [P4: p13]

O*ne…*[staff nurse] *was a bit of a radical I guess in those days…she kept pushing the boundaries as to what we needed to know and don't rely on the doctors they're not always here. You're the first port of call…so if something goes wrong and something changes rapidly within your scope you've actually got to be able to do that and justify why you've done it…she used to be really, really good… the more she pushed the boat out the more you realised that if you wanted to do the best for your client you actually needed to know*. [P6: p11]

If personal values of nursing encompass learning as an integral component of nursing practice individuals develop personal ways of learning in order to achieve the goal of ideal practice. Current and past experiences shape personal perceptions of successful learning strategies and the learning experiences that best enable nurses to understand and apply bioscience knowledge to patient care. These experiences are essential to the development of ways of learning and subsequent ideals of teaching.

Ideals of teaching.

Each of the core themes presented thus far contribute to the development and evolution of personal *ideals of teaching* as participants' perceptions of ideal nursing underpin their ideals of teaching. Participants want the students they teach to be good nurses and strive to facilitate this through their teaching practice. Participants' own experiences of effective learning and practice development are expressed in ideals of teaching within each of the following sub-themes: (i) *making it real for them*; (ii) *bringing science into practice*; (iii) *telling stories from practice;* (iv) *teaching them*

what they need to know; (v) *emphasising responsibility;* (vi) *challenging them and asking why;* and (vii) *teaching backwards from the patient to what they need to know*. Positive experiences of reverse and experiential learning (*personal ways of learning*) resonate within teaching ideals. In terms of teaching practice, participant perspectives of *needing to know* as an individual influence personal expectations when teaching as they experience a need to (viii) *know more than they know*; (ix) *be prepared*; and (x) *feel*ing *responsible for future practice*.

Ideals of teaching surround the process and principles of learning as a nurse that are derived from experiences with learning and clinical practice. The sub-themes of (i) *making it real for them* and (ii) *bringing science into practice* by (iii) *telling stories from practice* each relate to the ideal of (iv) *teaching them what they need to know* so that students can be good nurses:

> *In your teaching you know what you didn't know in practice and you make sure that the students know the really fundamental life saving things I think, from practice and your own experiences…*[clinical experiences] *definitely inform my teaching, and the students love it when you tell them a clinical story, 'cause the whole class suddenly goes quiet and they're honed on in and they, "We must remember that stuff." They want to be a nurse and they love hearing the real stories and so, whenever I'm trying to teach I always make sure I try and link a story. And of course I think they also identify you, that you're actually the real McCoy*. [P5: p7]

Participant perceptions of teaching ideals include *making it real for them* by (v) *emphasising responsibility* to understand biosciences:

It's important to keep talking with them…about why they need to know this information and that this…is their building blocks for being prepared to be a registered nurse at the end, so you need to know it… If you give them that passion of why they need to know more, they will go and learn more. [P9: p17]

Participants' experience and perspective on ideals of teaching (v) *emphasise* student *responsibility* for learning by (vi) *challenging them and asking why:*

I think they [nurses] *have to know to ask questions, because there's so many individual things that go on… we're not all the same, so one person could present with a drug reaction in a certain way and the other person won't, so then you have to think about what's actually going on there, what is the physiology?* [P2: p19]

The concept of questioning as a means to emphasise the links between bioscience and nursing practice also permeates personal teaching ideals:

"The questioning is really important. Even if it's just a "why are you doing it this way?" or, "why is that occurring?" That digs the science out of them…I think that's a really powerful tool." [P8: p9]

Personal learning experiences underpin the perception that (vii) *teaching backwards from the patient to what they need to know* is the most effective way of (iii) *bringing science into practice*. Participant four reflects on the relationship between personal ways of learning and their teaching ideals:

For my learning, if I don't understand what's going on underneath, if… a patient's presenting with a heart attack and you don't understand the pathophysiology underlying that condition and the symptoms that the

person is presenting with, it makes it very difficult to actually learn and be able to recognise and identify and make the correct diagnosis. So it needs to be linked very strongly into any teaching… I think it's really important. [P4: p6]

In terms of teaching practice, participants' ideals of nursing underpin personal expectations to understand biosciences in order to (viii) *know more than they* [students] *know* (ix) *be prepared for teaching* and (iv) *teach them what they need to know* to be good nurses:

I always check up what I have to read about or what I have to teach, so I always refresh myself. Though it's almost as though the more experienced you become…in [clinical practice] or the sciences, the more you just seem to know stuff rather than remember all the nitty-gritty bits of it...you're past all that; you actually just know what you're looking for. So to teach it you always have to go back to the basics... I suppose I do it backwards, because I know the clinical work I know what is relevant for them to know. [P7: p4]

Participant four's experience of needing to (ix) *be prepared for teaching* also reflects the sense of (x) *feeling responsible for future practice* that is apparent for each participant:

I want to be as far ahead of the game as I possibly can. And I don't want to put anyone wrong, so I want to make sure that the information that I'm teaching is correct and up to date and if they ask me questions I can answer them. [P4: p8]

Ideals of teaching reflect participants' experiences of successful teaching and role modelling as students, registered nurses and nursing lecturers as experiences that have been important or significant to learning biosciences form a foundation for teaching practice. Using personal learning and practice experiences as a guide to what students need to know engenders greater confidence in personal values and decisions about the science that is important for nurses to know.

Realities of teaching.

Although participants' each experience teaching ideals that are intrinsically linked to personal ideals of what it means to be a nurse, their ideals are consistently challenged by the realities of teaching biosciences in nursing courses. The core theme *realities of teaching* reveals several qualities within participants' experiences that include: (i) *questioning of personal knowledge levels*; (ii) *science is taught in distinct courses by science experts;* (iii) *having to prepare and re-learn*; and (iv) *having to find out what you don't know.* Within the context of pre-registration nursing education each participant also experiences (v) *conflict between the ideals and realities of teaching bioscience in nursing courses*, particularly in relation to (vi) *time and content pressures* that challenge personal ideals of teaching.

Whilst participants' have confidence that they know what nurses need to know, they (i) *question personal knowledge levels* with regards to the depth of bioscience knowledge:

> *I like science…and I like reading pathophys and things like that, but I don't think I'm good at teaching it back because it's not something I've ever really done heaps of. So I can use it and talk in terms of incorporating it into a case study, as long as I've done the preparation.*

And I can see things that are missed, but I don't necessarily think I could stand up there. [P2: p7]

The separation of biosciences into distinct courses within higher education programmes underpins the perception that (ii) *science is taught in distinct courses by science experts.* Whilst this situation may influence the view that nurses are being appropriately taught by science experts, participant experiences reveal that it undermines their own confidence with bioscience knowledge (sub-theme (i)):

I expect them to come in with knowledge so that I don't have to teach them, 'cause I wouldn't know it to the extent that the science guys would"…" I'm just not doing it every day, whereas these science lecturers it's their total topic, whereas I'm hugely broadly experienced using my specialty knowledge, so yes I do worry about my own knowledge. [P9: p8]

A sense of confidence in science knowledge comes with clinical practice exposure and the depth of knowledge application that participants experience as a consequence of learning, working and thinking about bioscience concepts concurrently. This knowledge is perceived to be easily accessible, offering more confidence in personal knowledge and ability to integrate biosciences when teaching nursing. However, when clinical experiences are less recent participants describe (iii) *having to prepare and re-learn*:

When I first started...teaching, seeing I was so clinically current, it was really easy just to be able to think of a scenario 'cause it would quickly come to your head from a patient you'd perhaps seen in the last few weeks... now I sometimes have trouble… putting it back to a real person

… it's not as easy. And I notice when I've perhaps been in clinical with the students that that recall actually is better. [P5: p4]

Having to prepare and re-learn in order to recall the detailed bioscience knowledge underpinning practice characterises participants' perceptions of their own ability to integrate bioscience concepts in their teaching and (iii) *having to find out what you don't know*:

I feel like I've done my whole Bachelor of Nursing degree all over again 'cause I've done so much reading to make sure that I understand it well enough to be able to teach it…I hit the books again…I think it's really important that they get it and I don't feel like I'm confident in some areas… So I try my best to make sure that...I've got myself up to a reasonable standard to be able to teach it. [P4: p7]

Personal knowledge and confidence are *questioned* (i) in relation to post-registration teaching as the responsibility of being a lecturer is heightened by perceptions of students' expectations or existing knowledge. Participants experience particular pressure to (iii) *prepare, re-learn* and (iv) *find out what you don't know*:

I avoided the physiology or pathophysiology… because they were Postgraduate students… my knowledge…it's good at Undergraduate level, but at Postgraduate level I wasn't happy to teach it…next year I might do it…that's why I've just got the text book…to get my head around it, to move it from an Undergraduate level to a Postgraduate level. [P10:p3]

Participants each experience (v) *conflict between the ideals and realities of teaching bioscience in nursing courses* in pre-registration curricula that are influenced by practical factors such as (vi) *time and content pressures*:

> *If you've got a good understanding and grounding of that* [bioscience]*, I believe you can actually be a better nurse…the very good nurses are using it all the time… I think they* [students] *should get more of it, not so crammed, so that they really can get an understanding, because that will make everything else easier*. [P3: p7]

Whilst participants' own experiences show that integrating bioscience with nursing practice makes learning easier and more relevant, practicalities such as science separation from nursing and the challenge of synchronising timetables between courses creates conflict:

> *Some students are really good and can have the knowledge, understand the science and then apply it to a clinical practice…but… we don't do that very well… as much as we do kind of try…they might have done the respiratory system three weeks ago and here we are doing COPD now and they have to kind of think, "Oh my God," making all those links ...we make that really difficult for the students.* [P8: p13]

Similarly it may not be possible to facilitate ways of learning that one's personal experiences have shown to be successful:

> *Ideally I would prefer to have more tutorial time to teach concepts because then… when they don't understand something you can go back to your foundations...and say, "Okay well let's link that back, what is your understanding of X, Y and Z based on your knowledge that you've*

had from first year of physiology / pathophysiology?...But …by second year it is assumed that the students are … rereading what they have done in first year and making the linkages. [P10: p11]

They need to have a certain level of understanding, you know, physiology before they can tackle pathophysiology…if they haven't actually reached that point … it's almost like what comes first the chicken or the egg?..if this is too early do we have to then go back to that later on, or will it make it easier to understand… just scheduling problems… for some of them I don't think it does make a lot of sense…you've got a big group of students…you can't individually say like where are you up to and is this making any sense?...you don't have time to say, "Alright well we'll back track and go over that in a little more detail." [P4: p 6]

Whilst the structure of pre-registration nursing programmes is perceived to challenge ideals, participants also experience conflict within what they know students need to know and the realities of timetabled class time and content pressure within the curriculum:

"The same old thing… you could do a whole day on that, but you've only got maybe a couple of hours, so you just hope that they'll take some of that stuff into practice with them." [P2: p23]

The need to emphasise responsibility for personal learning amongst students is universally experienced as an ideal for teaching, yet the realities of having to choose content and teaching methods that align with personal ideals *and* the curriculum are challenging:

It's all well and good you can say to students "Go and do the learning afterwards." You might have say ten concepts to cover and you cover seven, and then say to the students they've got three other concepts to go and read it, but I know that a lot of the students don't do that. So it's like what do you do? [P10: p11]

Personal preference to teach from patients back to the science underpinning clinical presentation and care features strongly in personal ideals of teaching, yet when pre-registration students have limited exposure to clinical practice prior to classroom teaching this ideal is difficult to achieve:

I try and encourage them to…think about… if you have this pathophysiology going on, what symptoms would you think might happen out of that? Because that's what you need to watch for, or plan for...But I now notice that if they haven't been in practice they can't, that next bit's really hard. [P2: p18]

Experiences of learning and teaching biosciences contribute to participants' ideals of teaching. Yet the accounts above begin to illustrate the complexity that is revealed when experience and its influence upon personal teaching practice and preparedness with bioscience integration is explored.

Summary – core textural themes.

The themes, sub-themes and examples presented reflect the essential essence of learning and teaching biosciences in nursing. For the participants in this study this is what was, and is, experienced. The following section progresses to describe the essential essence of *experiencing* teaching and learning in the study context. The universal qualities of experiencing learning and teaching reveal how experiences

came to be and the meaning of experiencing as it appeared to study participants and the researcher.

Experiencing Learning and Teaching Biosciences in Nursing

For the participants in this study experiencing learning and teaching biosciences in nursing is comprised of three core structural themes. Each participant's experience reflects the qualities of *experiencing contrast, experiencing responsibility* and *experiencing reflection*. These core themes represent the structural essence of universal experience and a greater understanding of how experiences came to be. Each core theme, and the related contextual sub-themes, are explored below and illustrated in Figures 5.3, 5.4 and 5.5.

Experiencing contrast.

Experiencing learning and nursing practice in clinical environments is instrumental in the development of personal ideals of nursing. However the influence that distinct experiences have upon personal ideals is determined not only by exposure to different ways of learning and practicing, but also by the appraisal of experience according to personal perspectives of what it means to be a nurse. Distinct experiences and their contribution to learning, practice development and, ultimately teaching practice are characterised by exposure to contrast in practice methodology.

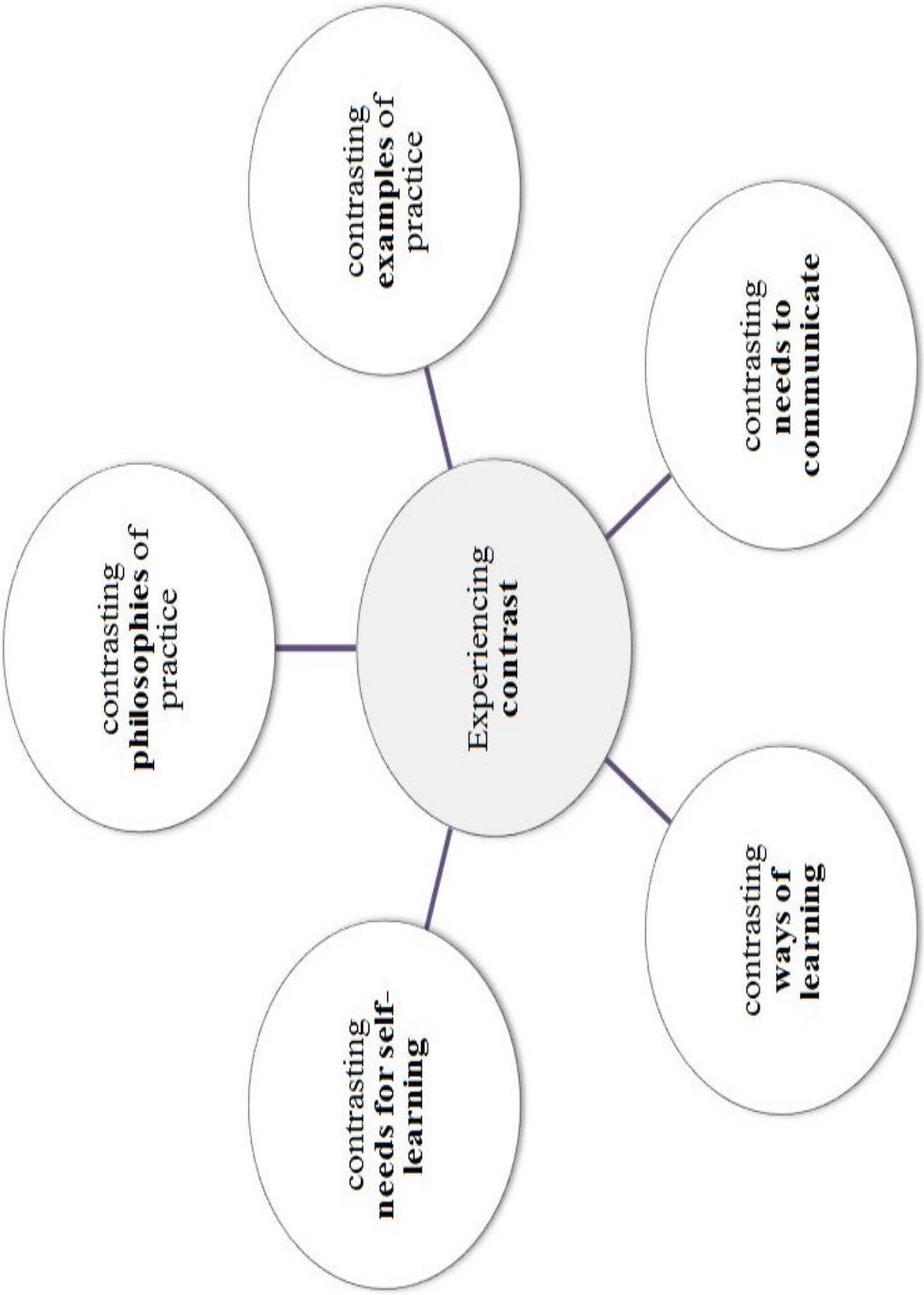
Experiencing contrast in learning, nursing and teaching practice initiates an evaluation of the experience and reflection upon its value for personal development towards what one perceives to be excellent or ideal practice. Experiencing contrast occurs in the context of five sub-themes that characterise its nature and influence: (i) experiencing *contrasting philosophies of practice* surrounds examples of good and

bad ways of practicing as a nurse or doctor and decisions concerning suitable role models for personal development; (ii) experiencing *contrasting examples of practice* in nursing that are perceived to demonstrate either excellent practice and positive learning experiences, or negative experiences that are perceived to demonstrate poor practice that the individual chooses not to replicate; (iii) experiencing *contrasting needs to communicate* concerns the need to communicate knowledgeably at different levels to patients and doctors, each highlighting the importance of understanding biosciences to enable effective communication as a nurse; (iv) experiencing *contrasting ways of learning* between patient and clinically focused learning that illustrates a reason to learn biosciences that is interesting and relevant, and formal learning that lacks context, relevance or applicability to nursing; and (v) experiencing *contrasting needs for self-learning*. Here the need to know bioscience may be driven by the expectations of other senior nurses or doctors that the nurse should know, in contrast to the personal expectation to know in order to feel prepared and confident, and the contributory feeling of being underprepared and unconfident when a knowledge deficit is apparent.

Participant five recalls their experiences with learning as a student nurse and the change in culture that was experienced when working as a staff nurse in a different location. Experiencing (i) *contrasting philosophies of practice* for this participant begins with their recollections of demonstrable bioscience application as a student:

> *It was quite taskie and it was all about the fluffy feely stuff more than probably pathophysiology… the ward that I…remember going to… the patients were sick was a busy surgical ward, and it was all about doing the tasks well and being really efficient and getting through the*

Figure 5.3 Experiencing Contrast - Core Structural Theme and Related Sub-themes



workload really...you were good if you managed to keep up and help wash them and sponge them and do their dressings...it was very task orientated. [P5:p10]

Perceptions of basic practice such as this are universally experienced as the 'norm' for many practice areas, yet personal values and ideals about nursing challenge one's acceptance that this represents good nursing. *Experiencing contrasting examples of practice* (ii) highlights that things can be different if certain ideals of nursing practice are upheld. Participant five went on to work in this influential environment that more closely aligned with their perception that good nursing encompasses understanding practice:

"They were really good senior nurses…there was always a nurse in charge who didn't have a patient load who you'd go straight to… they taught you everything actually, which they haven't got that now." [P5: p11]

Experiencing contrast in this way reinforces personal beliefs about nursing knowledge and how one wants to practice, yet also highlights contrasts between this participant's evolved ideals of nursing and their perceptions of the state of current nursing practice below:

"They're all useless actually, generally... there's just no real good clinical nurses on the floor nurses anymore…they haven't got that, it's all really quite depressing actually." [P5: p11]

Experiencing (i) *contrasting philosophies of practice* and standards of nursing such as these motivates individuals to do whatever they need to do to be a better nurse or lecturer so that they might positively influence bioscience integration in future nursing practice. Experiencing *contrasting philosophies* and *examples of*

practice emphasises the association that exists between knowledge, learning and the perception of better practice:

> *Those of us that were floating to the top would follow up knowledge, but there were always a lower grade of nurse who just was task orientated. Not the grade of nurse in terms of pay, but in terms of, in the unstated but acknowledged hierarchy of who really knew their biscuits and who didn't. The ones that chose not to do any more learning or follow up on things...would be the ones that were good at the tasks, but couldn't do any of the higher thinking.* [P7: p9]

Experiencing (i) *contrasting philosophies of practice* and (ii) *contrasting examples of practice* for participant one began with a particularly inspirational individual who role modelled ideal nursing practice and leadership. Seeing and experiencing how practice can be better shapes personal ideals and values that influence subsequent nursing and teaching practice.

> *She was human, she was real, she was amazing, absolutely stunning woman…we saw a whole new way… a huge change in the way nursing was delivered. From that militaristic, "Do as you're told," kind of way, to being encouraged to ask questions, being encouraged to challenge, being encouraged to think beyond what you could see in front of you. I… remember knowing… who I liked to work with and who I didn't… the people I liked to work with were…smart, thinking nurses*. [P1: p9]

Seeing excellent practice examples affirms personal ideals and motivates one to learn, practice and teach in what is perceived to be the best way. Experiencing (ii) *contrasting examples of practice* also influences the development of personal ideals

of nursing and exposure to good practice as it influences where individuals choose to work and who they like to work with:

> *I'm a little bit biased towards loving acute care, because I do see myself as being an equal there rather than when I go onto wards I still see, in some wards, a real hierarchical system. And the nurses not being able to… step up to a level that I think they should be working at.* [P9: p4]

Working with like-minded individuals contributes to the evolution of personal ideals by increased exposure to good practice, whereas exposure to (ii) *contrasting examples of practice* that one considers to be poor affirms personal beliefs about what nurses should know and do in their practice:

> *I remember a young woman who…had necrotising fasciitis developing in the orthopaedic ward...she was just totally ignored all weekend…she'd gone into cold shock by the time she came to ICU and she ended up having a hind quarter amputation and the necrotising fasciitis continued… she ended up cardiac arresting and she'd sat in that ward all weekend and all these nurses they had no idea what they were looking at…stuff like that, that's disgusting, so...in your teaching you really don't want that to be any student you've taught…all those stories and all that linking of stuff from practice you really push with pathophysiology*. [P5: p8]

The association between having, and being able to use bioscience knowledge to influence practice, and the confidence that this instils is universal within participants' experience. Yet how, and with whom one uses that knowledge in communication highlights (iii) *contrasting needs to communicate* that are integral to

nursing practice and personal ideals. Communicating knowledgeably with patients and with medical colleagues requires nurses to understand biosciences, yet contrasts are experienced in terms of how knowledge needs to be verbalised for the benefit of patient care:

> *I think that they* [nurses] *need to have a really clear understanding in terms of the.. medical side of whatever they're doing…so if they're talking to medical staff, they need to be able to use this jargon. And when they're talking to a patient, they need to be able to use just simple language that explains the jargon.* [P8: p12]

Personal ideals of nursing influence one's rationale for learning and communicating bioscience knowledge to promote both patient care and the values of the profession within the healthcare team. In the following examples (iii) *contrasting needs to communicate* are experienced as the need to gain respect amongst medical staff by communicating in a certain way. However, ultimately the need to communicate is driven by the participants' sense of responsibility for patient care:

> *As a senior nurse I was responsible for promoting knowledge on the unit, and that included questioning…asking for clarification around...medical practice...for me to be respected by the medical team I need to be able to speak the jargon with them... that's one of my drivers… how am I to question medical practice if I don't understand the underlying physiology… if we're going to question a treatment plan we need to be able to understand how that treatment's working… having that understanding means I can question practice and I do …because it's for the best for the patient.* [P10: p12]

The more knowledgeable I became, the more I could stand up to the medical team. And that was important to me, because…it offended me to be marginalised when I was the person that was with the patient all the time. [P7: p6]

The contrasting ways in which knowledge is used in practice mirror (iv) *contrasting ways of learning* as clinical practice exposure illustrates the various ways that bioscience knowledge can be used to benefit patient care. Contrast is experienced when participants compare clinically focused learning to their memories of formal learning that seemed to lack clinical application or relevance. This perception of contrast emphasises the ways of learning that appeared most relevant. Experiencing contrast enables individuals to evaluate learning experiences and their contribution to personal ideals of nursing. Subsequently, valuable learning styles are replicated in one's ideals of teaching and the personal perception of how nurses can learn to use biosciences in their practice. The examples below illustrate how participant ten experienced and evaluated *contrasting ways of learning* between formal and clinically-based experiences:

When I did my training…even though we did all this physiology...we didn't focus enough on linking… we didn't apply it ... it was that they teach you this pure system and then they tell you about there's asthma, but they didn't link it well. [P10: p8]

This experience is contrasted with learning in the clinical environment that emphasised the notion of needing to know as a nurse and a need to develop personal ways of learning in order to meet the expectations of senior nurses:

Report was a constant questioning… she [charge nurse] *always had really good questions but fair questions… I remember giving this drug and I actually didn't know much about it and she questioned me...I said, "We were really busy." And she went, "Well that's not a good enough excuse" So then I produced a little book* [on the drug] *I didn't know much about...she did kind of push me but... I didn't find it threatening.* [P10: p10]

Experiencing (v) *contrasting needs for self-learning* surrounds the ways in which individuals develop effective learning strategies through needing to know, and wanting to know. As previously discussed, learning need and desire are driven by personal and situational expectations. The need to know arising from the clinical context contrasts with the personal want to know that is driven by personal expectations and perceptions of ideal nursing knowledge. The following excerpt illustrates how clinical situations may drive the need to know, but also how personal ideals of nursing further motivate self-learning due to personal expectations of knowledge:

If... something was going on and you couldn't understand why the patient was going downhill, or what changes were happening, or you saw a blood result that didn't make a huge amount of sense…you could get the residents to start talking…they had a whole lot of new knowledge that they were quite willing to share, but it still had to be put into a nursing context...I had to do that…I had to sort of think, "Okay so that would explain why he's looking the colour he is and why he's sweating profusely", ... so you ...integrate it more that way…it was an advanced knowledge…they still wouldn't get it from a nursing perspective 'cause

they were doctors, but... you could...start putting two and two together.

[P6: pp10 & 11]

Experiencing contrast in the various contexts outlined in this section illustrates how contrast makes individuals evaluate their experiences. Experiencing contrast causes one to consider how certain experiences contribute to personal values and ways of being a nurse, ways of learning to be a better nurse and ultimately, ways of teaching nurses to achieve ideal or excellent practice. Experiencing contrast is therefore an essential essence of experiencing learning and teaching biosciences for nursing practice.

Experiencing responsibility.

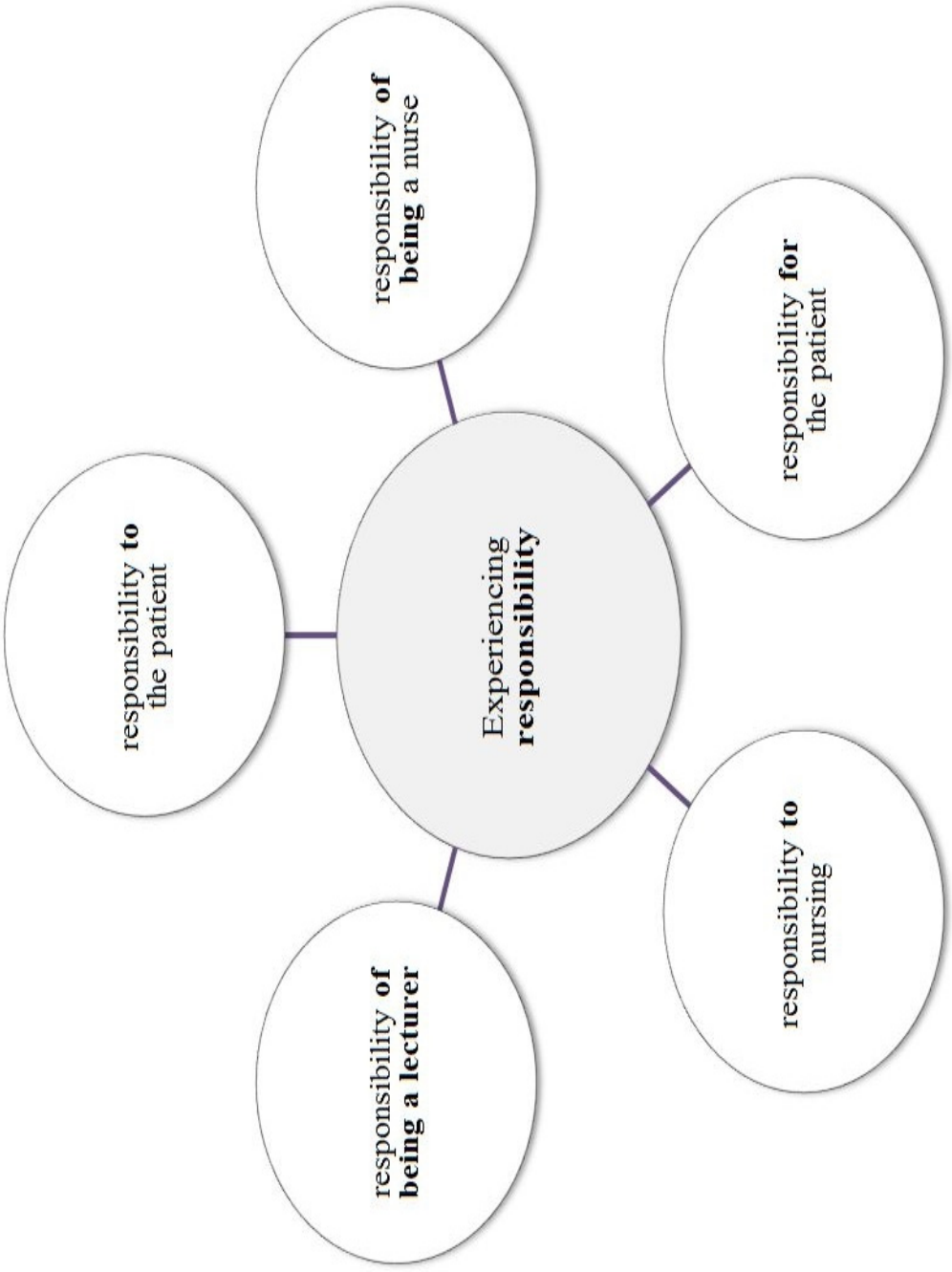
Various realms of responsibility are identifiable within participants' experiences of learning, practicing and teaching nursing that influence how each individual perceives and actualises their responsibilities as a nurse and nursing lecturer. Experiencing responsibility is reflected in five sub-themes (illustrated in Figure 5.4): experiencing a sense of (i) *responsibility **to** the patient* occurs when the individual feels that they need to know what to do in order to help the patient, striving to fulfil both the patient's expectations of the nurse and personal expectations of the nurse's role in patient care by learning and becoming prepared; experiencing the (ii) *responsibility of being a nurse* surrounds public and personal expectations of nurses and how one should fulfil this role. Expectations are influenced by personal ideals of nursing and perceptions of nurses' professional accountability; experiencing (iii) *responsibility **for** the patient* is influenced by the participant's perception of the nurse's role within the patient, doctor, nurse relationship and a sense of advocacy that reflects the individual's perception of nursing responsibility towards patients in their care; experiencing a sense of personal

(iv) *responsibility **to** nursing* and how nursing is perceived by others influences how participants see that their knowledge and practice might endorse and contribute to the generic perception of nursing as a profession.

Experiencing responsibility to, and for patients, to oneself, and the nursing profession each influence how participant's perceive and experience the (v) *responsibility of being a lecturer.* Here the sense of responsibility is transferred from personal nursing practice to the practice of those whom one influences as a teacher, role model or mentor. Personal responsibility for patient care and nursing practice is experienced vicariously through the practice of others, and also directly through the responsibility one has as an influential lecturer and nursing role model.

Participants universally experience responsibility within several concurrent, overlapping, yet distinct contexts. The difference between experiencing (i) *responsibility **to** the patient* and (iii) *responsibility **for** the patient* is subtle, and whilst each are integral to the role of the nurse, the scope of personal responsibility in each context is dependent upon the individual's perception of what being a nurse means. *Responsibility **to** the patient* surrounds each individual's experiences and perceptions of what patients might, or should expect in terms of nursing care. Participants experience a sense of duty and responsibility to do their best for patients and the concurrent (ii) *responsibility of being a nurse* as they strive to fulfil personal and public expectations of nurses and nursing.

Figure 5.4 Experiencing Responsibility - Core Structural Theme and Related Sub-themes



Although experiencing (i) *responsibility **to** the patient* is universal, what this responsibility means is unique to the individual as participants' have their own perception of what patients expect from nurses within the healthcare relationship, and what being a nurse within this relationship means. These perceptions evolve over time and with practice exposure as personal ideals of nursing develop and the (ii) *responsibility of being a nurse* becomes clearer:

> *It wasn't until I got a little bit older and...more mature that I realised, actually the science is really important and this is the process of what I need to know to be able to understand these concepts...people who come into hospital who have really good knowledge already… I need to know what they're talking about, so if I know it's correct or not…that's why our knowledge, understanding of the sciences is really important so we can actually explain it clearly.* [P8: pp4 & 14]

Sometimes the sense of responsibility to the patient and that of being a nurse is emphasised by the acuity or complexity of distinct clinical situations. These situations prompt one to consider the scope of their role, according to personal ideals and expectations. Experiences of not knowing what to do, or quite how to fulfil one's expectations of ideal nursing practice contribute to subsequent ideals of nursing and the perceived *responsibility of being a nurse*:

> *I think it's seeing patients that you don't know how to help, something happens and you don't understand it and it's sort of almost like a driving force to say, "Okay I don't understand, I've got to understand it 'cause if it happens again I don't want it to happen again. I want to know what to do if I'm faced with this again." So that probably, for me, is the biggest*

thing… there's always going to be a limit because of our scope of practice... But even if you know that something should be being done and it's outside your scope then you can push to make sure someone else gets on and does it. But if you don't know, then patients are going to die and go downhill and all sorts of things are going to happen because your knowledge isn't up to scratch. [P6: p13]

Participant six's sense of *responsibility to the patient* and *of being a nurse* is clear in this example, yet their sense of experiencing (iii) *responsibility* ***for*** *the patient* is also apparent. Responsibility is experienced with regards to what might happen to the patient if they, as a nurse, are not prepared or are unable to use scientific knowledge to recognise when medical care is required. The same participant reflects upon how this sense of *responsibility for the patient* changes according to clinical context, expectations of bioscience knowledge, and the progression of healthcare roles:

Hospital training...was still very much that the nurse is the handmaid of the doctor and we know what we know and it's nursing...it's not medicine. But... when I was overseas…there was no doctor and I was in a smallish village but with a lot of people around the area. So if I didn't know stuff … people just won't see it 'cause the doctor only came in once a month. So that's where it really...stood out that I had to know what I needed to know if people were going to actually survive. [P6: p12]

The following example illustrates how experiencing the (ii) *responsibility of being a nurse* within the health care team changes as clinical roles and collegial relationships alter:

The consultant physician who I had a very, very solid working relationship with, great mutual respect…an amazing person to work with...he would say, "Okay we've finished with them medically, [name], *how about you from a nursing perspective?" I just assumed that was how all doctors worked, I was absolutely shocked to find later on that it actually isn't... there were times when I'd make a comment and they would look at me, "Who do you think you are?" I'd be completely shocked*. [P1:p2]

Experiencing such a change in how the responsibility of the nurse is perceived contributes to the sense of (iv) *responsibility to nursing* as a profession. Here responsibility is shaped by personal expectations with regards to the role of the nurse, expectations of knowledge, and also situational contexts. In the first example, the contribution of nursing to the healthcare relationship was valued, whereas latterly, this contribution was questioned. This participant developed an enhanced sense of *responsibility to nursing* as a consequence of their status, and that of nurses in general, being challenged by medical colleagues. Fulfilling one's responsibilities to patients, for patients and the ultimate responsibility of being a nurse intrinsically shapes personal values and beliefs about what nurses need to know and do to fulfill their professional role.

The following participant's rationale for needing to know biosciences relates to the ways in which they experience the (ii) *responsibility of being a nurse* within the healthcare team, (i) *responsibility to the patient* and (iv) *responsibility to nursing* as a profession:

You have got more confidence in what you're doing…I think you just get a lot further… you can first of all look further and come up with some

good suggestions as to phoning up the doctor,…build a sensible picture which can help other people do their job as well and therefore that will help the patient. [P3: p8]

Experiencing responsibility in each of the contexts discussed thus far influences how participants experience the (v) *responsibility of being a lecturer*. Responsibility for patient care and nursing practice are experienced via the responsibility one feels as an influential lecturer and nursing role model. A sense of responsibility is experienced towards the profession (*responsibility to nursing*) through nursing lecturers' potential to influence the practice of existing and future nurses through their teaching, role modelling and mentorship. Personal ideals of nursing shape ideals of teaching and how the *responsibility of being a lecturer* is experienced:

I have always tried to have really high standards of patient care for myself…I say to the students here, it's not good enough just to do it because that's what you're meant to be doing, you need to know why you're meant to be doing it...I say to them, "I don't want 50% nurses, I want nurses who know about 80-90% but know where to find the other 10%"…students always say, "You have very high expectations…and you push us but we know it's worth it." [P9: pp6 & 12]

For participant six, *the responsibility of being a lecturer* reflects each sub-theme of experiencing responsibility and the integral relationship between bioscience knowledge and nursing practice within their personal ideals of nursing*:*

If I don't have the knowledge from the bioscience to help them integrate it and to know what they should know, I just feel that it's an awful waste.

Because if I'm teaching a nutrition lab and it's about how to feed a client, that's all very well, but if I don't understand the nutritional needs of different age groups and can... say to them, "Well it's really important for this reason," then all you're doing is teaching a skill and it's very task oriented...it wouldn't work if I wasn't doing the integration myself before I actually expect it from the students. [P6: p3]

The sense of respect that is shown towards students here is reflective of this participant's (iv) *responsibility to nursing* as well as the (v) *responsibility of being a lecturer*. Participant perceptions of how they believe nurses, and their students, should and shouldn't *be* underpin a sense of responsibility to role model what one believes to be good practice. The following example illustrates how experiencing contrasting ideals of nursing as a nursing lecturer emphasises the responsibility experienced in the role:

A lot of nurses in practice don't role model well...I've heard some horrendous comments…from nurses…the unbelievable lack of understanding. And I'm thinking, "I'm responsible for this, what have I done?" All these years I've tried so hard, "What are we doing, where are we going wrong?" It's horrible and then again you forget, you don't notice those wonderful highly intelligent nurses out there doing a fabulous job, you remember those awful... [P1: p19]

Experiencing responsibility in this way motivated this participant to strive harder to role model good practice for future nurses through their teaching. At a later stage in the discussion the participant revealed how their ideals of nursing underpin the belief that a commitment and (iv) *responsibility to nursing* within personal

teaching practice can positively influence nursing practice by role modelling the integration of caring and science:

> *I actually think being warm and caring to your students role models the way you want them to be with the patients, and I think that's really important... trying to get people to integrate the biosciences and nursing and help people understand what's happening for patients*. [P1:p24]

Participants experience a change in their sense of responsibility as they move from being a nurse to being a nursing lecturer. Whilst each essential structure of experiencing responsibility continues to exist, the ways in which one can fulfil these responsibilities shift from feeling responsible for one's own care to feeling responsible for the care of those whom one teaches, mentors or influences. Feeling responsible to, and for, the patient continues to motivate individuals to do their best, to learn whatever they need to learn and do whatever they need to do to facilitate ideal practice (in nursing and teaching). Personal goals for ideal nursing become the goals for the practice of those whom one teaches and mentors as participants draw on clinical and learning experiences that have influenced and confirmed their personal values and beliefs about bioscience in nursing.

Experiencing reflection.

Learning and practice experiences contribute to the ideals of nursing from which participants' ideals of teaching evolve as they become nursing lecturers. Reflection on personal experiences of learning and practicing as a nurse enables experiences to be evaluated according to their alignment with these ideals. The contribution that distinct experiences made to the individual's development as a nurse become conscious through reflection to influence and guide teaching practice.

Experiencing reflection is essential to the development of personal ideals for teaching as learning and clinical practice experience each influence values and beliefs about learning and teaching bioscience in nursing.

Reflection is experienced within the context of eight sub-themes that reflect its complex nature and influence: reflection (i) *on personal ideals of nursing* shapes and guides ideals for teaching as personal teaching goals ultimately reflect a desire to encourage and enable students to be what one perceives to be good nurses; reflection (ii) *on what nurses need to know* is influenced by experiences that highlight the presence and absence of what participants have come to believe is essential science knowledge for nursing. These notions then form the basis for teaching practice; reflection (iii) *on personal ways of learning* throughout one's own development enables participants to become aware of successful learning strategies and how these relate to confidence in practice and the capacity to learn as a lecturer. Here reflection reveals and reinforces the conviction that students and nurses need to develop successful ways of learning the science required for good nursing practice.

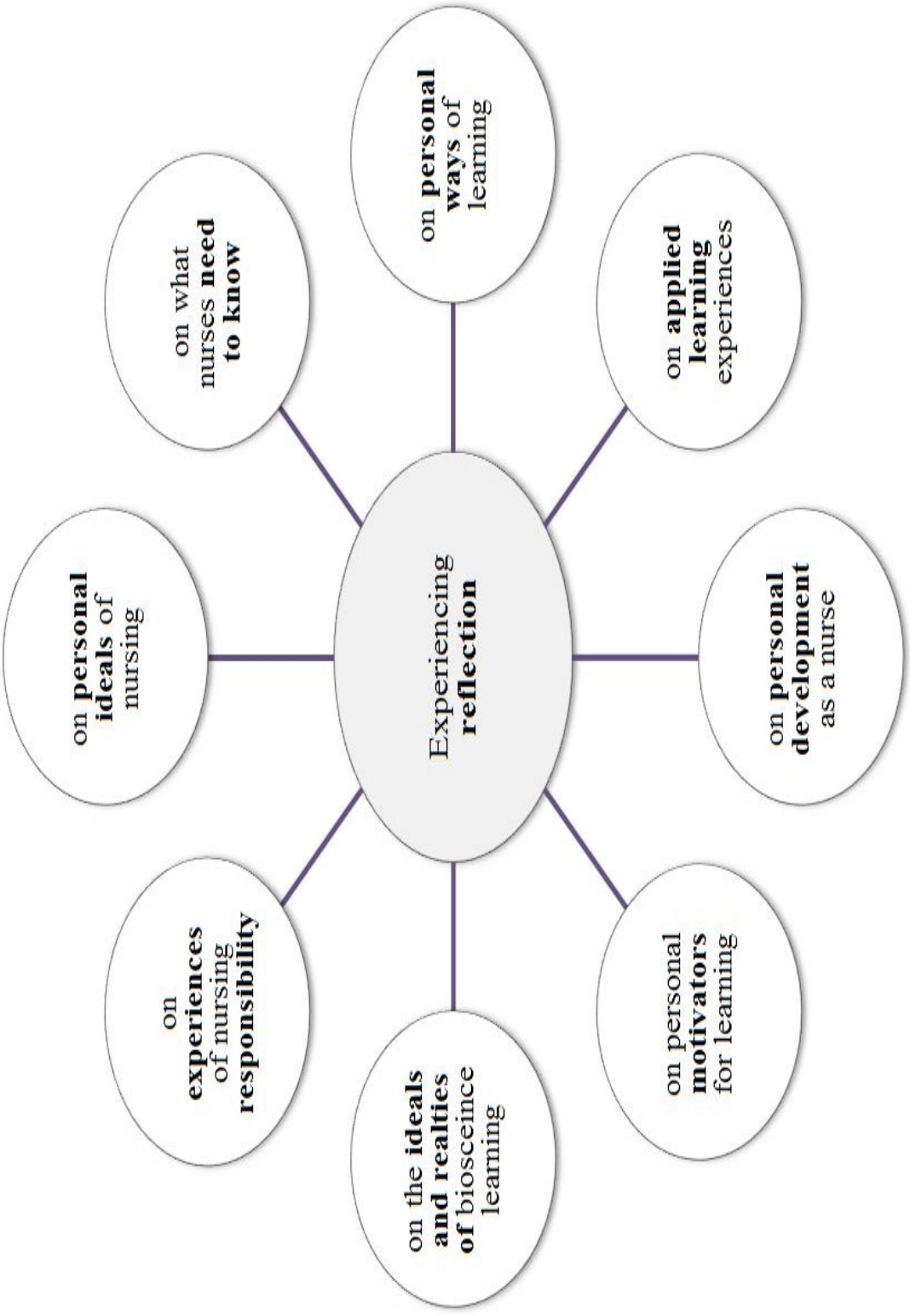
Reflection (iv) *on applied learning experiences* reveals how individuals learned to apply bioscience knowledge in their practice; (v) *reflection on personal development as a nurse* reveals how distinct experiences with learning, practice and mentorship have contributed to personal development and may, consequently contribute to student learning and development; (vi) *reflection on personal motivators for learning* bioscience enables participants to identify how distinct experiences, role models and relationships motivate learning. The role of the lecturer is shaped by this reflection, highlighting how lecturers can contribute to the learning and practice of others; experiencing reflection (vii) *on the ideals and realities of bioscience learning* highlights the contrast between personal ways of learning

applied science and the ways in which students are currently taught. Here reflection identifies and emphasises the role that nursing lecturers need to play within the teaching, learning, practice relationship to encourage the appreciation and application of bioscience knowledge in nursing practice; reflection (viii) *on personal experiences of nursing responsibility* enables participants to visualise how they can portray good and bad examples of nursing practice to students in order to highlight the responsibility that nurses have to make a difference to patient care. Utilisation of personal experiences is seen to make learning real, enabling students to recognise their responsibilities as a nurse and the importance of making links between science and nursing practice for the benefit of the patient.

Experiencing (i) *reflection on personal ideals of nursing* in relation to nursing knowledge helps to clarify, and provide rationales for personal beliefs about what (ii) *nurses need to know* to be good nurses:

> *You have to include that bioscience stuff... people will ask some quite good questions around that so you do need to know…you do have to understand … you also need to be able to have a conversation with the GP, or whoever you're working alongside about why or why not…you can deliver better care for the person that you're working with really… if you could have the conversation… about what you'd observed or noticed… it'd be a better outcome.* [P2: p8]

Figure 5.5 Experiencing Reflection - Core Structural Theme and Related Sub-themes



For some participants reflection (i) *on personal ideals of nursing* emphasises the absolutely fundamental principles that are believed to underpin nursing practice:

> *How can you help people to maintain wellness if you don't know what causes wellness, and how can you help people to get better if you don't know what made them sick in the first place and what's contributing to their ongoing sickness?…It's just too intimately integrated, it's about science and art, you cannot be a nurse without one or the other.* [P6: p20]

The identification of such fundamental beliefs about (ii) *what nurses need to know* reifies the motivation underpinning teaching practice and the confidence to teach what one believes to be important for nursing practice. Experiencing reflection in this context strengthens the connection between beliefs and personal experiences with bioscience in clinical practice. Participant stories reveal that personal values are upheld by becoming aware, and then considering how teaching and learning can best facilitate fundamentally good practice.

Experiencing reflection (iii) *on personal ways of learning* to consider what worked to assist bioscience learning and (v) *personal development as a nurse* reinforces both the responsibility that nurses have to learn, and the requirement to undertake self-directed learning in order to achieve learning goals. Reflection on learning experiences highlights effective personal learning strategies that subsequently enable one to feel more confident when preparing for teaching, particularly in less familiar areas such as the details of intricate bioscience knowledge:

If I'm going to learn something new… even if I'm being taught by someone else I like to read things... the… way I learn best is actually to read the words myself… reading seems to be the way to immerse yourself…and get a feel for it and then pick out the bits that you think are important, depending on the objectives that you want to achieve from the teaching session. [P4: p12]

Experiencing reflection (iv) *on applied learning experiences* enables participants to explore how different learning strategies assist nurses to utilise bioscience knowledge in their practice and, consequently realise its significance for patient care:

"That was how I learnt. I remembered sitting my exams thinking about the patients I'd looked after and what they looked like and that's what I try and bring to my teaching...remember you had this patient in clinical." [P9: p14]

When reflecting upon the ways in which nursing lecturers helped and motivated students to learn science in clinical practice ((iv) *applied learning experiences*), participant three recalls:

We had lectures and then… we had to go and work in the wards…So I did link what we learnt then into practice…It's not just that we learn something that we weren't going to use... maybe it is because we were constantly doing the two together, as opposed to being a year at varsity not seeing a patient, we saw them on day one…never ever can I say that when I've asked questions I've not been told…again by example… we learnt a lot of things in the wards…by seeing things. [P3: p9]

Experiencing reflection on personal experiences as a student highlights significant moments or approaches to teaching and personal development that shape personal ideals of teaching and illustrate not only *that*, but *how* lecturers can make a difference to bioscience learning and nursing practice:

"One of the people who taught us… hadn't been qualified for an extended period of time, only for a few years. But... she was very good at... relating practice, the actual bringing examples and putting it into context." [P10: p5]

When discussing their own priorities for teaching, this positive *experience of applied learning* (iv) and *personal development as a nurse* (v) is reflected in the participant's approach to bioscience integration when teaching nurses:

"You want to do all the application stuff, that's the focus, is application of knowledge and developing that kind of knowledge." [P10: p2]

Reflection on what one perceives to be good and bad examples of teaching practice influences how one wants to practice as a nursing lecturer. Being able to visualise biosciences as they relate to patient care is universally experienced as a fundamental contributor to (v) *personal development as a nurse* and a (vi) *motivator* for learning throughout participants' reflections. Consequently, making science real for students by using clinical examples is a universal ideal for teaching practice. This becomes even more important when reflection (vii) on the *ideals versus realities* of bioscience learning highlights the difficulties that pre-registration students encounter when learning science as a separate subject to nursing, and also their limited concurrent clinical exposure. Reflection on past experiences with learning and teaching biosciences in nursing reveals that nursing lecturers have the potential to

influence the development of students' ideals of nursing, motivate learning and improve nursing practice.

Achieving this ideal for teaching is perceived to require nursing lecturers to apply bioscience concepts to nursing situations, emphasise the students' own responsibility for learning and role model what one perceives to be ideal nursing. Reflection in this context encompasses reflection on personal ideals, how nurses are perceived to learn best, and how one believes nursing lecturers can facilitate learning and practice development.

The complex interaction of personal values, experience and beliefs emphasises the responsibility that lecturers experience with regards to the future practice of their students. Reflection (viii) *on experiences of nursing responsibility* within one's practice provides examples of the ways in which real stories can be used in teaching to emphasise the students' responsibility to understand the science that explains what is happening for their patients. Ideals of teaching are integrated with examples of poor practice in order to emphasise nurses' responsibility to know:

> *Tertiary education is not about teaching you, giving you information, it's about teaching you how to figure out what questions to ask and how to find answers… so every patient, "What do I have to know, what do I need to know?"...I had a precious nurse telling me something ridiculous*…[when telephoning to enquire about a relative, the participant was told] *"Oh well I don't know much about her, this is the first day I've looked after her." I felt like saying, "Just get away from her, get away from her if you don't know anything about her."...How could you be so stupid to tell a relative that?...I don't want my students to be that kind of a nurse...I tell them the bad stories…* [P1: p27]

Both positive and negative experiences in clinical practice highlight the difference that nurses can make by understanding why things are happening, what they are doing, and how their actions contribute to patient health and recovery. These experiences help to shape personal ideals for nursing and identify what needs to be done in terms of learning and practice development to achieve ideal practice and realise one's responsibility as a nurse. Yet to use personal experiences to inform and guide teaching practice requires reflection and evaluation to identify influential experiences, and qualify how distinct experiences influenced bioscience learning and practice development. Experiencing reflection clarifies what is important to know, why it is important and how certain experiences might illustrate nursing responsibility to future nurses when used in teaching practice. Becoming conscious of personal ideals for learning, nursing and teaching through reflection clarifies the beliefs and priorities that guide personal teaching practice and contribute to one's sense of fulfilling the responsibility of being a nursing lecturer.

Textural-Structural Synthesis

Textural-structural synthesis reveals the essential relationships between experience and experiencing, and the influence of learning and teaching experiences on participants' preparedness with bioscience integration as a nursing lecturer. Relationships within the essence of learning and teaching biosciences in nursing are described below. Key relationships are explored with respect to their influence on participants' preparedness with bioscience integration in their teaching practice.

Experiences of learning and teaching biosciences in nursing surround the individual's *ideals of nursing*. Fundamental notions of what makes a good nurse suffuse experiences in nursing and nursing education and the ways in which experiences are evaluated. Participants begin nursing with certain beliefs, values and

expectations of nursing that form a platform for future experience and the meaning that comes from experiencing. Learning and clinical practice experiences are evaluated from this beginning perspective to consider if, how, and why distinct experiences challenge, refute, affirm or alter one's fundamental ideals for nursing knowledge and practice. Beginning ideals evolve as experience offers learning and practice examples that illustrate contrasting philosophies and responsibilities of practice. Personal ideals of nursing are therefore dynamic in nature as every experience has the potential to change one's perspective on what ideal nursing is and how it might be achieved.

However, for an experience to influence and potentially change one's perspective on what constitutes good nursing it must be evaluated to consider its meaning for the individual and their nursing practice. For the participants in this study, influential experience is characterised by experiencing contrast, responsibility and reflection. Each participant experienced multiple examples of basic, average, poor and excellent practice in nursing and education that contributed to the development of their own nursing practice through reflection (conscious and sub-conscious) and shaping of personal ideals of nursing. Fundamentally, nursing practice is about achieving what one believes to be ideal nursing and patient care. Understanding what and how personal experiences shape this belief is crucial to understanding the ways in which nurses learn to develop their practice. This understanding informs and shapes subsequent ideals of teaching.

Clinical experiences guide one's development as a nurse through exposure to the depth and breadth of the nurse's role in patient care and the healthcare team. Despite subtle individual variation in the qualities of ideal nursing, participants' overarching belief is that nursing is about doing one's best for the patient. Exposure

to different clinical situations and environments illustrates the scope of nursing knowledge and practice expected by patients, doctors and other nurses. Experiencing contrast and responsibility in clinical practice highlights what one needs to know as a nurse as practice experience reveals the idiosyncrasies, expectations and specific requirements for knowledge pertaining to the patient and/or environment (including biosciences). Situational expectations to know are experienced as a need to know that highlights the responsibilities of being a nurse, whereas wanting to know is driven by personal expectations that are derived from perceptions of ideal nursing. Seeing and caring for patients in varied contexts informs and shapes personal ideals of nursing and one's expectations for nursing knowledge. Learning to skilfully blend nursing knowledge of bioscience with the art of caring is a universal essence of ideal nursing amongst the participants in this study.

Personal expectations of what it means to be a good nurse generate the feeling of responsibility that one associates with being a nurse. Feeling responsible to the patient pushes one to reflect on what a nurse should be able to do in each situation to help the patient, thus qualifying the role of the nurse according to personal ideals and distinct clinical situations. The needs of the patient are perceived to be largely dependent upon the nurse and their ability to advocate for the patient within decisions about care. This sense of responsibility engenders a need to ask questions and make sense of things in order to fulfil personal expectations and do one's best for the patient. Participants know that learning enables one to achieve personal ideals and the expectations of the clinical environment. For many, knowing that nursing is about learning was inherent to their beginning ideals of nursing, yet practice experiences that highlight the scope of nursing responsibility and requirements for scientific knowledge continue to expand and refine the perceived relationship

between learning and the achievement of ideal nursing. Whether experiences of learning biosciences occur in the context of being a student nurse, a registered nurse, or a nursing lecturer, learning is consistently seen to enable the individual to fulfil personal and situational expectations of ideal nursing practice and patient care.

Learning how to learn independently is a huge part of learning to be a nurse, extending the scope or depth of one's practice, and learning to be a lecturer. Personal expectations about learning in nursing permeate participants' *ideals of teaching* through their approaches to teaching and the expectations that they have of students. These expectations always surround learning for the benefit of patient care and the promotion of nursing responsibility, consistently reflecting the values within personal ideals of nursing. Experiencing reflection is essential to the development of teaching ideals as one considers the clinical practice experiences that help to shape ideals of nursing, emphasise the responsibility and requirements of being a nurse and the contribution that formal and independent learning make to the achievement of ideal nursing practice. Reflection on useful learning and practice development experiences highlight successful personal learning strategies and the experiences that really made a difference to how one wanted to practice as a nurse. Ideals of teaching evolve from these fundamental ideals of beginning teaching practice, which are informed and shaped by prior experiences in nursing. Personal experiences as a teacher then shape and guide perspectives of ideal teaching practice. Reflection on experiences with bioscience integration in personal teaching practice and the relationships between teaching, student learning and students' practice reveals a deeper understanding of learning and teaching in nursing that, then contributes to developing ideals of teaching.

Reflection in, and on, teaching experiences and their relationship to ideal nursing serves to affirm, challenge and refute beginning ideals and the relationships between teaching and students' perceptions of ideal nursing and the responsibility for self-learning in practice development. Ideals may consequently evolve as each experience has the potential to alter perspectives of ideal teaching practice. Being a lecturer is about making a difference to patient care by making a difference to student learning, enabling students to see what is important about bioscience in nursing and understand how learning and knowledge application can make a difference to both patient care and personal growth. Yet, whilst this fundamental ideal is central to participants' ideals of teaching, the realities of teaching challenge personal perspectives on what and how bioscience integration may best be facilitated. Reflection on the contrasts between ideal and real teaching experiences serve to strengthen convictions about what constitutes fundamental knowledge for nursing practice. When ideal teaching practice is hard to achieve, reflection on what mattered most in personal learning highlights the priorities for teaching practice.

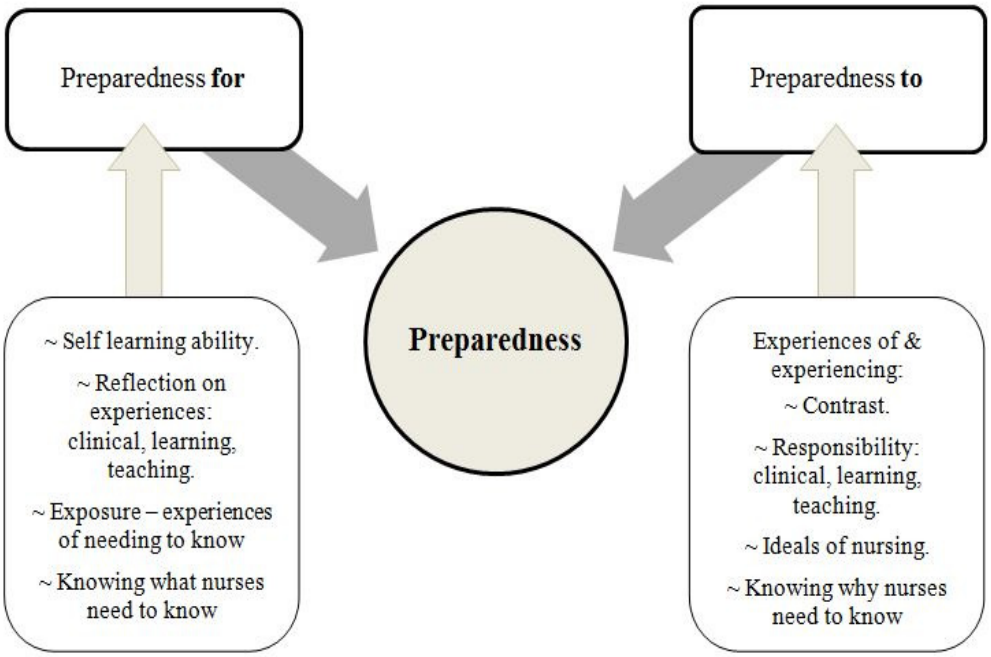
The influence that learning and teaching experiences have upon preparedness with bioscience integration as a nursing lecturer is integrally related to personal perceptions of what it means to be a good nurse. Ideals of teaching are informed by ideals of nursing and the experiences that characterise one's development as a nurse. The role that bioscience learning and knowledge application plays within personal ideals of nursing thus comes to characterise ideals of teaching. For the participants in this study ideal nursing practice encompasses knowledge and understanding of the biosciences that underpin patient care. Participants expect nurses to use bioscience knowledge to better understand patient presentation, treatment plans, and the requirements for nursing and collaborative interventions. Whilst each participant

experienced many examples of nursing practice that demonstrated poor understanding and/or limited desire to understand the science underpinning patient care, their ideals of nursing prohibited their acceptance that this was good nursing. The situation of bioscience knowledge within personal ideals of nursing is influenced by *experiencing* learning and teaching biosciences in nursing as experiences trigger reflection on the value of bioscience knowledge in nursing. However, as the following discussion reveals, preparedness with bioscience integration in personal teaching practice is not merely influenced by willingness to embrace bioscience in nursing practice.

Preparedness with Bioscience Integration in Teaching Practice

In the context of this study, the phenomenon of preparedness *with* bioscience integration in personal teaching practice has two distinct essences. The learning and teaching experiences discussed in the preceding sections universally contribute to, influence and shape personal preparedness for this group of nursing lecturers, yet experiences and experiencing contribute to a sense of preparedness in two distinct ways (Illustrated in Figure 5.6). Some experiences encourage and inspire these individuals to be *prepared **to*** integrate biosciences in their teaching practice, whilst others encourage and assist them to be *prepared **for*** bioscience integration when teaching nurses and nursing students. Exploration of the relationships between essential structures of experience and experiencing shows that there is a difference between *knowing that* biosciences should be integrated into one's teaching within nursing courses and *knowing how* and / or feeling adequately prepared with personal knowledge and teaching ability to practice bioscience integration.

Figure 5.6 Preparedness with Bioscience Integration in Teaching Practice



Preparedness to integrate biosciences in teaching practice.

Preparedness *to* integrate bioscience surrounds a personal willingness to value and include bioscience concepts when teaching nursing. Willingness is essentially characterised, and determined, by the situation of bioscience knowledge within personal values of nursing. When experiences demonstrate that bioscience knowledge application can directly influence, explain and improve patient care, bioscience knowledge becomes firmly situated within personal ideals of nursing. Yet personal beliefs about what it means to be a nurse fundamentally shape one's perspective on the value of biosciences in nursing and, consequently how distinct experiences relating to bioscience application are evaluated. The role of bioscience knowledge in personal values of nursing is therefore influenced by the relationship between fundamental ideals of nursing and the experiences in clinical practice that confirm or refute one's perception of bioscience in nursing.

Experiencing episodes of learning and patient care in which knowledge of bioscience is directly related to patient care encourages individuals to believe that bioscience integration is important for their own teaching practice. Seeing these experiences as examples of good practice, whether it is good nursing practice or good teaching practice, positively influences nursing lecturers to be prepared *to* integrate bioscience knowledge in their teaching. If being a good nurse means that nurses understand and use biosciences in their practice then lecturers strive to facilitate good nursing by using biosciences in their teaching, role modelling and mentorship with students.

Being prepared *to* integrate biosciences when teaching nursing is also underpinned by the sense of responsibility that nursing lecturers experience as a lecturer, or have experienced as a nurse in clinical practice. Experiences of having to know, needing to know and wanting to know how, and why biosciences relate to patient care in clinical practice each emphasise that being a nurse is about understanding what you are doing. If personal ideals of nursing encompass the perspective that nurses have a responsibility to understand and apply biosciences in their practice, the responsibility felt as a nursing lecturer manifests as a need to facilitate this learning for nursing students by integrating bioscience knowledge in personal teaching practice.

Reflection on personal experiences with learning and clinical practice emphasise that understanding bioscience in nursing is important, and that learning that is directly related to patient care is easier and more relevant for nursing. Experiencing responsibility to help students learn how to use knowledge in this way motivates nursing lecturers to be prepared to integrate biosciences in their teaching, endeavouring to make biosciences real, about patients and about the nurse's

responsibility to know. Believing that this type of learning needs to happen comes from clinical practice experiences that emphasise how important nurses' knowledge of art and science is for patient care. A sense of knowing why nurses need to know bioscience arises from clinical experience, but also as a consequence of how experiences align with personal ideals of nursing. A fundamental belief that bioscience knowledge is relevant and beneficial for nursing therefore underpins nursing lecturers' preparedness *to* integrate bioscience knowledge in their teaching.

Preparedness for bioscience integration in teaching practice.

Whilst being prepared *to* integrate bioscience in personal teaching practice reflects how nursing lecturers value biosciences in nursing, being prepared *for* this particular aspect of teaching practice is influenced by perceptions of personal knowledge, ability and confidence with bioscience integration when teaching nurses. Preparedness *for* bioscience integration is influenced by experiences of knowing what nurses need to know, understanding what you are doing and developing ways of learning that each come from being a nurse and experiencing nursing. Exposure to different ways of learning and using biosciences in clinical practice, being exposed to, and aware of clinical situations in which bioscience knowledge enhanced patient care, learning to learn on the job, and ultimately learning how to teach applied biosciences within nursing courses each contribute to personal preparedness *for* bioscience integration.

The ability to use experience to enhance teaching preparedness arises from experiencing reflection on the value and contribution that personal experience can make to one's teaching. Reflection in this context is able to provide specific examples of clinical practice that illustrate and emphasise the links between bioscience and nursing practice. The presence of real, clinical examples positively

influences preparedness *for* bioscience integration as one can speak candidly about practice. Personal involvement enables lecturers to confidently emphasise the responsibility that nurses have to understand what is happening for their patients and discuss the bioscience knowledge that relates specifically to each case. When lecturers have clear examples of bioscience integration in practice their confidence in personal ability and willingness to share these examples when teaching are both increased. What is important for nurses to know is clear as a consequence of personal experience, and relevant bioscience knowledge is perceived to be easier to recall and integrate in teaching because it has been experienced in practice.

The sense of knowing what nurses need to know enhances lecturers' confidence and perceived ability to integrate relevant biosciences in their teaching, thus enabling preparedness. Whilst knowing what nurses need to know comes from clinical experience, and clinical experience enhances personal confidence with bioscience integration, experience and knowledge are context specific. Absent, limited or dated clinical experience in a specific context that one is required to teach impairs lecturers' confidence and perceived ability to integrate relevant bioscience knowledge. Here personal knowledge is questioned, and while preparedness *to* integrate biosciences may be present, one's sense of feeling prepared *for* teaching is lessened. Personal confidence to know what nurses need to know declines, yet a sense of responsibility for student learning and nursing practice persists. Knowing that nurses need to know, and preparedness *to* integrate biosciences motivates lecturers to draw on self-learning strategies as a means to *become prepared for* the demands of teaching.

The ability to learn independently when situations dictate that greater knowledge is required, or existing theoretical knowledge needs to be applied to a

nursing context, are each critical to preparedness *for* bioscience integration in teaching practice. Bioscience theory is perceived to be complex and detailed when considered without context, requiring nurses, nursing lecturers and students to be able to take concepts from bioscience knowledge and apply their understanding to clinical situations. The ability of nursing lecturers to apply bioscience knowledge to nursing is perceived to help it make sense for students, thereby facilitating student learning and, ultimately nursing practice. Yet confidence in *pure science* knowledge is questioned, particularly with regards to detail and higher thinking. In order to become prepared and confident to integrate the bioscience that nurses need to know lecturers require self-learning strategies to enable preparedness.

When a teaching situation or context arises that causes lecturers to question their existing knowledge, the resultant lack of confidence and underlying sense of responsibility towards students motivates lecturers to go back, re-learn and become prepared. The ability to learn independently is therefore intimately linked to the perception of preparedness *for* bioscience integration in teaching as, given time to prepare, lecturers are confident that they can learn to understand. Whilst they question the depth of personal bioscience knowledge in comparison to that of science teachers, fundamentally their experiences in nursing reassure them that they know, and can teach what nurses need to know in the context of applied nursing courses.

Each of the essential characteristics of preparedness *for* bioscience integration in personal teaching practice arise from, or can be traced back to personal ideals of nursing and the value that is placed on biosciences in nursing. If one is prepared *to* integrate bioscience when teaching nursing, and feels able to utilise personal experience and learning to prepare *for* teaching, preparedness *for* bioscience knowledge integration in personal teaching practice is enhanced.

The essence of preparedness *with* bioscience integration in personal teaching practice reflects the qualities of knowing that bioscience knowledge is important for nursing and knowing how students can learn to develop this aspect of their nursing practice. As a consequence of personal values and beliefs about nursing, nursing lecturers experience a responsibility to facilitate useful, relevant learning that will enable students to understand, appreciate and utilise bioscience knowledge to enhance the care of their patients.

Conclusion

The findings presented in this chapter describe the participants' experience of learning and teaching biosciences in nursing. The textural themes and sub-themes first presented reveal the essence of the experience. The core structural themes that followed illustrate the essential characteristics of the experience as it came to be. For the participants in this study experiencing learning and teaching biosciences in nursing is characterised by the qualities of experiencing contrast, experiencing responsibility and experiencing reflection.

Intuitive integration within phenomenological analysis enabled the meaning and qualities within learning and teaching biosciences in nursing to be revealed. Key relationships between personal ideals of nursing, and the meaning that is derived from experiencing contrast, responsibility and reflection when learning and teaching nursing, are shown to influence the value that lecturers place upon biosciences in nursing practice and education. This value intimately influences the situation of bioscience knowledge and its application within subsequent perceptions of good teaching practice as a nursing lecturer. Preparedness *with* bioscience integration in personal teaching practice is shown to have two distinct qualities as experience contributes to preparedness *to* and preparedness *for* bioscience integration in

different ways. Preparedness is ultimately influenced by the relationships between personal ideals of nursing, ways of learning, ideals of teaching and the perceived responsibility of the nursing lecturer to facilitate bioscience integration in nursing courses.

CHAPTER SIX

Discussion

> "Experience strengthens, extends and refines our structures of meaning by reinforcing our expectations about how things are supposed to be." (Mezirow, 1990, p. 4)

Introduction

This chapter discusses the key findings with respect to the research question: How do teaching and learning experiences influence nursing lecturers' preparedness to integrate bioscience knowledge into their teaching practice? The phenomenon of preparedness is discussed in the context of key relationships within the data and the contribution that this knowledge makes to nursing education. The findings consistently show that each essential essence of preparedness is, in some way, related to personal ideals of nursing and the situation of bioscience knowledge within personal perspectives of learning, practicing and teaching nursing. Textural themes within the universal experience of teaching and learning biosciences contribute to the phenomenon of preparedness as what is experienced influences personal perspectives of nursing. Distinct experiences, such as working with inspirational people, have the potential to influence the value one places upon biosciences in nursing, and value is shown to positively influence preparedness to integrate. However, this study has shown that structural themes, and the essence of how experiences came to be, are more influential than experience alone.

Teaching and learning experiences influence preparedness as a consequence of complex relationships between experiencing, reflection, learning to understand practice, and personal values of nursing. The impact that distinct experiences have

upon personal attitudes towards bioscience is highly individual, occurring as a consequence of the interaction between 'an' experience and the emotional and intellectual response of the individual (experiencing). To be influential, experience must come *through* the individual. Experiences, in this instance, are essentially filtered by personal ideals of nursing as these ideals influence the way experiences are evaluated. Evaluation outcomes then determine any subsequent change or transformation in perspective. This concept is important for nursing education as mere exposure to examples of bioscience integration in nursing may not effect perspective transformation concerning the value of bioscience knowledge for practice.

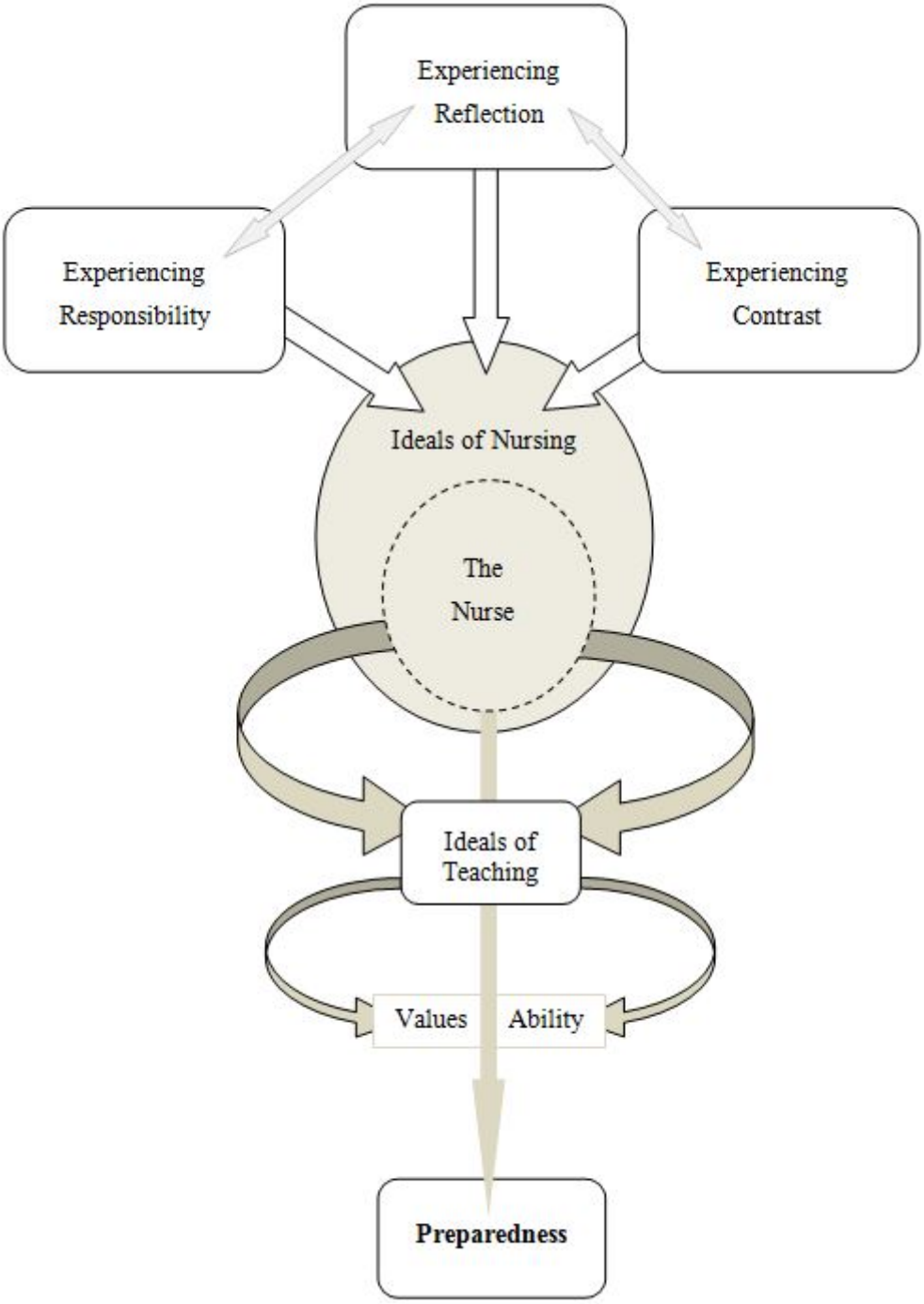
This study revealed a complexity within several interconnected relationships of experience and preparedness that are discussed in the following sections of this chapter. The critical interaction of experience, personal ideals of nursing and reflection is illustrated in Figure 6.1 and discussed as a major influence upon preparedness as the chapter begins. The role of reflection is then discussed to illustrate the significance of reflective learning experiences on preparedness with bioscience integration amongst the study participants. Concepts of preparedness are then outlined as a key finding. Links are made to the difference between knowing *that* and knowing *how,* and the importance of this concept for bioscience preparedness in nursing education. Preparedness *to* integrate is discussed as a fundamental prerequisite to preparedness *for* integration, and the implications of a lack of preparedness *to* integrate, amongst nursing lecturers, are considered. The relationship between personal perceptions of valuable knowledge, self-learning capacity and preparedness is also discussed to illustrate personal factors that are shown to enhance, and hinder preparedness *for* bioscience integration.

The chapter includes reference to theories and research that illustrate links between the study findings and theories of reflective, experiential and transformative learning. Relevant theoretical connections are discussed in the context of the study and the original works in order that newly integrated literature is explained. The chapter concludes with a synopsis of the study findings and their significance for nursing education as a prelude to the conclusions and recommendations presented in the final chapter.

The Centrality of Personal Ideals of Nursing

The findings reveal the essential nature of the relationship between personal ideals of nursing and preparedness *to* integrate biosciences in nursing and teaching practice. Whilst exposure to learning and clinical practice offers experiences that may influence ideals of nursing and the way in which one practices, the fundamental perspective from which one views nursing and what being a nurse is about acts as a critical filter with regards to the impact that distinct experiences have on the individual. For example, two nurses with different values and beliefs about the role of bioscience knowledge in nursing could experience a virtually identical clinical practice situation that is likely to influence their practice in different ways. The participants in this study were all motivated to emulate practice that was perceived to benefit patient care as a result of overt application of bioscience knowledge, yet they also each saw and worked alongside nurses who believed that knowledge and practice of this nature was the domain of doctors, more senior nurses or other health professionals. The fundamental difference between the two arises from personal ideals of nursing and the situation of bioscience knowledge within personal conceptions of nursing.

Figure 6.1 The Critical Nature of Ideals



What is experienced (textural essences) affects the individual and their preparedness as a consequence of the interaction between the experience and the affective processes the experience generates within the individual. The structural essences of experiencing contrast, responsibility and reflection are triggered by

experiences that cause participants to think about their beliefs about ideal nursing and nursing knowledge. This interaction makes the individual judge 'an' experience and consider whether their values and beliefs about nursing need to change (transformation in perspective). This process is critical to the ways in which participants come to value biosciences in nursing and is highly influential upon their preparedness *to* integrate biosciences in their teaching. Beliefs about the value of biosciences in nursing then underpin ideals of teaching. This influences preparedness *to* integrate, and encourages participants to develop their ability to understand and integrate biosciences when teaching nurses (preparedness *for* integration).

Several authors have written about the influence and significance of what they term *preconceptions* (Andersson, 1993; Gallagher, 2007), *personal knowledge* (Carper, 1978; Perry, 2000; Peters, 2000; Spouse, 2000), *practical knowledge* (Benner, 1984), or *professional values* (Leners, Roehrs, & Piccone, 2006) that nursing students bring to any new learning experience. Whilst Benner's (1984) and Carper's (1978) work refer to practical and personal knowledge in the context of multiple knowledge types used in nursing practice, the remaining authors discuss the beliefs, values and attitudes that students associate with nurses and nursing as they enter the profession, and their impact on learning and practice development.

Described as *beginning ideals of nursing* in this study, the values and perceptions of nursing that individuals hold upon commencement of nursing education are shown to represent a foundational viewpoint from which the worth of practical and formal learning experiences are evaluated (Andersson, 1993; Gallagher, 2007; Leners, et al., 2006; Spouse, 2000), and further learning is motivated (Barnett, 2007; Leners, et al., 2006). The findings from Andersson's study are particularly relevant to this study as she also found that preconceptions act as a

'filter' for new information and experience. Knowledge, values and behaviours that did not align with the students' "ideal image of nursing, are rejected or induce perspective transformation" (Andersson, 1993, p. 814). Ideals of nursing thus exert a critical influence upon the impact of distinct learning experiences, and the perceived value of biosciences in nursing practice and education. If personal ideals of nursing do not encompass a desire to understand and apply bioscience knowledge in clinical practice it is less likely that experiences of learning and using biosciences in nursing will positively influence the value placed on bioscience knowledge in nursing for that individual. Indeed each of the following authors found that beginning preconceptions and personal knowledge are not only influential, but extremely resilient throughout the course of students' education and professional development (Korthagen & Kessels, 1999; Leners, et al., 2006; Perry, 2000; Spouse, 2000).

Experiencing.

Personal values undoubtedly influence one's orientation towards experiences relating to nursing, yet this study demonstrates that personal ideals of nursing are somewhat dynamic in nature and, although individuals begin nursing with a particular view of what it means to be a nurse, experiencing *contrast* in clinical practice philosophy through exposure to different ways of nursing, and *responsibility* within one's role as a nurse each have the potential to alter beginning ideals. The thoughts and feelings that arise from *experiencing* are shown to exert greater influence on the evolution of personal ideals than experience alone. Exposure to various teaching, learning and practice examples may influence ideals, but any change occurs after evaluation of the experience. Evaluation is guided by existing values and beliefs about nursing and, in the context of bioscience preparedness, perspectives on the role and utility of biosciences in nursing.

Participant stories reveal that meaning must be generated from experience in order for the experience to be influential. This involves thoughtful deliberation during, and following distinct experiences that is characteristic of reflective learning. Experiencing contrast and responsibility in nursing are therefore influential as a consequence of participants' reflection.

Relationships between experiencing and reflection.

For experience to be influential in shaping personal ideals, *reflection* is required to evaluate the relationship between experience and ideals and realise personal meaning. In this study, reflection was easily triggered by conspicuous examples of what participants saw to be excellent, inspirational practice and also by poor practice that was seen to lack the qualities of nursing practice they had come to uphold. Such explicit examples were instantly seen to align or contrast with personal ideals, influencing their values and beliefs about nursing and the role of biosciences. Whilst deeper reflection, during participant interviews, revealed the influence that more subtle experiences of contrast can have upon personal ideals and beliefs about biosciences in nursing, clear examples of contrast have memorable impact on ideals and subsequent preparedness in teaching practice.

Several authors discuss the influence that *experiences of shock* (Schutz, 1973; van Manen, 1977), *surprise* (Schön, 1988), *perturbation* (Dewey, 2001), *disorienting dilemmas* (Mezirow, 1981), *paradigm cases* (Benner & Wrubel, 1982), or *problematic clinical situations* (Kim, 1999) have upon reflective learning and perspective transformation. Such explicit examples of contrast or responsibility are, according to Benner and Wrubel, situations "in which the clinical lesson stands out in bold relief" (1982, p. 15). They continue "paradigm cases make an impact and remain with nurses throughout their clinical careers" (p. 15). Experiencing contrast

or responsibility in clinical practice, learning and teaching influenced the ways in which participants view the contribution of biosciences to learning, nursing, and subsequent teaching practice. Experiencing the benefit that bioscience application has for patient care and, conversely, what is perceived to be sub-optimal care as a result of bioscience knowledge deficits each positively influence the situation of biosciences in personal ideals of nursing and teaching. This subsequently enhances preparedness *to* integrate biosciences in personal teaching practice. There remains, however, a critical relationship between experience and experiencing reflection that is necessary to generate meaning that may then influence personal ideals.

The Role of Reflection

Reflection offers the opportunity to consider existing values, beliefs and knowledge from a different angle (Stroobants, 2009), and has the potential to enhance epistemological insight into professional practice (Boud, Keough, & Walker, 1985; Rolfe, 1998; Schön, 1988). This study found that experiencing reflection is critical to the interpretation of experience and the ultimate influence of learning and teaching experiences upon personal values and preparedness with bioscience integration in teaching practice. Boud et al. comment that, although reflection itself is an experience, "It has the objective of making us ready for new experience" (1985, p. 34). The act of experiencing reflection in, and on, experiences in nursing influences one's anticipation and evaluation of future experiences and their contribution to beliefs and values about nursing. Participants' ideals and perspectives of biosciences in nursing evolved as a result of reflective experiences that emphasised or confirmed the value of bioscience knowledge for nursing. This process is consistent with Kim's analysis of nurses' intentions for practice, revealing that "although nurses' deliberations may not necessarily be systematic or rational,

deliberations produce intentions, either obvious or latent, for actions in practice" (Kim, 1999, p. 1209). Reflection on experiences that highlight the utility and /or need for bioscience knowledge in nursing motivates participants to learn and apply bioscience concepts in their practice. The subsequent sense of understanding positively influences their preparedness with bioscience integration in teaching.

Participants' stories reveal that their deliberations over experiences throughout the years have contributed to specific ideals of nursing, teaching, and beliefs about bioscience in nursing. The interconnected relationships within experience and experiencing noted in this study are consistent with theories of experiential, transformative, and reflective learning espoused by Dewey (1963), Mezirow (1981; 1990), Schön (1988, 1991), Kolb (1984), Boud et al. (1985), and Rolfe (1998; Rolfe, Freshwater, & Jasper, 2001). The complex relationships noted are reflective of Dewey's precept that "every experience both takes up something from those that have gone before and modifies in some way the qualities of those which come after" (Dewey, 1963, p. 35). Teaching and learning experiences shape ideals through reflective deliberation and the identification of personal meaning. Any change in perspective then influences the ways in which future experiences are evaluated.

Although notions of reflective practice have been incorporated in nursing education since the 1990s (Rolfe, 2002), the relationship between experiencing practice and reflective *learning* in biosciences has not been discussed. Indeed, the majority of literature pertaining to bioscience learning in nursing arguably focuses on *teaching* and rationalist learning outcomes rather than the process of learning or practice development (see for example Courtenay, 1991; Ives, et al., 1996; Meehan-Andrews, 2009; Whyte, et al., 2011). This study has shown that reflective thinking positively influences lecturer preparedness with bioscience integration as

participants' learned to make sense of bioscience in nursing through teaching and learning experiences that made them stop and think about the relationships between knowing and patient care. Experiential learning in this context requires critical reflection to make sense of, and learn from experience. In order to illustrate the contribution that the study findings make to theories of learning as the chapter progresses, an outline of experiential learning theory and reflective thinking is offered below.

Learning from experience.

Concepts of experiential learning underpin many of the theoretical foundations of adult education. Epistemologically, experience is seen to enable learning and the generation of new knowledge through cognitive and affective learning processes arising as a consequence of individuals' interaction with their environment (Segers & Van der Haar, 2011).Yet this concept is also critiqued on the basis of the idealistic notion of adults' innate developmental learning capacity (Miettinen, 2000). The experiential learning theory presented by Kolb (1984) is regarded as a pivotal contribution to the field (Miettinen, 2000; Segers & Van der Haar, 2011). However, Kolb's integration of various constructs of experiential learning theory, therapeutic and humanistic psychology, emancipatory education and neurophysiology is critiqued with regards to its inadequate representation of the epistemological theories (Garner, 2000; Miettinen, 2000).

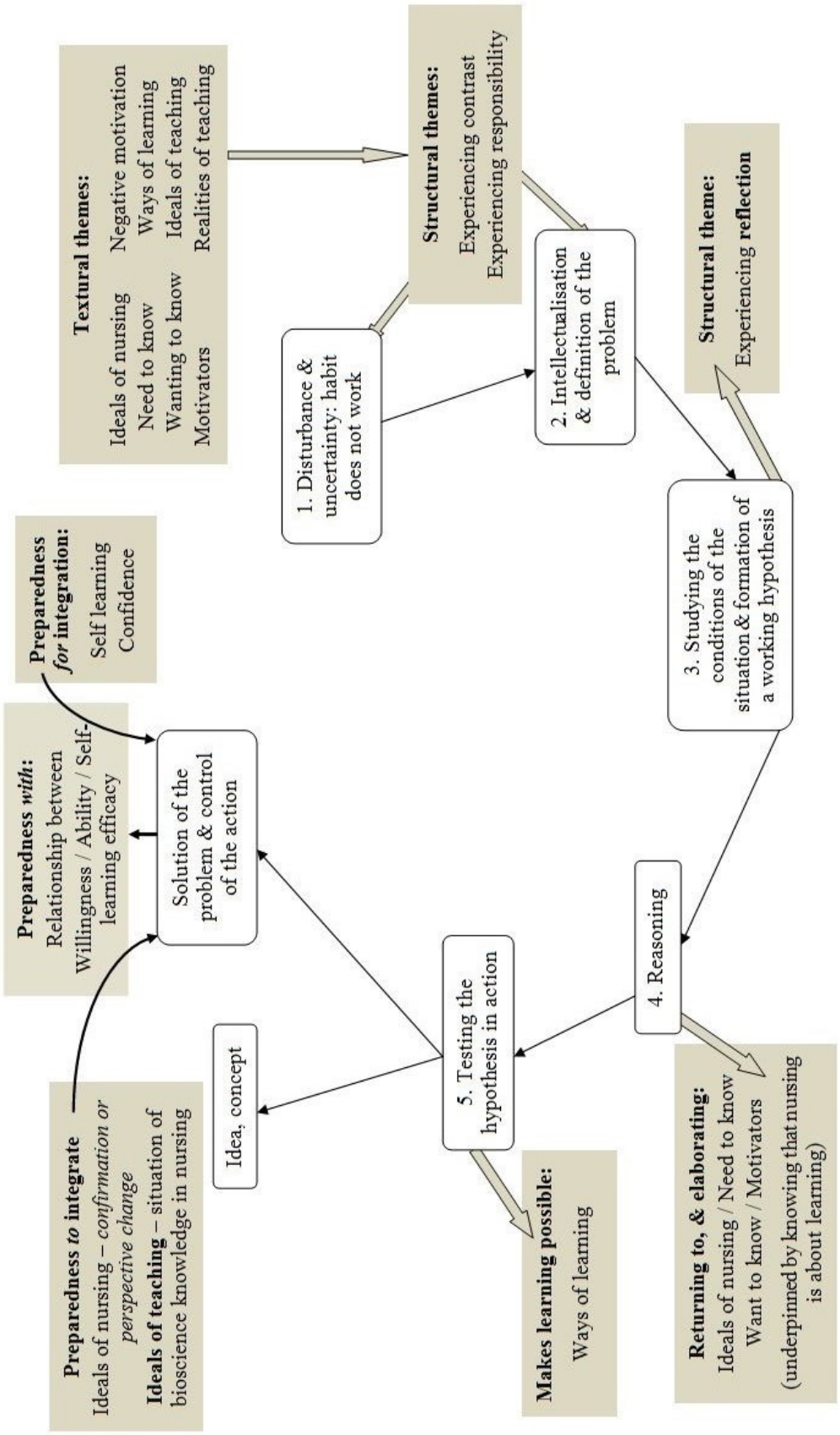
The centrality of reflection in experiential learning is also poorly reflected in Kolb's theory (Boud, et al., 1985; Segers & Van der Haar, 2011). Reflective thinking is a crucial component of Dewey's original theory of learning from experience (Dewey, 1910, 1997) and is instrumental in experiential learning for the participants in this study. However, the philosophical roots of reflective thought are noted to be

missing from many contemporary interpretations of reflective and experiential learning (Boud, et al., 1985; Miettinen, 2000; Rodgers, 2002). Boud and colleagues have developed Dewey's concept of reflection as a key process within experiential learning in their theories of experiential and professional learning (Boud, et al., 1985; Boud & Walker, 1990). However, the foundational theory offered by Dewey provides the most salient background to explain the findings of this study (see Figure 6.2 below).

Dewey identified two forms of experience, noting that only reflective experience could lead to progressive thought and action. Non-reflective experience is described as habitual action, and is dominant in everyday experience. Experience becomes reflective when habitual actions contradict or inadequately explain the situation, creating an intellectual problem. Here the purpose of reflection is problem solving. Reflection is thus a complex, systematic intellectual and emotional process that requires time and discipline to generate meaning. The concept of *continuity* of learning is a key feature of Dewey's theory as individual and community understanding deepens with each reflective experience, informing and shaping future experience and intellectual growth (Dewey, 1997; Miettinen, 2000; Rodgers, 2002).

Dewey describes five phases of reflective thought and action that are humanistic and evolutionary in nature (illustrated in Figure 6.2 in relation to this study's findings). The reflective process has two potential outcomes: the problem is reconstructed in a way that resolves the situation; or, the systematic process of intellectualisation and reasoning generates new meaning that becomes a resource for future experience (Dewey, 1997; Miettinen, 2000). In relation to the study findings, participants' teaching and learning experiences shape their ideals and understanding of bioscience in nursing and their habitual actions.

Figure 6.2 Dewey's Reflective Thought & Action in the Study Contex



Central diagram adapted from Miettinen (2000 p.65), shaded text boxes represent the research findings

Dewey's first three phases are apparent when experiencing contrast and/or responsibility causes a disturbance or uncertainty that triggers reflection to intellectualise or define the problem (*needing to know* for example), or reason for emotional response (such as *contrasting philosophies of practice*). Here reflection encompasses studying the conditions of the situation and a making sense of one's response. The process of reasoning takes participants back to their ideals of nursing and the experiences that shape them. Reasoning, in this fourth phase, highlights that nursing is about learning, and that learning to apply bioscience in practice *may* enhance future practice (in nursing and teaching). Engaging in self-learning (as a means to test the hypothesis in action – phase five) confirms that enhanced understanding facilitates practice improvement, confirming or extending one's perceptions of nursing and the utility of bioscience knowledge in practice.

Preparedness *to* integrate is influenced by reflective experience in ways that parallel Dewey's model as reflective experience contributes to ideas and concepts of bioscience value in nursing. However, the potential for experience to positively influence preparedness *for* integration (influencing long-term ways to control action or solve the problem) is dependent on the ongoing relationship between the willingness to integrate, the individual's perceived ability and confidence to facilitate integration, and their capacity to self-learn (become prepared *for* integration).

The integral relationship between preparedness *to*, preparedness *for* and preparedness *with* bioscience integration reflects Dewey's notion of how the ideas and concepts that arise from reflective experience elicit an indirect intellectual outcome. He proposes that such outcomes are "incomparably more valuable for living a life than the primary and intended result of control" (Dewey, 1916, as cited

by Miettinen, 2000, p. 67). In this way what one values in practice comes to characterise ideals for nursing and teaching, indirectly offering a solution for the problem. If bioscience is seen to be valuable in ideals of nursing, it highlights the lecturers' responsibility to practice integrated teaching, providing the motivation to learn and become prepared.

Knowing through valuing.

Study participants' come to appreciate what they value through experiencing contrast, responsibility and reflection. What they come to value as knowledge influences what, and how, further knowledge is developed as conscious choices are made about how they wish to practice, where and with whom they want to work, and what is important to learn so that ideal practice may be attained. This process of knowing through valuing what is seen to be relevant knowledge, rather than mere knowledge attainment, is consistent with the work of Carper (1978), Chinn and Kramer (2011), and Mezirow (1981, 1991; 2000). Individual, professional and societal values are each acknowledged to influence the development of nursing knowledge as beliefs, attitudes and values about what is important motivate learning and practice development (Carper, 1978; Chinn & Kramer, 2011).

In the wider context of educational theory, Mezirow emphasises how adults' prior learning influences the ways in which future experience and learning opportunities are interpreted. He refers to *meaning perspectives* as the existing assumptions, beliefs, values or attitudes that frame how experience is evaluated and, subsequently, how and what we learn from experience (Mezirow, 1991). This is consistent with the ways in which participants' values influence the meaning generated from teaching, learning and practice experiences and the knowledge they

value. Mezirow's transformation theory of learning uses the individuals' "acquired frame of reference" as the lens through which experience is viewed, and the foundation for transformative experiential learning (1991, p. 4; Mezirow & Associates, 2000). Experiences that cause existing assumptions to be queried, confirmed, or negated (disorientating dilemmas), have the potential to transform existing assumptions, thus generating new meaning and perspective transformation. However, as Mezirow contends, and this study's findings attest, critical reflection is required to uncover existing assumptions, question their validity and potentially transform one's perspective. In this way the scope and components of valuable knowledge may evolve with ongoing experience.

Mezirow's theory is widely adopted in adult education in Australasia and the USA. Although many authors using Mezirow's theory offer limited critique, concern is expressed regarding its egocentric focus on individual transformation, rather than social action (Taylor, 1997, 2007). However, the findings from this study emphasise the individual nature of learning and professional development that occur in nursing. The theory also lacks acknowledgement of psychological, social, or cultural influence upon perspective transformation due to its focus on the individual (Boyd & Myers, 1988; Clark & Wilson, 1991; Collard & Law, 1989). Mezirow does refer to the influence of socialisation and culture upon the development of meaning perspectives, which inherently influence learning and future perspective transformation. However, the influence of socio-cultural and environmental context on perspective transformation is not discussed. This study shows that different clinical and formal learning environments are influential with regards to the facilitation of experiences that may challenge existing perspectives. This suggests that socio-cultural and environmental context do influence perspective

transformation. However, the meaning that is generated through exposure remains dependent on the individual and their values, supporting Mezirow's emphasis on the individual in transformative learning.

Renewed appreciation of the worth of values in nursing knowledge has spurred several contemporary authors to campaign for nurse educators to revisit the philosophical roots of experiential, transformative and reflective learning as a means to rediscover what is important for the development of nursing practice (see for example Edmond, 2001; Horsfall, et al., 2012; Kear, 2013; McDermott, 2012; Rolfe, 2002). The critical relationship between values, knowledge, learning motivation and practice development noted amongst the participants in this study adds support this campaign.

Values in teaching.

The study findings also demonstrate that the values one holds as a nurse form fundamental and enduring ideals of teaching. What participants believe about what nurses should know, and how they learn best, influences personal teaching practice and preparedness *to* integrate bioscience. Again, *experiencing* learning and teaching in relation to knowing bioscience is more influential than a particular experience, or textural essence. Experiences of useful or valuable learning influence preparedness as a consequence of the affective and cognitive processes that are generated by the experience (see Figure 6.1). Stand-out examples of effective bioscience learning influence the want and need to know that characterise personal ideals of nursing through reflection. Reflection on learning experiences, in the context of being a lecturer, highlights the knowledge and ways of learning that generated personal meaning. Knowledge and ways of learning that are seen to be valuable for personal

nursing development form integral goals for, and characterise approaches to, teaching. If applied knowledge of the biosciences is perceived as valuable, this valued knowing forms an integral component of the nursing knowledge required for practice and, consequently, a goal for student learning through personal teaching practice.

The approach outlined above is characteristic of learning through discovery (Bruner, 2006; Dewey, 1963; Neill, 1968; Rogers, 1969; Rolfe, 2002). With its foundations in Dewey's original works on reflective learning, discovery occurs as "we learn by doing and realizing what came of what we did" (1938, as cited in Rolfe, 2002, p. 22). Dewey's theories of *progressive*, learner-centred education were originally perceived as radical in relation to existing *traditional* content-centred education. His philosophy emphasised the importance of the learner's participation in the learning process. He proposed that learners determine the purpose of their learning by responding to experience that is perceived to be relevant, directing their learning activities to enhance understanding and personal meaning (1963, 2001). Dewey's philosophy was embraced and developed by educationalists such as Carl Rogers (1969) and AS Neill (1968) who each advocated that meaningful, significant learning occurs through experiences that enable individuals to learn for themselves. The importance of learners' understanding the relevance and purpose of what they are being asked to do is critical to discovery learning. The study participants' most influential learning experiences with bioscience were associated with a need to know. Learning that enabled better practice was perceived to be relevant; guiding future learning and subsequent teaching practice. Reflection on experience emphasises what is important to know and how applied learning in biosciences may be facilitated through teaching.

Experiencing teaching.

The notion of discovery and reflective learning that is apparent in participants' stories of learning through experiencing, as a nurse, is also apparent within their experiential and reflective accounts of experiencing teaching. Whilst tried and tested values of knowledge and knowing from one's experiences as a nurse form a base for direction and values in teaching practice, being a nursing lecturer offers new and alternative experiences that may challenge, affirm, extend and alter personal ideals of teaching. Experiencing reflection in this context is guided towards improving and supporting personal practice in teaching and the nursing practice of one's students. Experiencing responsibility and reflection on ideals of nursing and the role of the nursing lecturer encourages participants to draw on multiple ways of knowing to support their autonomy and confidence in teaching. Reflection is a way of making "sense of the reality of their professional lives…how they come to know…revise, renew and extend their personal practical knowledge" (Clarke, James, & Kelly, 1996, p. 175).

However, reflective and discovery learning in this context are influenced by personal perspectives on biosciences in nursing. Making sense of one's teaching role through reflection could just as easily devalue bioscience knowledge in nursing as confirm it. The influence of reflection within the development and refinement of teaching ideals is therefore dependent on the ideals of nursing from which experience is evaluated. Although participants in this study each value the role of biosciences in nursing and are prepared *to* integrate bioscience in their teaching, earlier research attests to the dominance of behavioural and social science perspectives within nursing faculty (Clancy, et al., 2000; Davies, et al., 2000; Manias & Bullock, 2002). The influence of dominant faculty and philosophies within

distinct nursing programmes must therefore be considered as a factor that can enhance or hinder preparedness with bioscience integration.

The use of reflection for professional practice development amongst nursing lecturers is also discussed by Horsfall et al. as they note "As teachers gain more experience…reflection becomes integral to teaching practice" (2012, p. 932). Participants use cognitive and affective outcomes of reflection in, and on, their teaching experiences to guide future teaching practice. Self-reflection is thus able to inform practitioners so that they may generate "models of 'good practice' and theories of application" from actual experience (Kim, 1999, p. 1206). Participants each value theoretical knowledge from the biological and social sciences as an important base for nursing practice, but the knowledge that comes from creative application, seeing and using various forms of knowledge in nursing offers greater contribution to reflective learning, practice, and personal ideals of teaching.

The valuing of personal, experiential knowledge is consistent with existing theories of education and experiential learning in professional disciplines in which practice is not rule based (Benner, et al., 2010; Eraut, 1994, 2004, 2007; Rolfe, 1998, 2002; Schön, 1991). Here the context of learning is crucial to professional knowledge and its application in practice as practitioners learn to select relevant, useful knowledge to apply in the context of each unique professional situation. Whilst theoretical knowledge is integrated, it is insufficient for the demands of professional practice in nursing. Professional practice encompasses knowledge derived from theory, experiencing particular situations over time, and personal knowledge of individual clinical situations (Rolfe, 1998; 2001).

Benner et al. (2010) discuss the concept of *salience* as nurses learn to use complex, open-ended, skilled knowledge to improve practice and clinical reasoning as they gain experience. Experiential knowledge thus encompasses the "what, how and when" knowledge of nursing (Benner, et al., p. 54). Study participants value bioscience knowledge that they have used in clinical practice. Yet reflection on teaching and student learning highlights that students may be taught theoretical bioscience by science experts, but they learn how to use relevant bioscience knowledge in nursing courses. Participants see their teaching as crucial in enabling students to use theoretical bioscience knowledge to explain and support their nursing practice. Reflection thus highlights the lecturers' responsibility to facilitate applied learning through their teaching. Experiencing responsibility in this way positively influences participants' preparedness *to* integrate biosciences when teaching nurses, and is further enhanced by the perception that the bioscience taught in discrete science courses means little to students unless it is applied to nursing.

Concepts of Preparedness

The term preparedness is used largely in the context of disaster and emergency response, particularly surrounding public health (see for example Fauci, 2006; Moulton, Gottfried, Goodman, Murphy, & Rawson, 2003). Understandably, the profile of preparedness in public health has risen considerably following the threats to public safety due to pandemic infection, natural disasters and bioterrorism. This situation has created unprecedented interest in preparedness with respect to future public health and safety. In this context, notions of preparedness surround planning, resource and being prepared *for* future events that could threaten public safety. Preparedness is discussed in relation to how government departments can, and should, enable communities to respond (Gibson, Theadore, & Jellison, 2012; Lurie,

Wasserman, & Nelson, 2006). Here, the notion of whether to respond or not seems ludicrous, if not negligent. Preparedness *to* respond is not questioned.

However, the findings from this study reveal that preparedness in the context of teaching practice amongst nursing lecturers encompasses a complex relationship between the lecturer's willingness on the one hand, and perceived ability on the other. Described as preparedness *to*, and preparedness *for* in the preceding chapter, this finding has significant implications for nursing education and practice as the sense of feeling prepared and able to integrate biosciences in one's teaching is imperative for actual practice to occur. Firm beliefs about bioscience in nursing are a prerequisite for preparedness *to* integrate; willingness is prerequisite to preparedness *for* integration, but ultimately lecturers must feel able to teach integrated bioscience for it to happen.

Knowing *that* and knowing *how*.

Discrepancy between preparedness as intent or willingness, and preparedness in terms of ability or capacity is apparent in this, and other studies involving health professionals. Weissman, Betancourt, Campbell et al.'s (2005) study explored preparedness in the context of cross-cultural care provision amongst resident physicians. The study revealed that, although the doctors understood that cultural competence is a valuable component of their medical practice, they felt largely unprepared to provide specific components of cross-cultural care. Weissman et al. identified a contrast between what they term "preparedness to provide" and "preparedness to perform" (2005, p. 1065) that reflects the findings of this study.

Nursing lecturers in this study value biosciences in the context of nursing practice and consistently attest to its relevance for student learning and development.

Their preparedness *to* integrate biosciences when teaching nurses is securely situated within personal ideals of nursing, yet they also question personal knowledge levels and their ability to integrate biosciences in their teaching practice. Their preparedness *for* bioscience integration is less robust, more vulnerable to experiential influence and therefore less secure. The disconnect noted between preparedness *to* and preparedness *for* amongst the participants in this, and Weissman et al.'s study highlights a fundamental difference between *knowing that* and *knowing how* that is reflective of the original works of Ryle (1949, 1976) and Polanyi (1967, as cited in Eraut, 1994; Polanyi, 1981). Acknowledging Aristotle's original distinction between *technical* and *practical knowledge*, Ryle used the terms *knowing that* and *knowing how* to differentiate the knowledge that, respectively, underpins action and the knowledge that is inherent and inseparable from action itself (Eraut, 1994; Ryle, 1949).

Although health professionals value particular aspects of their practice, the intent to practice in a particular way may not equal their ability and therefore actual practice. DesRoches et al. (2010) identified a similar difference between beliefs, preparedness, and actual practice amongst physicians in the context of reporting impaired and incompetent colleagues. Although the majority of physicians in this study reported their commitment to report instances of impaired or incompetent colleagues, "when faced with these situations, many do not report" (p. 187). The existence of influential relationships between awareness, ability, experience and actual performance amongst doctors is also noted by Warmough, Taylor, and Garden (2006) and Davison, Jhangri, Holley, and Moss (2006), and amongst student nurses by Happell (2008).

In this study, personal values and ideals of nursing are instrumental in shaping participants' perspectives of the *knowledge that* nurses need to know. Embracing biosciences in personal ideals of nursing leads to preparedness *to* integrate biosciences in teaching practice as the value of this way of knowing is seen to be integral to nursing practice. However, knowing *that* biosciences are important and that one should practice integrated teaching may not effect *know how* and preparedness *for* bioscience integration in actual teaching practice.

In the context of professional practice disciplines such as nursing, Eraut (1994) uses the terms *propositional knowledge* to describe the theoretical knowledge that enables professional action, and *action knowledge* to describe the practical know-how that comes from skilled integration of various forms of knowledge in personal practice. Eraut acknowledges that that publicly accessible, propositional knowledge is unable to explain important aspects of professional competence or expertise. Equally, action knowledge is acknowledged to encompass aspects of knowledge utilisation that are difficult to explain. Polanyi and Schön each refer to this type of knowledge as *tacit,* "that which we know but cannot tell" (Eraut, 1994, p. 15; Grene, 1981; Schön, 1991).

Whilst the plethora of ways of knowing in nursing and professional action aim to explain the complexities of knowledge utilisation in practice, the array of overlapping, yet subtly different terminology hinders epistemological clarity and comparable discussion. At a fundamental level, the differentiation apparent within the majority of nursing literature pertaining to bioscience education is underpinned by the view that propositional knowledge is *theory* and action knowledge is *practice*. Although this is a gross simplification of the aforementioned theories, the

differentiation is maintained in the following discussion to facilitate clarity and consistent use of terminology.

Participants' stories suggest that they experience greater preparedness with action knowledge derived from practice than with propositional knowledge. Theoretical bioscience knowledge is seen to be something that participants 'must have learned', whereas the knowledge developed through reflecting on, and making sense of clinical encounters is memorable, meaningful and easily utilised in teaching practice. This finding is reflective of discovery learning, and Eraut's theory that professionals only use a portion of the public, disciplinary knowledge available to them in their daily practice (1994, p. 17). Whilst more extensive propositional knowledge is available, it may only be called upon when specific clinical or teaching problems are beyond the scope of one's action knowledge. In the context of preparedness *for* bioscience integration, participants refer to re-learning or revisiting theoretical knowledge as a means to support limited or dated action knowledge.

The know *that* – know *how* distinction.

The study findings show that participants use propositional knowledge from a variety of theoretical disciplines, including the biological sciences, when they teach nurses. The know-*how* of nursing is clear through experiencing reflection on practice. Reflection on this action knowledge reveals the propositional knowledge *that* they believe underpins nursing. They also know *that* understanding the biological sciences can, and should be, an integral part of being a nurse, yet they question their abilities with respect to both propositional knowledge of detailed bioscience theory and the action knowledge to teach biosciences across a wide range of clinical contexts. The migration of pre-registration nursing programmes into

tertiary education appears to have fuelled the perspective that science experts are better qualified to teach biosciences at degree and diploma level. Yet participants also attest that the pure sciences mean little to students unless they are applied to nursing. This highlights a distinction between knowing *that* and knowing *how* that hinders perceived ability, confidence and, therefore, preparedness *for* bioscience integration in teaching practice.

The belief that students learn to apply bioscience knowledge best when it is applied to clinical practice and patient care by nursing lecturers is consistent with earlier research (Danielson & Berntsson, 2007; Green, et al., 2000; Logan & Angel, 2011; Wynne, et al., 1997), as is the lack of confidence in personal knowledge and ability to teach bioscience concepts amongst nursing faculty (Clancy, et al., 2000; Davis, 2010; Friedel & Treagust, 2005; Skingsley, et al., 2006). Existing literature also suggests that nursing faculty with higher qualifications in biological sciences are scarce (Friedel & Treagust, 2005; Jordan, et al., 1999; Manias & Bullock, 2002). The know *that*, know *how* distinction noted in this study is, however, context specific, with perceptions of preparedness *for* bioscience integration varying according to the action knowledge that participants have developed in particular clinical contexts.

Examples of bioscience application derived from personal nursing practice instill confidence as this action knowledge has been validated through experiencing. Eraut refers to action knowledge as "that which has been sufficiently integrated into or connected with personal practice to be either automatically or very readily called into use" (Eraut, 1994, p. 17). The presence of real, clinical examples positively influences preparedness *for* bioscience integration as lecturers use validated action knowledge of relevant biosciences in their teaching. Conversely, absent, limited or dated action knowledge pertaining to particular clinical contexts hinders

preparedness *for* integration through lack of confidence and a sense of responsibility to be able to facilitate up-to-date, practice-relevant learning. Participants want to do their best for their students which manifests in the need to know and be prepared to facilitate appropriate bioscience learning. However, the sense of responsibility to *teach them what they need to know* and not *put anyone wrong* [P4:p8] hinders confidence when clinically validated action knowledge is lacking.

Making Sense of Things

Preparedness *for* bioscience integration in teaching practice requires that the lecturer is first prepared *to* use bioscience concepts to facilitate applied science learning amongst their students. Perceptions of feeling prepared *for* integration in teaching practice are then influenced by the extent or scope of one's action knowledge and the ability to undertake independent, self-directed learning as a means to become prepared in areas where knowledge or experiential deficits are perceived. Experiencing reflection on one's own learning, and development, highlights that being a nurse is about making sense of things, understanding what is happening to patients, and finding rationales for practice interventions. In order to work towards the attainment of personal perceptions of ideal nursing, participants develop, and then rely on, self-learning strategies that help them make sense of nursing. This includes revisiting, relearning or exploring further links between theoretical bioscience concepts and their relationship to clinical encounters.

Embedding theoretical knowledge in practice in order to make sense of clinical situations is characteristic of what Benner and Wrubel call *clinical knowledge* (1982). This process of learning to know what, and how various forms of theoretical knowledge enable good nursing practice, this making sense of things contributes to

personal ideals of nursing and teaching, particularly in terms of conceptualising what nurses need to know. Benner and Wrubel state that clinical knowledge is manifest in nursing actions that make "a difference in patient care and patient outcomes" (1982, p. 11). They assert that clinical knowledge develops through experiencing the relationship between theoretical knowledge and its use in clinical practice. Actual practice situations that differ from one's expectations trigger a process of refinement or transformation of preconceived ideas or theory that also contribute to clinical knowledge. The process of coming to know that they describe reflects that of Dewey's reflective thought (1910, 1997) and Mezirow's perspective transformation (1991).

In this study, participants' preparedness *for* bioscience integration is questioned in relation to theoretical bioscience knowledge that they have not experienced or used in practice. The absence of self-perceived clinical knowledge creates uncertainty with regards to what nurses need to know as lecturers lack the action knowledge that affirms their understanding. However, they experience motivation to make sense of things and understand related bioscience concepts through their sense of responsibility for student learning and patient care. Tried and tested ways of learning as a nurse are revisited as a lecturer in order to explore bioscience theory, visualise links between theory and practice and enhance personal preparedness *for* teaching. The ability to learn independently is critical to preparedness *for* bioscience integration as, without the confidence that arises from personal learning success, uncertainty and self-doubting pervade perceptions of ability, regardless of the willingness or intent that is derived from personal ideals of nursing.

Successful experiences of being able to make sense of things encourage participants to apply self-learning strategies in situations of uncertainty. Confidence is derived from previous ability to 'reverse learn' or work backwards from the patient, or demands of clinical practice, to determine what nurses need to know. Various ways of knowing are utilised in order to identify and re-learn the propositional knowledge that underpins clinical practice. Knowledge *that* is then supported with perceptions of useful ways of learning in order that one can become prepared *for* relevant bioscience integration that can facilitate student learning. The ability to unite perceived knowledge and confidence deficit with self-learning strategies in order to become prepared is influenced by an underpinning need to know and understand that characterises participants' experiences as student and registered nurses. Experiencing the need, and want to know effects personal learning strategies that are revisited as a nursing lecturer. Preparedness *for* bioscience integration in teaching practice is therefore influenced by the relationship between experiences of independent learning in nursing, confidence in one's ability to make sense of bioscience in practice, and a fundamental desire to facilitate practice-focused learning for those whom one teaches. However, preparedness *for* integration is ultimately dependent on preparedness *to* integrate as, without the belief that nurses and lecturers need to understand biosciences in order to be a good nurse, notions of being prepared *for* bioscience integration are extraneous.

If Preparedness to Integrate is Missing?

The participants in this study all value the contribution that bioscience knowledge can make to nursing practice and believe that bioscience concepts should be integrated in their teaching. The self-selected sample is therefore biased towards nursing lecturers who are prepared *to* integrate biosciences in their teaching. The

findings may therefore not be representative of the wider population of nursing lecturers. Whilst the consequences of sample bias are discussed in chapter seven as a limitation of the study, the implications of participant's overwhelmingly positive perspectives of biosciences in nursing warrant discussion here. The study has shown that preparedness *to* integrate is a prerequisite for preparedness *for* integration in teaching practice. Valuing bioscience in nursing is a fundamental requirement for integration in actual teaching practice. Yet other studies report that biosciences are undervalued in nursing education programmes, and by nursing lecturers (Friedel & Treagust, 2005; Manias & Bullock, 2002; McVicar, et al., 2010; Sturgeon, 2008). This would suggest that preparedness amongst the wider population of nursing lecturers may be inconsistent with the participants in this study.

Friedel and Treagust's study found that two thirds of nurse educators in one tertiary institution in New Zealand had very positive attitudes towards biosciences in nursing practice (despite their attitudes being less positive than those of their students). However, the 29 nurse educator participants (61.7% of those in the school) reported low levels of personal confidence in "describing or explaining basic bioscience topics that relate to nursing" (2005, p. 208), and were less positive in their attitudes towards bioscience in nursing education. It is not possible, therefore, to assume that beliefs about bioscience value in nursing practice necessarily reflect preparedness *to* integrate biosciences in teaching practice.

Whilst the findings in this study suggest that the presence of bioscience knowledge in personal ideals of nursing is essential to preparedness, the participants also believed that they had a responsibility to integrate bioscience concepts in their own teaching. Their stories reveal experiences of learning and re-learning biosciences because they wanted, and needed to understand the science related to

nursing practice. Although Friedel and Treagust recommend that nursing and science teachers should share responsibility for mentoring students in bioscience application to practice, almost half the nursing lecturers studied "perceived that their science background was not good enough to understand all the bioscience needed for nursing" (p. 212). This could further suggest that the sense of responsibility to integrate felt amongst the participants in this study may not reflect the general population of nursing lecturers. Experiencing responsibility to integrate seems to be critical to progress lecturers from believing bioscience is important to feeling responsible to integrate it in their own teaching.

This raises the question of how preparedness with bioscience integration can be facilitated amongst nursing lecturers who place little value on biosciences in nursing, or those who acknowledge its value yet perhaps feel that the responsibility for bioscience integration sits with science lecturers, rather than nursing. For biosciences to be integrated in nursing courses lecturers need to value its contribution to nursing, perceive that they have a responsibility to facilitate applied science learning for students, and be able to utilise self-learning strategies to enable preparedness *for* teaching. These findings are important for nursing education as they signal a need to explore the pedagogies underpinning contemporary nursing education.

Implications for Nursing Education

As an applied discipline, nursing education and the work of nursing lecturers is likely to be continually plagued by competing conceptions of the theoretical and practical knowledge requirements for practice. This study has highlighted that underpinning perceptions and values of what it means to be a nurse pervade every

aspect of teaching and learning experience that come to influence personal nursing and teaching practice for the participants in this study. These ideals of nursing determine the situation of bioscience knowledge within perceptions of nursing practice and education that are absolutely fundamental to preparedness with bioscience integration in teaching. In terms of nursing education, the ideals of nursing held by individual and collective faculty have potential to influence the philosophies of nursing and education that guide curriculum decisions, teaching practice and the nursing practice of graduates. Indeed the findings from this study highlight that preparedness *to* and *for* bioscience integration in teaching practice are influenced almost entirely by the willingness and abilities of individual lecturers.

If lecturers do not value bioscience in personal ideals of nursing or teaching (not prepared *to* integrate) it is unlikely that students will be exposed to, and encouraged to use bioscience knowledge in learning or practice. Participants in this study were all prepared *to* integrate biosciences, but they felt less prepared *for* integration in certain areas of bioscience theory. This is consistent with existing reports of poor science knowledge articulation by lecturers and registered nurses in practice (Friedel & Treagust, 2005; Skingsley, et al., 2006; van Wissen & McBride-Henry, 2010). Without the motivation and ability to self-learn and become prepared, lecturers are unlikely to integrate bioscience knowledge that they feel uncomfortable with. This study shows that lecturer preparedness influences student exposure to bioscience integration, and suggests that limited exposure, particularly with regards to expectations to know, is likely to inhibit students' potential to reflect on the utility of bioscience knowledge in nursing. The full potential of bioscience knowledge for nursing practice, and nurses' responsibility to understand bioscience in practice may therefore remain largely unknown.

The study shows that bioscience learning is very much driven by personal values of nursing knowledge and the ability to make sense of practice through self-learning. This is where the relevance of understanding bioscience in nursing is realised. However, mere exposure to classroom and clinical examples of bioscience integration in nursing practice is insufficient to influence the ideals of nursing lecturers or their students' beliefs about bioscience and nursing practice. The ability to reflect on experience and the relationships between experiencing and notions of responsibility within personal ideals of nursing is critical to the generation of sufficient personal meaning to effect transformation or confirmation of perspectives of nursing knowledge.

Conclusion

The key discussion points presented in this chapter highlight the complex nature of the interconnected relationships that can evolve from teaching and learning experiences to influence the preparedness of nursing lecturers with bioscience integration in teaching. Experiencing learning and teaching incites unique responses and consequences within the individual that centre upon personal beliefs, values and ideals about nursing and being a nurse. The situation of bioscience knowledge within these values is critical to the phenomenon of preparedness with bioscience integration in teaching practice. Preparedness *to* integrate is largely influenced by perspectives on the value of bioscience knowledge for nursing practice, experiencing reflection on what nurses need to know and a determination to fulfill one's responsibilities as a nursing lecturer.

Preparedness *for* bioscience integration is fundamentally influenced by preparedness *to* integrate, as without the intent to integrate science in one's teaching, it is unlikely to occur. Prominent values with regards to bioscience in nursing encourage lecturers to integrate science in their teaching, yet confidence in knowledge and ability are shown to be context variable. Here clinical experience and action knowledge are shown to increase preparedness as a consequence of one's knowing what nurses need to know, whereas absent or dated action knowledge hamper confidence and perceived ability. The capacity to learn independently is able to contribute to preparedness by enabling lecturers to become prepared and enhance their confidence by learning to make sense of things. As with preparedness *to*, preparedness *for* teaching is critically linked to values of nursing, particularly with respect to perceptions of responsibility. The sense of responsibility experienced as a nursing lecturer manifests as a need to know, need to learn and need to role model science application in nursing courses for the benefit of future nursing and patient care. Experiencing responsibility through reflection thus fosters preparedness *if*, however, one's ideals of nursing encompass a responsibility to understand, utilise and teach applied bioscience knowledge.

The study findings offer the greatest potential for nursing education and lecturer preparedness by signalling a need to reconsider and further explore ways of learning and ways of knowing biosciences in nursing practice. The findings evidence the critical influence that reflection has upon personal beliefs about nursing and the role of learning in nursing. Experiential and reflective learning are shown to positively influence perceptions of bioscience in nursing and subsequent teaching preparedness amongst this group of nursing lecturers. Exploring bioscience learning and teaching from the perspective of reflective pedagogy offers significant potential

for future integration of bioscience concepts and nursing practice in nursing education. This claim forms the basis for the conclusions and recommendations presented in the following chapter.

CHAPTER SEVEN

Conclusions and Recommendations

> "Experience is not what happens to a man; it is what man does with what happens to him." (Huxley, 1959, p. 4)

Introduction

This final chapter presents the conclusions drawn from the study and discusses three key recommendations for educational practice in bioscience for nursing. Exploration of the teaching and learning experiences of nursing lecturers throughout their professional development has provided new insights into the ways in which nurses learn to understand and use biosciences in nursing and teaching practice. Prior to this study, the bioscience problem has mainly been investigated with respect to educational delivery, assessment, and knowledge attainment amongst nursing students. Learning experiences of nursing lecturers have received little attention. This study enables greater understanding of the bioscience problem by revealing the importance of reflective learning and meaning perspectives in bioscience learning, and teaching preparedness. The integral nature of personal values and ideals of nursing highlight a need to consider value development, reflective, and transformative learning in bioscience education and the preparation of nursing lecturers for integrated teaching.

The conclusions highlight that certain paradigmatic shifts in nursing epistemology could better facilitate bioscience preparedness amongst nursing lecturers. Such changes also have the potential to improve student learning in biosciences, and the application of bioscience knowledge in nursing practice. The key recommendations from the research signal a need for large-scale change in the

way nursing education views bioscience knowledge and pedagogy. However, any large-scale change is only achievable through small, incremental, ground-level changes that pave the way for bigger change (Eckel & Hignite, 2012). The chapter thus leads into three key recommendations with suggested action points as beginning steps towards epistemological and pedagogical change in bioscience for nursing. The limitations of the study are then outlined and followed by recommendations for future research. In keeping with the chosen research methodology, researcher presuppositions are briefly revisited and the researcher's reflections are presented. The chapter concludes with a summary of the study's contribution to existing knowledge in professional nursing education.

Understanding Preparedness – Aims and Achievements

The main objectives of this inquiry were to understand how experiences with learning and teaching influence participants' preparedness to integrate biosciences in their teaching practice; identify positive and negative experiential influences; and better understand the phenomenon of preparedness with bioscience integration in nursing education. Exploration beyond the immediate conscious experience of each participant revealed that preparedness with bioscience integration is influenced by personal ways of learning to make sense of one's professional role and responsibilities as a nursing lecturer. Personal ideals of nursing and teaching influence preparedness *to* integrate, yet feelings of responsibility and perceptions of ability are hindered by uncertainty around the worth of personal bioscience knowledge in the academic environment. This highlights the importance of personal, and epistemological values in nursing education and their influence on bioscience integration amongst nurses and nursing lecturers.

Reflective learning.

The study did not aim to specifically explore bioscience knowledge development in professional nursing practice. However, exploration of participants' learning and teaching experiences has yielded a far greater understanding of the ways in which nurses learn to understand and use biosciences in their practice. These personal ways of learning subsequently influence ideals of nursing, teaching, and integrated teaching preparedness as a nursing lecturer. The study shows that nurses predominantly come to understand and integrate biosciences through reflective learning. Whilst the relationships within reflective learning experiences are complex, bioscience exploration and personal understanding are commonly driven by reflection on clinical experiences and personal learning goals. This finding makes a significant contribution to current knowledge of bioscience learning in professional nursing. The words 'reflection' and 'reflective practice' are commonplace in nursing education, yet *reflective learning* pedagogy is rarely practiced (Edmond, 2001; Horsfall, et al., 2012; Rolfe, 2002), and has not been considered in the context of bioscience education. This suggests that current approaches to teaching and learning may be contributing to the bioscience problem.

The bioscience knowledge that nursing lecturers feel more prepared to integrate is derived from learning and using bioscience concepts in their clinical practice. Participants talked of learning from the patient back to the science, or of 'reverse learning' according to the situational demands of clinical practice. This is essentially how nurses make sense of their practice, yet nursing education is somewhat dominated by behaviourist pedagogy and fragmented curricula (Brandon & All, 2010; Dalley, Candela, & Benzel-Lindley, 2008). The role of reflection *in* and *on* action (Schön, 1991) to discover how knowledge or values contribute to

outcomes is underutilised in nursing education (Rolfe, 2002), yet this study has shown that the relevance of biosciences in nursing is realised through reflection on how understanding bioscience can enhance patient care. Reflective deliberation on learning, practice and teaching experiences is critical to ongoing learning and practice development in bioscience application and integrated teaching. It seems timely, therefore to reconsider the potential of reflective, discovery and transformative learning theories for bioscience education in nursing and the development of preparedness amongst nursing lecturers.

First steps.

The conclusion presented above suggests that significant changes in educational philosophy, design and implementation are required in nursing education, particularly in the context of pre-registration programmes. Reorientation towards practice-centred, reflective learning pedagogy in bioscience education is a major undertaking that would necessitate extensive curriculum review, pedagogic, and epistemologic inquiry across educational programmes. However, adaptations to teaching and learning over the last four decades have had little impact on the bioscience problem in nursing. This research suggests that bioscience pedagogy within nursing curricula needs to change if real progress in bioscience knowledge application and preparedness is to be made. In support of this claim, recommendations to engage with reflective and transformative experiential learning in nursing are not new (see for example Burns & Bulman, 2000; Coward, 2011; Dalley, et al., 2008; Giddens & Brady, 2007). Indeed, the profession is repeatedly urged to critique existing pedagogical approaches to nursing education (Benner, et al., 2010; Diekelmann & Smythe, 2004; Goodman & East, 2014; Horsfall, et al., 2012). However, the dominance of technical rationality in tertiary education, and

reliance on behaviourist pedagogy in nursing appear to limit tangible progress in professional bioscience education.

The following sections present further conclusions from the study and discuss their relevance for future nursing education and bioscience preparedness amongst nursing lecturers. Each conclusion is linked to the conclusion above, adding further evidence to the epistemological and pedagogical issues that are contributing to the bioscience problem. The chapter then progresses to present the researcher's recommendations with respect to incremental changes that could facilitate the pedagogical culture change and epistemological inquiry that is required.

The Elements of Preparedness

The study concludes that preparedness with bioscience integration is influenced by both personal and epistemological values in nursing education. Preparedness *to* integrate is fundamentally influenced by the personal values within ideals of nursing and teaching that determine the lecturer's willingness to practice integrated teaching. If bioscience knowledge is not valued as an essential component of nursing practice, integrated teaching is unlikely to occur. However, the presence of willingness *to* integrate may be insufficient to facilitate preparedness *for* integration. The study shows that epistemological values within the tertiary education sector hinder lecturers' preparedness *for* integrated teaching as they question the academic validity of their clinical bioscience knowledge. Although preparedness *for* integration is also influenced by confidence in personal ability, the findings suggest that the emphasis on theoretical science knowledge in tertiary nursing education hampers lecturers' confidence in bioscience knowledge and teaching ability.

Personal values.

If teaching and learning experiences are to positively influence lecturers' preparedness to teach, and nurses desire to understand and utilise bioscience concepts in practice, personal ideals must encompass an appreciation of the contribution that bioscience knowledge can make to patient care. However, existing studies show that the value placed on biosciences is variable amongst nursing lecturers, and registered nurses in practice (Logan & Angel, 2011; McVicar, et al., 2010). Preparedness *to* integrate biosciences is therefore also likely to be variable and, without preparedness *to*, biosciences are unlikely to be integrated in teaching practice. The perceived value of bioscience knowledge amongst nursing lecturers in any programme thus largely influences student exposure to bioscience integration. This is an important consideration for future practice in bioscience education that will be addressed in the study recommendations.

Preparedness *for* integration is also influenced by values as these shape perceptions of personal responsibility to learn, responsibility for student learning, and one's influence on patient care. If teaching ideals encompass a sense of responsibility to facilitate integrated teaching and learning in bioscience, it is more likely to occur. Individual perceptions of bioscience value are also influenced by the context of one's teaching role and its impact on perceived responsibility for bioscience teaching. Modular delivery of blocks of distinct knowledge domains in nursing education appear to negatively influence lecturers' perceptions of preparedness *for* bioscience integration, and their sense of responsibility to teach fundamental bioscience knowledge. Indeed, participants defended their struggle to integrate biosciences through stories of competing demands created by content rich and time poor curricula that echo recent studies pertaining to curriculum overload in

nursing (Brandon & All, 2010; Candela, et al., 2006; Dalley, et al., 2008; Davis, 2010; Tanner, 2010).

Study participants expected students to come into nursing courses with bioscience knowledge from other pre-registration courses, or pre-registration education. Their comments illustrate a division of labour, and knowledge, within nursing curricula that influence the ways in which nursing lecturers see bioscience within their teaching roles. Modular delivery of distinct subjects is common practice in nursing programmes. Consequently, biosciences are taught in discrete courses with the expectation that the theory explored and assessed in each course can then be applied to theoretical and practical nursing courses elsewhere in the programme. However, this approach to teaching and learning is noted to be both; inconsistent with professional knowledge and practice development (Benner, et al., 2010; 2009; Eraut, 1994, 2007; Schön, 1991); and detrimental to nursing lecturers' confidence and preparedness with integrated bioscience teaching.

Prior studies imply that lecturers value other forms of nursing knowledge above bioscience (Friedel & Treagust, 2005 NZ; Jordan, et al., 1999 UK; Manias & Bullock, 2002 Australia). Yet this was not the case for the participants in this study. They resolutely attested to the value of biosciences in nursing and felt prepared *to* integrate. However, their preparedness *for* integrated bioscience teaching was hesitant, highlighting an important difference between preparedness *to* integrate and actual teaching practice. Identification of the influential relationship between values and actual integrated teaching practice is an important development in our understanding of bioscience teaching and learning in nursing. However, strategies to promote the value of biosciences in nursing, whilst important, may be insufficient to facilitate changes in integrated teaching practice. Hesitancy with integrated teaching

is undoubtedly influenced by confidence in personal knowledge and ability, but this study also reveals how important one's perceptions of responsibility and knowledge value are *for* integrated teaching preparedness.

Epistemology.

Despite widespread concern regarding the bioscience problem, there continues to be a paucity of nurses and nursing lecturers who confidently and knowledgably role model relevant application of bioscience knowledge in, and to, clinical practice. Although participants in this study were prepared *to* integrate biosciences in their teaching, they questioned their theoretical knowledge in certain aspects of bioscience content. The presence of clinically validated, action knowledge (Eraut, 1994), or clinical knowledge (Benner & Wrubel, 1982), enhanced their preparedness *for* bioscience integration, whereas absent or dated clinical and theoretical knowledge hindered preparedness. Confidence and preparedness are each positively influenced by one's understanding of bioscience in the clinical context.

One of the fundamental issues raised in existing literature on bioscience education is the lack of nursing faculty with higher qualifications and an interest in bioscience integration at the level that appears to be required for tertiary education (Clancy, et al., 2000; Manias & Bullock, 2002). Consequently, science teachers may be employed to teach nursing students if nursing lecturers lack the qualifications to teach applied science courses (Friedel & Treagust, 2005; Larcombe & Dick, 2003). This places higher value on academic qualifications in bioscience (knowing that) than professional, clinical knowledge of bioscience application in nursing (knowing how and why). Yet this, and other studies, reveals that learning experiences with acontextual bioscience challenge rather than enhance nursing students' ability to

apply science concepts in their practice (Clancy, et al., 2000; Logan & Angel, 2011; Wynne, et al., 1997). This raises a fundamental epistemological question for nursing education: Is theoretical, propositional bioscience knowledge more valuable to nursing practice than experientially validated, clinical, action knowledge of the biosciences?

Individual lecturers value the propositional and action knowledge that they derive from practice. Knowledge of bioscience theory and application that develops from experiential and reflective learning shapes personal ideals and approaches to teaching practice. Yet the situation of nursing programmes in tertiary education is reported to place greater value upon theoretical, technical knowledge in light of the mandate for research and evidence-based-practice (Ewashen & Lane, 2007; Hewitt, 2009; Rolfe, 2007, 2012; Timmins, 2013). Consequently, lecturers are discouraged from using action knowledge in their teaching as it is not perceived to be publicly validated, theoretical knowledge within the discipline. However, action knowledge is more complex and sophisticated than theoretical knowledge alone as it includes all types of knowledge that are applicable in the uniqueness of clinical encounters and patient care. Relevant, contextual bioscience knowledge is able to be utilised in a manner that is perceived to positively influence patient care and outcomes (Prowse & Heath, 2005; van Wissen & McBride-Henry, 2010). This contrasts with 'general' theoretical knowledge that is limited in its ability to "adequately capture the concrete manifestations and qualitative distinctions that are central to clinical understanding" (Benner, et al., 2009, p. 384).

Study participants remember little of their formal bioscience learning, whereas action knowledge derived from professional practice is easily recalled and positively influences preparedness with integrated bioscience teaching. Lecturers know what is

relevant for nurses to know for competent practice and professional credibility. Yet they question their knowledge of biosciences and ability to teach applied science to nurses when conventional, behaviourist pedagogies in nursing appear to value technical, rational forms of bioscience knowledge above clinical knowledge. This perception hinders their perceived ability, and therefore preparedness, *for* bioscience integration despite feelings of preparedness and responsibility *to* practice integrated teaching.

Despite poor memories of their own theoretical learning, the dominant paradigm (of technical rationality) appears to influence notions of knowledge validity in bioscience education. This finding suggests that the epistemological and pedagogical theories underpinning current approaches to nursing education need to be re-examined so that the value of practical, experiential and reflective learning in the development of nursing practice can be critically examined (Edmond, 2001; Horsfall, et al., 2012; Rolfe, 2002). This is particularly pertinent in the context of bioscience learning as students and registered nurses continue to struggle to apply bioscience theory in clinical practice despite numerous adaptations to teaching delivery, content and assessment in science courses (Fell & James, 2012; Logan & Angel, 2011; McVicar, et al., 2010).

If the premise of pre-registration education is to enable graduate nurses to competently utilise "nursing knowledge and complex judgement…and provide nursing interventions that require substantial scientific and professional knowledge and skills" (Nursing Council of New Zealand, 2007, p. 4) the guiding pedagogy should value learning processes as highly as outcomes (Benner, et al., 2010; Horsfall, et al., 2012; Ironside, 2006; Kantor, 2010). This study provides evidence that clinically-focused teaching and learning is critical to the development of

bioscience knowledge and its application in nursing and teaching practice. This is widely supported by proponents of nursing bioscience (Davis, 2010; Logan & Angel, 2011; McVicar, 2009). Greater utilisation of clinical bioscience knowledge in teaching also has the potential to enhance lecturer preparedness by validating clinical knowledge, enabling confidence. The view that practitioners' confidence needs to increase with regards to "what they already know" is also advocated by McVicar (2009, p. 149).

Letting go of dominant pedagogies.

Although this is not the first study to question the suitability of conventional, behaviourist pedagogies for nursing education, wide-spread progress towards more inclusive contemporary, student-centred pedagogies has been limited (Benner, et al., 2010; 2009; Candela, et al., 2006; Diekelmann, 2005; McDermott, 2012). Traditional conceptions of the teacher as the expert provider of abundant information persist in nursing education, as does the perceived requirement for students to achieve measurable behavioural, cognitive and skills-based outcomes (Brandon & All, 2010; Ewashen & Lane, 2007; Kantor, 2010). This study shows that lecturer preparedness is undermined by the perception that they must be able to teach complex theoretical bioscience detail, even though their experiences clearly show that the knowledge required for practice comes from basic knowledge that is made real by its application and relevant extension in practice (through self-learning).

The conclusions presented above suggest that significant changes in educational philosophy, design and implementation in bioscience education are required, particularly in pre-registration nursing programmes. The adoption of practice-centred, reflective learning pedagogy in bioscience education would require

extensive curriculum review and pedagogical inquiry across programmes and faculty. However, existing strategies to address the bioscience problem in nursing have not led to any comprehensive improvement. Reconceptualising bioscience from the perspective of clinical knowledge represents a 'less is more' approach to teaching and learning. Whilst this may appear radical, history demonstrates that the additive approach to curriculum design and delivery overwhelms both students and lecturers. This study also shows that mere exposure to bioscience theory is inadequate to facilitate meaningful learning. Meaningful extension of knowledge to practice comes from reflective learning in, and on, clinical experience and the knowledge that one needs to care for patients. Teaching students how to learn relevant bioscience through reflection on their responsibilities as a nurse offers better preparation for lifelong learning and professional practice than theoretical exposure.

The following sections outline the researcher's recommendations for practice changes that may facilitate the adoption of reflective learning pedagogy for bioscience education; and bioscience teaching preparedness amongst nursing lecturers. In recognition of the substantial change in epistemological perspectives that would be required to achieve these goals, the following recommendations include incremental, actionable changes that could contribute to educational culture change and the reconceptualisation of bioscience knowledge in nursing.

Recommendation One:

Utilise Reflective Learning Pedagogy for Bioscience Integration Across Nursing Curricula.

This study shows that current approaches to bioscience education are inconsistent with the ways in which nurses learn to understand and use biosciences in their practice. Realisation of one's responsibilities as a nurse is shown to influence the development of self-learning strategies and personal motivation to make sense of nursing practice by understanding the bioscience 'underneath' what is happening to, and for, patients. Reflective learning has the potential to encourage exploration of taken-for-granted assumptions about what it means to be a nurse, or indeed a nursing lecturer, and encourage students to be more responsible for their own learning and professional development (Coward, 2011; Horsfall, et al., 2012; Kantor, 2010; Murphy & Timmins, 2009; Stockhausen, 2005).

Assumptions amongst students or nursing lecturers that science is, for example, difficult, specialist knowledge, more relevant to doctors, irrelevant for nursing practice, or not nursing lecturers' responsibility to teach, are likely to negatively influence student learning and lecturer preparedness with bioscience integration. Whereas critical questioning of the rationale underpinning personal ideals, assumptions, and the situation of bioscience knowledge in ideal nursing practice can reveal the nurse's responsibility to understand the bioscience component of nursing practice and patient care. This approach has the potential to uncover both the *need*, and *want* to know biosciences for one's nursing and teaching practice.

Integration of reverse or problem-based learning from clinical situations to the knowledge that can enable quality care clearly situates bioscience knowledge in

nursing practice and highlights the nurses' responsibility to know. This approach to learning is well received by students and reported to enable them to see why, and how, biosciences are relevant for nursing practice (Davies, et al., 2000; Davis, 2010; Johnston & McAllister, 2008; Kumar, 2005). Learning in this way encourages the development of self-learning strategies that will be required for the remainder of the student's, or lecturer's career.

Barriers.

Reflection is purported to be firmly embedded in nursing education (Burton, 2000; Parrish & Crookes, 2013; Perry, 2000), and many regulatory bodies clearly stipulate that reflection is a required component of competent nursing practice (Nursing and Midwifery Board of Australia, 2008; Nursing and Midwifery Council, 2008; Nursing Council of New Zealand, 2007). However the current tendency to use reflection to assess or demonstrate competence in nursing education is incongruent with both the philosophical intent and potential of reflective learning (Coward, 2011; Hargreaves, 2004; Perry, 2000; Rolfe, 2002). Reflective practice is thus widely regarded as something that student and practicing nurses 'must do', rather than a way of learning to become a nurse and develop practice expertise (Benner, 1984; Burns & Bulman, 2000; Burrows, 1995; Coward, 2011; Perry, 2000). If reflective pedagogy is to be used as a means to develop bioscience learning in nursing the philosophy of reflective thought and action in professional learning needs to be better understood by students and faculty.

Although study participants did not explicitly refer to reflective learning pedagogy, their teaching experiences with case-study and problem-based learning, critical questioning, and reflective discussion with students were seen to be valuable

for student learning, and their own teaching practice. However, their discussions of the *realities of teaching* highlighted a persistent issue of time and curriculum content pressure that hindered their ability to utilise this approach to teaching and learning as frequently as they would like.

Action points:

1.1. Professional development for nursing lecturers.

In the context of learning and professional development, reflection should be perceived as a means to develop knowledge and practice. As such it *is* a critical skill that student nurses, registered nurses, and nursing lecturers, need to develop. Yet reflective thought and action are complex intellectual activities that may not be intuitive (Bolton, 2010; Perry, 2000; Russell, 2005; Schön, 1991). Furthermore, few schools of nursing require nursing lecturers to hold qualifications in adult education prior to their appointment. Lecturers may thus be unaware of the philosophical intent of reflection or reflective learning pedagogy (Coward, 2011). It is also reported that novice practitioners may not have the ability to think reflectively, or the prior experience upon which to reflect (Benner, 1984; Burns & Bulman, 2000; Burrows, 1995; Coward, 2011; Perry, 2000). Whilst nursing lecturers are not novice practitioners in nursing, they are frequently novice teachers (Kantor, 2010; Spencer, 2013; Timmins, 2013). Foundational learning as a beginning student, or lecturer, should therefore encompass guided learning about reflection and reflective practice (Horsfall, et al., 2012; Parrish & Crookes, 2013; Yorks & Sharoff, 2001). Greater awareness, and integration of Dewey's theory of reflective learning through experience could encourage students and lecturers to question relationships between patient care and bioscience knowledge (Dewey, 1933).

The above points could be addressed by:

1.1.1. The provision of professional development education for beginning lecturers to enable greater understanding and practice in adult education and reflective pedagogy.

1.1.2. Increasing the proportion of faculty with higher qualifications in adult education to enable beginning lecturer support and pedagogical inquiry.

1.2. Dedicate more time to reflective learning in nursing courses.

Whilst the concerns over curriculum crowding in pre-registration education have been discussed previously, this recommendation suggests that the distribution of curriculum time across courses is reconsidered to better facilitate reflective learning throughout nursing programmes. This recommendation is made in conjunction with recommendation two as a reduction in bioscience theory hours in distinct science courses would enable contact teaching time to be redistributed into nursing courses to facilitate reflective, clinically-focused, problem-based learning opportunities; and emphasise nursing lecturers' responsibility to facilitate integrated bioscience learning within nursing courses.

1.3. Introduce formal teaching in reflective thinking for students.

In recognition of the complexity of reflective thought and experiential learning, several authors suggest that students require guidance and teaching in order to understand reflective practice and its potential for lifelong learning (Alpers, Jarrell, & Wotring, 2013; Liimatainen, Poskiparta, Karhila, & Sjögren, 2001; Russell, 2005). Although reflective practice is widely advocated, the interpretation and application of the principles of reflection are extremely varied (Coward, 2011; Glaze, 2001;

Parrish & Crookes, 2013; Rolfe, 2002). Whilst some authors claim that there is no evidence that reflection facilitates learning or improvement in nursing practice (Burton, 2000; Hargreaves, 2004), their interpretations appear to lack an appropriate appreciation of the philosophical intent of reflective learning. This lack of consistent understanding of reflective learning pedagogy amongst nursing faculty adds support to each of the action points above. The use of reflective pedagogy in bioscience would therefore require that students and faculty better understand the philosophy and practice of reflective thought through the introduction of guided, formal learning opportunities.

Recommendation Two.

Enhance the Epistemological Value of Clinical Bioscience Knowledge in Nursing Education.

The conclusions from this study highlight two contrasting issues within existing approaches to bioscience education in nursing, and the preparedness of nursing lecturers *for* bioscience integration:

1. Clinically validated bioscience knowledge is undervalued in traditional pedagogies and curricula (particularly in pre-registration programmes).

Yet;

2. Students and nursing faculty value clinically validated bioscience knowledge and feel that inadequate time is available to explore science application in practice within nursing courses.

The recommendation that epistemological inquiry and discussion with regards to what constitutes valuable bioscience knowledge for nursing challenges nursing

faculty to undertake deep philosophical exploration that questions the status quo of epistemology in tertiary education. This is acknowledged to be a significant undertaking that will not happen overnight. However, this is not the only study to suggest that over-reliance on theoretical, propositional knowledge is not conducive to professional learning (Benner, et al., 2010; 2009; Eraut, 1994, 2007; Schön, 1991). This research suggests that preparedness *for* relevant bioscience integration could be enhanced if lecturers feel able to value their existing bioscience knowledge and ability to apply science to practice situations. The following presents some preliminary steps that may encourage nursing lecturers to question the appropriateness of customary knowledge validity, and the relationships between propositional and clinical, action knowledge in developing nursing practice.

Action point:

2.1. Include explicit reference to bioscience integration within the learning outcomes of theoretical and practical nursing courses.

Without explicit reference to bioscience application within the learning outcomes and assessment requirements of nursing courses, student learning in bioscience application is fundamentally influenced by the ideals of the lecturer(s) responsible for the course. Inclusion of bioscience application within the objectives for each course sends several messages to students and nursing lecturers:

i. Biosciences are relevant, and integral, to nursing practice.

ii. Nurses have a responsibility to understand bioscience and its application to unique clinical encounters to make sense of their practice and patient care.

iii. Nursing lecturers have a responsibility to practice integrated teaching, using clinically relevant bioscience knowledge.

iv. Nursing lecturers should question what is important for students to know in the context of their clinical practice and stage of development.

v. Integrated teaching is about bioscience for nursing rather than bioscience for tertiary education.

More explicit and consistent integration of clinically relevant bioscience concepts in nursing courses, by nursing lecturers with contextual knowledge of clinical practice, serves to validate action knowledge of bioscience within the profession. This beginning strategy has the potential to initiate critical questioning amongst lecturers as to the validity of customary bioscience content knowledge for clinical practice development. In time, this may stimulate faculty wide discussion concerning required bioscience content and the development of nursing bioscience knowledge throughout educational programmes and clinical practice experience. Widespread increase in the value associated with clinically validated, *action* bioscience knowledge has the potential to encourage nursing students, registered nurses and nursing lecturers to feel more confident about the bioscience knowledge *that* underpins the *know-how* of clinical practice.

Recommendation Three:

Enable Progressive Development of Bioscience Knowledge and Lecturer Preparedness through Spiral Curricula.

To achieve more inclusive bioscience integration amongst nursing lecturers, levels of preparedness need to increase, and curricula structure need to be reconsidered. The separation of bioscience into discrete, content-laden courses presents bioscience as a distinct knowledge domain that is rife with complex, technical, theoretical language that is often delivered by content experts rather than nurses. This situation influences the perception amongst many students and nursing lecturers that bioscience is both challenging, and somewhat disconnected from nursing when much of the subject experts' knowledge appears superfluous to that required for every-day nursing practice (Craft, et al., 2013; Davis, 2010; McVicar, 2009). A difference exists therefore, between theoretical and professional bioscience knowledge that:

i. Negatively influences nurses' confidence in personal bioscience knowledge.

ii. Creates a perception that the biosciences are specialist theoretical knowledge, rather than an integral component of nursing knowledge.

A progressive, spiral curriculum of explicit bioscience integration in nursing courses, across pre-registration curricula, has the potential to better facilitate student learning, and the use of clinical bioscience knowledge by nursing lecturers (see Figure 7.1). Spiral curricula enable crucial concepts to be integrated in a manner that is consistent with the learners' intellectual and cognitive development, enabling gradual development of knowledge (Bruner, 2006). Concepts and topics are

developed and redeveloped in subsequent courses as learners develop their understanding of fundamental principles and their relationship to nursing practice (Brandon & All, 2010; Candela, et al., 2006; Giddens & Brady, 2007). This is consistent with the ways in which participants made sense of their practice and the role of bioscience knowledge in patient care. Participants developed much of their bioscience understanding through reflective clinical practice experiences that revealed a responsibility to know. This motivated them to explore, and redevelop their understanding of related biosciences through self-learning.

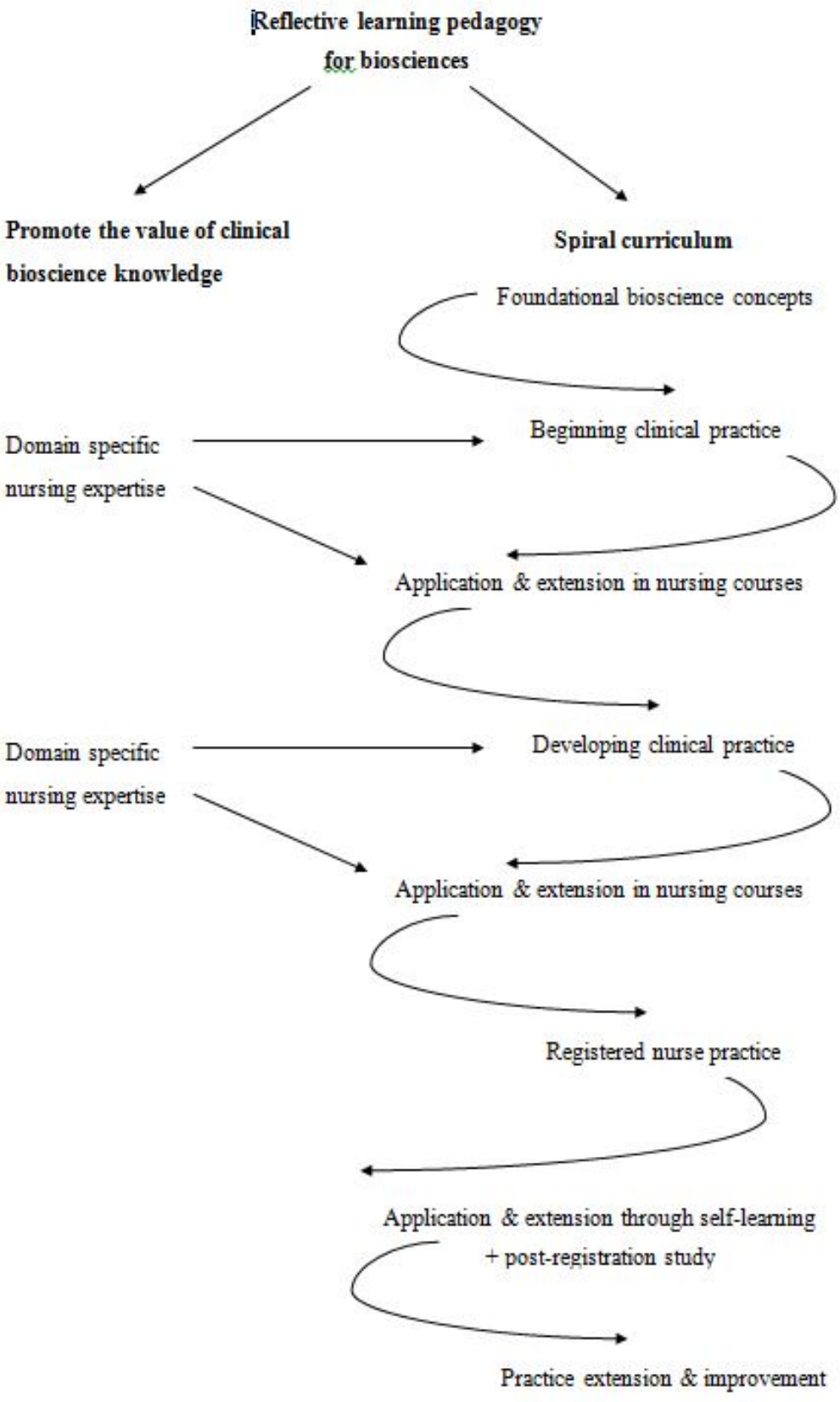
Nursing education should refocus its attention from the delivery and acquisition of highly theoretical bioscience knowledge in discrete science courses to the development and extension of foundational bioscience concept knowledge within theoretical and practical nursing courses. Whilst foundational bioscience study *is* required in pre-registration nursing education, the breadth and depth of theoretical content in beginning level courses could be revised to focus on fundamental anatomy and physiological concepts, *if* students and lecturers could be assured that this foundational knowledge would be extended through its application in practical and theoretical nursing courses across the curriculum. Currently, the degree of extension is essentially dependent on the students' attitude to learning, and individual lecturers' willingness to integrate bioscience concepts in their teaching.

Progressive integration of bioscience learning within spiral curricula has the potential to facilitate students' ability to understand, utilise and reflect upon the bioscience knowledge that underpins nursing practice in a manner that is more consistent with their intellectual and professional development. Students want to be nurses and learn about nursing, therefore *reverse learning* of bioscience from clinical situations, or scenarios, back to the responsibilities and knowledge required to care

for the patient is likely to seem more relevant to students (Johnston & McAllister, 2008; Kantar, 2013). Progressive integration of clinically validated, *action* bioscience knowledge throughout curricula could encourage nursing students, registered nurses and nursing lecturers to feel more confident about the bioscience knowledge *that* underpins the *know-how* of clinical practice. This has successfully been achieved with respect to pharmacology integration at one tertiary institute in New Zealand (Lim & Honey, 2006).

Figure 7.1 illustrates a basic model for a spiral curriculum in bioscience education that would support study recommendations one, two and three. Foundational knowledge of the biosciences *is* required for nurses to begin to apply and extend concept knowledge in practice as they learn to nurse. However this study emphasises that any beginning level bioscience education should be exactly that – fundamental knowledge of the biosciences that are relevant to beginning nursing practice. Foundation bioscience course content should therefore be reviewed by nursing lecturers in order that clinical bioscience concepts are explored in a manner that is consistent with students' intellectual development and practice experience. The findings also show that lecturers' preparedness *for* bioscience integration is context specific, in that the presence of clinically validated bioscience knowledge that is relevant to certain clinical specialties enhances confidence and perceived ability to integrate. It is likely therefore, that lecturers with expert clinical knowledge in specific clinical domains would feel adequately prepared *for* integrated bioscience teaching within their own specialty. Utilisation of this valuable *nursing* knowledge has the potential to enhance students' perceptions of bioscience relevance in clinical practice whilst sending the message that nurses can, and do, understand bioscience

Figure 7.1 The Supportive Spiral Curriculum for Nursing Bioscience.



theory. Greater utilisation of nursing lecturers' clinical bioscience knowledge also emphasises the worth of clinically validated knowledge in nursing education.

A recent doctoral study in bioscience education in nursing (New Zealand) also concluded that science education should be integrated throughout nursing programmes, rather than the current practice of *front-loading* (Dunnington Fenton, 2010, p. 275). However, Dunnington Fenton suggests that science lecturers are responsible for teaching and learning in nursing science, and that bioscience integration may be best achieved by increasing their involvement in students' clinical learning (2010). Whilst the author also recommends a *scaffolding* approach to progressive bioscience learning as students develop learning ability, the recommendation to develop further education to enable science lecturers to teach nurses seems unnecessary if the clinical bioscience knowledge of nursing lecturers was afforded greater value.

Action points:

3.1. Review of bioscience content in beginning level, preparatory science courses by nursing lecturers with clinical practice expertise.

3.2. Team discussion of the above aims, objectives, and outcomes with science lecturers so that the bioscience for nursing pedagogy and spiral curriculum is better understood throughout the faculty.

3.3. Reduce contact teaching hours for discrete bioscience courses to facilitate more reflective bioscience learning opportunities in nursing courses (through redistribution of hours).

3.4. Include explicit reference to bioscience integration in the learning outcomes for theoretical and practical nursing courses (see recommendation 2.1).

Acknowledging barriers.

The use of nursing lecturers' clinical specialty bioscience knowledge is beneficial for their confidence in bioscience integration, and promotes the worth of nurses' bioscience knowledge. However, this recommendation has resource and logistical implications that need to be acknowledged. Study participants talked of logistical challenges within curriculum timetables as a factor that hindered their ability to practice integrated teaching. However, this was in relation to the incongruence of separate bioscience and nursing courses. The recommendations to enable more hours within nursing courses and promote nursing lecturers' responsibility for integrated teaching could alleviate this problem somewhat. Nonetheless, the availability of distinct clinical specialty experience amongst the faculty of any one department, or school, of nursing may challenge its capacity for domain specific bioscience integration. The logistics of staff availability within timetabled class hours must also be considered as a potential barrier. However, nursing lecturers invariably teach within the domains of their clinical practice experience. The problem with bioscience integration here is a lack of time and perceived responsibility to undertake bioscience teaching within the lecturer's teaching scope. The recommendations above, again, may provide a beginning solution to this issue.

Limitations of the Study

Positive perceptions of bioscience.

Although the study participants represented a spread of teaching areas, experience in nursing, teaching experience, and gender, their perceptions of the value of biosciences in nursing were overwhelmingly positive. Participants were

consistently prepared *to* integrate biosciences when teaching nursing and, although this enabled positive influential experiential factors to be identified, the data contained little reference to experiences that may hinder preparedness *to* integrate biosciences in personal teaching practice. This is a limitation of the study that may be explained by the approach taken to recruit participants.

Potential participants were invited to take part in individual interviews with the researcher by email distribution of the study invitation flyer and information sheet. It is possible that lecturers who place less value on biosciences or those who feel particularly unprepared would be less likely to respond to an invitation to participate in a study of this nature. Although the email invitation clearly stated that the researcher was interested to talk with any lecturers involved with bioscience integration in nursing courses, regardless of their comfort or preparedness with the topic, it is possible that those offering to participate in the study were particularly interested in bioscience integration or had particular experiences that they felt may contribute to the study.

The data may therefore be overly representative of lecturers who are prepared *to* integrate biosciences. However Friedel and Treagust's (2005) study found that two thirds of nurse educators in one tertiary institution in New Zealand also had very positive attitudes towards biosciences in nursing education and practice (despite their attitudes being less positive than those of their students). Whilst the potential over representation of lecturers who are prepared *to* integrate biosciences needs to be considered in the context of this study, the identification of relationships between experience and experiencing that positively influence preparedness *to* and *for* bioscience integration when teaching nurses has enabled the phenomenon of preparedness to be better understood. The study also highlights experiences that

hinder preparedness *for* bioscience integration that deepen knowledge with respect to the relationships between experience and perceived ability to integrate biosciences when teaching nurses. These findings are particularly helpful for future educational practice that may seek to reduce negative perceptions regarding personal bioscience knowledge and go some way to increase preparedness *for* bioscience integration amongst nursing lecturers.

Predominance of pre-registration experience.

Several study participants had teaching experience with both pre- and post-registration nursing education. However participants talked much more about their experiences with pre-registration teaching, particularly in the context of experiencing the *realities of teaching.* Teaching experiences with post-registration nursing students appear to differ from pre-registration students with respect to the ways in which registered nurses' clinical experiences influence their learning and critical inquiry around practice knowledge. The teaching and learning experience appears more collegial in nature as student and lecturers each have clinical context upon which to draw. This contrasts with the realities of teaching pre-registration students who lack clinical experience and the ability to connect theory with practice. Whilst the study did not seek to explore the differences between the influence of pre- and post registration teaching experiences on lecturer preparedness, the dominance of pre-registration experiences needs to be considered as a limitation of the study findings.

Generalisation.

Phenomenological inquiry seeks to understand subjective human experience, therefore no attempt is made to generalise the findings beyond the context of the study. However, it is important to acknowledge that the descriptions of textural and structural experience presented in the findings chapter reflect only the experience of ten nursing lecturers at a specific period in time in the context of nursing education in New Zealand. The small number of participants, whilst consistent with the research methodology, similarly reflects the experience of a small number of nursing lecturers. It is therefore inappropriate to generalise the findings beyond the participants in the study.

Future Research

Bioscience or bioscience for nursing?

This study has shown that nursing lecturers question their preparedness *for* bioscience integration with regards to personal knowledge and abilities. This is consistent with Friedel and Treagust's (2005) New Zealand study, yet neither study has specifically explored the reasons why personal knowledge is questioned. Whilst this study suggests that the situation of pre-registration nursing programmes in tertiary education, and the minimum requirement for degree level preparation for registered nurses (in Australia and New Zealand), have each negatively influenced nursing lecturers' perceptions of their own knowledge, this is not adequately evidenced within the data. The study does show, however, that preparedness *for* bioscience integration is critical to its implementation within the education of existing and future nurses. Further research to explore the rationale underpinning lecturer perceptions of adequate and valuable bioscience knowledge for nursing

practice is warranted, as without preparedness *for*, bioscience integration is likely to be limited.

Understanding limited preparedness.

The study has shown that valuing bioscience in nursing is a fundamental requirement for preparedness *to* integrate and a prerequisite *for* integration in teaching. Participants' experiences also revealed that a personal sense of responsibility to integrate is important to progress lecturers from believing bioscience is important to feeling responsible *to* integrate it in their own teaching. However, the findings are limited with respect to understanding why some lecturers place less value on bioscience in nursing practice and/or education, or why some feel that the responsibility for bioscience integration does not lie with nursing lecturers. Exploration of this issue through further research could contribute to knowledge of bioscience value perceptions amongst nursing lecturers.

Revisiting Presuppositions

Adoption of a transcendental phenomenological approach to explore the research question within this study required the researcher to reflect on her own preparedness with bioscience integration at the beginning of the study. Phenomenological reduction and the epoché enabled the relationships between personal teaching and learning experiences and preparedness to be identified as follows:

i. Biosciences are integral for nursing practice.

ii. Nursing lecturers can help nurses to understand what is happening to, and for, patients in their care by illustrating the links between bioscience knowledge and their actions as nurses.

iii. Understanding biosciences has the potential to improve nursing practice and patient care, and empower nurses in their professional roles.

iv. Nurses should understand and be able to provide rationale for the care they provide or facilitate.

The process of bracketing the above presuppositions throughout the study became increasingly difficult as participants' experiential accounts began to reveal experiences and beliefs about biosciences in nursing that were similar to my own. Whilst I endeavoured to transcend personal assumptions during interviewing and data analysis in particular, the similarities between participants' and my own experiences created a feeling of unease and need for increased reflexivity. This undoubtedly influenced the rigour and complexity of the data analysis procedures used to ensure that the participants' stories truly reflected their own experiences. The need for constant questioning was paramount throughout my experience of data analysis and presentation of the findings. This, I believe, enabled me to remain true to the participants' own subjective experience.

Reflection on the research process has also revealed that I was somewhat unprepared for participants to have such overwhelmingly positive perceptions of biosciences in nursing. I really wanted to better understand positive *and* negative influences on preparedness that may somehow explain why anecdotal experiences, and published reports, of poor knowledge and practice in bioscience integration amongst nursing lecturers might be. This desire may have influenced interview conduct as my questions sought to uncover deeper meaning through participant reflection on the relationships between what was experienced and their bioscience preparedness. Whilst I am disappointed that the rationale for lecturer perceptions of

poor or inadequate knowledge requires further research, the study has highlighted the importance of lecturer confidence in preparedness *for* bioscience integration. My own confidence perhaps influenced my inquiry with regards to the factors influencing participant experiences of feeling less prepared. I feel confident in the validity of my own bioscience knowledge through my experiences with teaching integrated biosciences in nursing, whereas, in certain clinical domains, participants question the validity of their own clinically derived bioscience knowledge. This emerging theme intrigued me; therefore it is possible that my own experience influenced the scope of inquiry and direction of questions during participant interviews.

Reflection on my experiences throughout the study and thesis writing has reinforced my belief that transcendental phenomenological inquiry was appropriate for the study. The requirement to look beyond experiences to consider how experiences came to be has enabled a deep understanding of preparedness and the influential nature of personal values to be identified. I believe that this is an important contribution to existing knowledge of professional learning in nursing that has the potential to enable greater preparedness with bioscience integration in both nursing and teaching practice in the future.

Conclusion

This thesis represents a deep understanding of the universal experience of teaching and learning biosciences in nursing for ten New Zealand nursing lecturers. Transcendence of conscious experience revealed complex interrelationships between, and within experience, experiencing, ideals of nursing, reflective learning and the phenomenon of preparedness with bioscience integration in teaching. The

study enables teaching, learning, and practice relationships to be better understood, highlighting previously unrecognised influences upon bioscience learning and teaching preparedness. Clinical context and professional responsibility are identified as critical requirements for the development of bioscience knowledge and its utilisation in nursing practice. This underpins recommendations to consider the potential of reflective learning pedagogy, progressive, spiral curricula for bioscience learning, and a greater appreciation of the value of clinically situated bioscience knowledge for the development of professional practice in nursing.

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Appendix A. Ethical Approval Confirmation.

MASSEY UNIVERSITY

FILE

10 March 2011

Jane Hardcastle
14 Upper Crichton Terrace
Cashmere
CHRISTCHURCH 8022

Dear Jane

Re: **HEC: Southern A Application – 11/04**
Integrating biosciences in nursing education – How do teaching and learning experiences influence nursing lecturer preparedness?

Thank you for your letter dated 9 March 2011.

On behalf of the Massey University Human Ethics Committee: Southern A I am pleased to advise you that the ethics of your application are now approved. Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Prof Julie Boddy, Chair
Massey University Human Ethics Committee: Southern A

cc Dr Linda Leach
School of Educational Studies
PN900

Prof Howard Lee, HoS
School of Educational Studies
PN900

Appendix B. Indicative Interview Guide

Appendix C. Pilot Group Discussion Invitation

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

INVITATION TO PARTICIPATE: PILOT GROUP DISCUSSION

INFORMATION

Your name has been provided by your programme leader / head of school as a potential participant for a pilot group discussion – based on your area(s) of teaching practice in CPIT nursing programmes

The purpose of the subsequent research project is to find out if there are any commonalities in nursing lecturers' experiences with bioscience teaching, learning and integration in clinical practice and how prepared they feel to integrate biosciences in their own teaching practice.

Project overview – the study

Nursing lecturers whose teaching practice requires some links to be made between biological science knowledge and nursing practice will be invited to participate in individual interviews with the researcher. Study participants will be asked to talk with the researcher about their experiences with learning, using, and teaching bioscience concepts in nursing.

Pilot group - your involvement

Prior to the interviews the researcher will undertake preliminary discussion of the interview guide (for the study) within a pilot group of eight nursing lecturers from CPIT school of nursing to highlight additional or alternative topics and issues to be explored further during participant interviews and enable the researcher to be more familiar with potential questions prior to data collection.

Further information about the study and pilot group procedure will be provided if you are interested in participating.

If you would like to find out more and possibly participate in the group discussion, please contact the researcher:

Via email Jane.Hardcastle@cpit.ac.nz

Or telephone 940 8273 (DDI)

By 30th September, 2011

Appendix D. Pilot Group Discussion Information Sheet

Massey University

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

INFORMATION SHEET – PILOT GROUP discussion

Introduction

The researcher for this project is Jane Hardcastle, a Doctor of Education student at Massey University. The project is being undertaken in partial fulfillment of the Doctor of Education qualification and seeks to explore factors that influence nursing lecturers' preparedness to integrate biological science concepts in their teaching practice.

The purpose of the project is to find out if there are any commonalities in nursing lecturers' experiences with bioscience teaching, learning and integration in clinical practice and how prepared they feel to integrate biosciences in their own teaching practice.

Project overview – the study

Nursing lecturers whose teaching practice requires some links to be made between biological science knowledge and nursing practice will be invited to participate in individual interviews with the researcher. Participants in this stage of the research will be asked to talk with the researcher about their experiences with learning, using, and teaching bioscience concepts in nursing. In order to fully explore the topics and experiences involved, it is likely that two to three interview sessions will be required.

Pilot group - your involvement

Prior to the interviews the researcher will undertake preliminary discussion of the interview guide (for the study) within a pilot group of nursing lecturers within her own school of nursing to highlight additional or alternative topics and issues to be explored further during participant interviews and enable the researcher to be more familiar with potential questions prior to data collection. The information below and your involvement pertain to this pilot phase of the study.

Participant Identification and Recruitment

- Participation in the study is voluntary and you may withdraw from the participation at any time prior to data evaluation.
- Your name has been provided by your programme leader / head of school as a potential participant – based on your area(s) of teaching practice in CPIT nursing programmes.
- A total of eight participants will be recruited to take part in the pilot group discussion.
- The pilot group discussion will be conducted in a private, quiet room within CPIT away from work-related distractions or disturbances wherever possible. There will be no personal expense incurred.
- It is not anticipated that participation in the focus group will cause any physical or psychological harm.

- The pilot group discussion process encourages reflection and exploration of thoughts and feelings that may be highly personal and unpredictable in terms of the information you may share with the group.
- Participation in the group discussion means that your contribution will be public (within the group). Whilst it is difficult to predict any potential consequences, the researcher's experience will enable her to acknowledge and respond to issues and / or ethical dilemmas that may be raised as a consequence of the discussion.
- All participants are required to complete a confidentiality agreement form.

Project Procedures
Every possible attempt will be made to ensure that data collected remains confidential to myself (as the researcher), my research supervisors and the other focus group participants. No individuals or institutions will be identified in any written material or to any other person. All data will be stored electronically with unique password protection and/or in a locked filing cabinet to which only the research will have access.

- Individual participants will be required to sign a confidentiality agreement prior to participation in the pilot group discussion.
- The pilot group discussion will be summarised via note-taking by the researcher during the session then transcribed into a word processed document.
- Personal identification data will not be collected.
- Transcribed material will be kept safely for a period of five years following completion of the study. Upon completion of the study and examination of the researcher's doctoral thesis, data destruction will be the responsibility of Dr Linda Leach as chief supervisor.

Your involvement
If you agree to participate, the researcher will contact you regarding a mutually agreeable date and time to conduct the pilot group discussion. This should take no more than one hour of your time.

- It is unlikely that you will be asked to participate in a further group discussion.
- The researcher will also be looking to recruit one participant to undertake a pilot interview (using the refined interview guide following group discussion) at a later date.
- Further information concerning the pilot interview will be provided should you be interested to consider being involved in the pilot interview.

Your rights
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- withdraw from the study (at any time before data evaluation commences);
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded;
- ask for written documentation of your own comments to be suspended at any time during the discussion.

How to proceed
If you would like to participate in the pilot group discussion, please contact the researcher:
Via email Jane.Hardcastle@cpit.ac.nz
Or telephone 03 940 8273 (DDI)
By 30th September, 2011.

Project Contacts
Please feel free to contact me and/or my supervisor if you have any questions about the project.

Researcher: Jane Hardcastle
Contact details: School of Nursing and Human Services
Christchurch Polytechnic Institute of Technology
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PO Box 540
Christchurch
Tel: 03 940 8273 (DDI)
Jane.Hardcastle@cpit.ac.nz

Research supervisor: Dr Linda Leach
Contact details: Massey University
Private bag 11222
Palmerston North
Tel: 06 356 9099 Extn 8831
L.J.Leach@massey.ac.nz

Ethical approval
This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application 11 / 04. If you have any concerns about the conduct of this research, please contact Professor Julie Boddy, Chair, Massey University Human Ethics Committee: Southern A, telephone 06 350 5799 x 2541, email humanethicssoutha@massey.ac.nz

This project has also been reviewed and approved by the Christchurch Polytechnic Institute of Technology Ethics Committee. If you have any concerns about the conduct of this research, please contact the Academic Research Committee c / - Judy Yarwood Judy.Yarwood@cpit.ac.nz Ext. 8280.

Appendix E. Pilot Group Discussion Confidentiality Agreement

Massey University
Te Kunenga ki Pürehuroa
College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education
How do teaching and learning experiences influence nursing lecturer preparedness?

CONFIDENTIALITY AGREEMENT – PILOT GROUP discussion

I ..... (Full Name - printed)
agree to keep confidential all information concerning the project:
Integrating Biosciences in Nursing Education How do teaching and learning experiences influence nursing lecturer preparedness?

I will not retain or copy any information involving the project.

I will not discuss information or disclosures made during the group discussion outside the group.

Signature: **Date:**

Appendix F. Participant Consent Form Pilot Group Discussion

Massey University

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

PILOT GROUP PARTICIPANT CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree not to disclose anything discussed in the Focus Group.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: **Date:**

Full Name - Printed

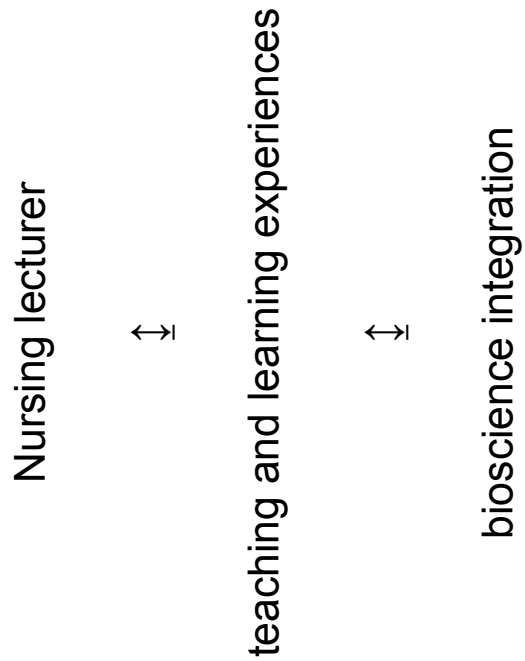
Demographics:

The following information will not be included in data analysis for the research study, nor will your personal details be accessible to anyone but the researcher and her supervisors. The purpose of collecting the data below is to enable the researcher to demonstrate that the pilot group demographics are reflective of the purposive sample sought in the subsequent study. This serves to increase rigour within the pilot phase of the study and increase the validity of any adaptations that may consequently be made to the indicative interview guide prior to commencement of participant interviews.

Consequently – a summary of the pilot group demographics will be included in the thesis. This will not contain any personal information that would enable identification of any pilot group participants.

Gender					
Experience – nursing years	How long have you been a registered nurse?				
Experience – teaching years	How long have you been lecturing?				
Experience – teaching area(s)	What is your current area of teaching practice? Please summarise any other significant areas of teaching in the past				
Teaching – requirement to integrate biosciences *What is currently expected of you in terms of bio integration?*					
Personal perspective – biosciences in nursing education	*Do you think it is valuable?*				
How would you rate your own bioscience:	*please circle the most appropriate response*				
Knowledge	Very low	Low	Average	High	Very high
Confidence	Very low	Low	Average	High	Very high
Ability	Very low	Low	Average	High	Very high

Appendix G. Pilot Group Discussion Concept Map



Appendix H. Invitation to Participate - Pilot Interview

Massey University

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

INVITATION TO PARTICIPATE: Research Interview – Pilot Study

INFORMATION

This flyer has been sent to you based upon your area(s) of teaching practice within the undergraduate + / or postgraduate nursing programme at CPIT.

You have been identified as a potential interview participant for the pilot study within the above research project

The purpose of the research project is to find out if there are any commonalities in nursing lecturers' experiences with bioscience teaching, learning and integration in clinical practice and how prepared they feel to integrate biosciences in their own teaching practice.

Project overview – the study

Nursing lecturers whose teaching practice requires some links to be made between biological science knowledge and nursing practice are invited to participate in individual interviews with the researcher. Study participants will be asked to talk with the researcher about their experiences with learning, using, and teaching bioscience concepts in nursing.

Pilot interview - your involvement

Prior to the interviews the researcher will first undertake preliminary discussion of the interview guide (for the study) within a pilot group of nursing lecturers within the CPIT school of nursing to highlight additional or alternative topics and issues to be explored further during participant interviews and enable the researcher to be more familiar with potential questions prior to data collection. You may have been involved with recruitment for this first pilot phase of the study.

The pilot interview phase involves the researcher undertaking a pilot or 'test' interview with one lecturer from the school. If you would be interested to participate in this interview, the researcher will contact you to discuss the details of the project and send you a detailed information sheet about the project. The researcher will then contact you to arrange a mutually agreeable date and time to conduct the interview if you agree to proceed. This should take no more than 50-60 minutes of your time.

You are under no obligation to accept this invitation.

If you would like to find out more and possibly participate in the project, please contact the researcher, **providing a brief outline of your experience** with bioscience integration in teaching and learning:

Via email Jane.Hardcastle@cpit.ac.nz
Or telephone 03 940 8273 (DDI)
By xxxxx date.

Appendix I. Information Sheet - Pilot Interview

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

INFORMATION SHEET – PILOT INTERVIEW

Introduction

The researcher for this project is Jane Hardcastle, a Doctor of Education student at Massey University. The project is being undertaken in partial fulfilment of the Doctor of Education qualification and seeks to explore factors that influence nursing lecturers' preparedness to integrate biological science concepts in their teaching practice.

The purpose of the project is to find out if there are any commonalities in nursing lecturers' experiences with bioscience teaching, learning and integration in clinical practice and how prepared they feel to integrate biosciences in their own teaching practice.

Project overview – the study

Nursing lecturers whose teaching practice requires some links to be made between biological science knowledge and nursing practice will be invited to participate in individual interviews with the researcher. Participants will be asked to talk with the researcher about their experiences with learning, using, and teaching bioscience concepts in nursing. In order to fully explore the topics and experiences involved, it is likely that two to three interview sessions will be required.

Pilot interview - your involvement

Prior to the interviews the researcher will first undertake preliminary discussion of the interview guide (for the study) within a pilot group of nursing lecturers within her own school of nursing to highlight additional or alternative topics and issues to be explored further during participant interviews and enable the researcher to be more familiar with potential questions prior to data collection. You will have been involved with this pilot phase of the study.

This phase of the pilot involves the researcher undertaking a pilot or 'test' interview with one participant from the pilot group discussion.

Participant Identification and Recruitment

- Participation in the study is voluntary.
- You have participated in the pilot group discussion and may wish to participate in a pilot interview with the researcher.

One participant will be recruited from the pilot group discussion conducted at CPIT on XXX date.

- The interview will be conducted in a location of your choice (workplace or other) providing the setting is private, quiet, and away from work-related distractions or disturbances wherever possible. As such, there will be no personal expense incurred.
- It is not anticipated that participation in the pilot interview will cause any physical harm.
- The interview process encourages reflection and exploration of thoughts and feelings that may be highly personal and unpredictable in terms of the information you may share with the

researcher. Whilst it is difficult to predict any potential consequences, the researcher's experience will enable her to acknowledge and respond to issues and / or ethical dilemmas that may be raised as a consequence of the interview(s).

Project Procedures
Every possible attempt will be made to ensure that research data remains confidential to myself (as the researcher) and my research supervisors. No individuals or institutions will be identified in any published material or to any other person. All data will be stored electronically with unique password protection and/or in a locked filing cabinet to which only the researcher will have access.

- The interview will be recorded with your permission using digital audio equipment to enable researcher evaluation and any subsequent refinement of the proposed interview guide. The interview will not be transcribed.
- You will be assigned a unique code that identifies you to the researcher only.
- Personal identification data will not be recorded.
- Recorded material will be safely destroyed within five years of the study's completion for the protection of the research participants.

Your involvement
If you agree to participate, the researcher will contact you to arrange a mutually agreeable date and time to conduct the pilot interview. This should take no more than 50-60 minutes of your time.

Your rights
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- ask for the audio recording to be turned off at any time during the interview;
- withdraw from the study (at any time before data evaluation commences);
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given a copy of the summary of the project findings when it is concluded.

How to proceed
If you would like to participate in the pilot interview, please contact the researcher:

Via email Jane.Hardcastle@cpit.ac.nz

Or telephone 940 8273 (DDI)

By xxxxx date.

Project Contacts
Please feel free to contact me and/or my supervisor if you have any questions about the project.

Researcher: Jane Hardcastle
Contact details: School of Nursing and Human Services
Christchurch Polytechnic Institute of Technology
Madras Street Campus
PO Box 540
Christchurch
Tel: 03 940 8273 (DDI)
Jane.Hardcastle@cpit.ac.nz

Research supervisor: Dr Linda Leach
Contact details: Massey University
Private bag 11222
Palmerston North
Tel: 06 356 9099 Extn 8831
L.J.Leach@massey.ac.nz

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application _11_ / 04_. If you have any concerns about the conduct of this research, please contact Professor Julie Boddy, Chair, Massey University Human Ethics Committee: Southern A, telephone 06 350 5799 x 2541, email humanethicsoutha@massey.ac.nz.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor John O'Neill, Director, Research Ethics, telephone 06 350 5249, email humanethics@massey.ac.nz.

Appendix J. Head of School Approval Letter

Massey University

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

.. / .. / 2010

xxxxxx
Head of School, Nursing
xxxxx
Private Bag xxxx
xxxx

Dear xxxx

Re: potential involvement in research project

Integrating Biosciences in Nursing Education
How do teaching and learning experiences influence nursing lecturer preparedness?

I am writing to request an outline of the approval procedures required within your institution should you agree to permit faculty within your school of nursing to participate in the above research project.

The initial stage of this research project requires the researcher to establish the presence and location of potential nursing lecturer participants who meet the criteria that their teaching practice in some way involves the integration of bioscience content within nursing courses. This would involve liaison with the programme leader(s) responsible for undergraduate and postgraduate nursing programmes within your institution to provide preliminary demographic data concerning nursing lecturers within your school.

The project will, ideally be conducted in three tertiary education organisations (TEOs) in New Zealand. I understand (*insert name of institution*) provide integrated bioscience courses within the nursing curricula and I would welcome the opportunity to work with nursing faculty within your school.

I am a Doctor of Education candidate and will be researching lecturer experiences with teaching and learning biosciences within nursing programmes to explore whether there are any common factors influencing their preparedness to integrate bioscience content in their own teaching practice.

I want to answer the question: *How do teaching and learning experiences influence nursing lecturers' preparedness to integrate bioscience knowledge into their teaching practice?*

I will use semi-structured interviews to answer this question and seek a total of eight participants (from 2-4 schools in NZ) for the study. It is likely that participants will be required to undertake two interviews; the researcher will travel to the participants in order to gather this data.

This project has received ethical approval from Massey University Human Ethics committee (date).

If you are willing for xxxx School of Nursing to participate – your approval would require the provision of:

- an outline of your institution's requirements for research approval and ethical clearance in relation to participation (if required)
- the name and contact information for programme leader(s) for undergraduate and postgraduate nursing programmes
- permission for the programme leader to nominate potential research participants
- permission for the researcher to approach potential participants by written invitation, circulated via email by the programme leader (to avoid unnecessary staff identification should lecturers decline to participate)
- permission to use facilities for interviews
- permission to use work time, if required, for interviews with nursing lecturers

If you agree to for (*insert name of school*) to participate in this study, nursing lecturer(s) within your school may become one of the eight interview participants.

One researcher, myself, would work with the nominated programme leader(s) during the sampling and recruitment phase of the project. The identity of your organisation will be kept confidential and all participants' identities will be confidential.

A summary report of the research will be available to yourself and provided for any participants.

I hope you will agree for me to work with nursing faculty within your school. If you agree to participate please complete either form A (organisation approval to participate) or form B (organisation Participation Approval Procedures) as appropriate and return via email reply (Jane.Hardcastle@cpit.ac.nz) or by mail to:

Jane Hardcastle
Principal lecturer - Graduate Studies in Nursing
School of Nursing and Human Services
Madras Street
PO Box 540
Christchurch 8140

P: 03 940 8273
M: 0210520756
F: 03 940 8019

Should you require any further information, please do not hesitate to contact me.
Yours sincerely

Jane Hardcastle

Form A. **Organisation Approval to Participate**

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

I, xxxx of xxxx, grant approval for nursing lecturers within xxxx to participate in the research project *Integrating Biosciences in Nursing Education. How do teaching and learning experiences influence nursing lecturer preparedness?*

I agree that the researcher, Jane Hardcastle, has:

- permission to approach the programme leaders for undergraduate and postgraduate nursing programmes
- permission for the programme leader to nominate potential research participants
- permission to approach potential research participants by written invitation, circulated via email by the programme leader (to avoid unnecessary staff identification should lecturers decline to participate)
- permission to use facilities for interviews
- permission to use work time, if required, for interviews with nursing lecturers

The person who will be the liaison for the project and their contact information is:

Name: ……

Phone: ……

Email: ……

Name: ……

Signature: ……

Position: ……

Date: ……

Form B. **Organisation Participation Approval Procedures**

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

I, xxxx of xxxx, grant approval for the researcher, Jane Hardcastle, to apply to xxxxxx to conduct the research project *Integrating Biosciences in Nursing Education. How do teaching and learning experiences influence nursing lecturer preparedness?* with nursing lecturers within xxxx .

I agree to provide the researcher, Jane Hardcastle, with:

- an outline of research participation approval requirements within xxxxx organisation.
- permission to approach potential research participants by written invitation upon the approval of xxxxxxx research / ethics committee.

Upon approval from xxxxxx committee for xxxxxxx:

- the name and contact information for a liaison person (below)
- permission to approach the programme leaders for undergraduate and postgraduate nursing programmes
- permission to approach potential research participants by written invitation, circulated via email by the programme leader (to avoid unnecessary staff identification should lecturers decline to participate)
- permission to use facilities for interviews
- permission to use work time, if required, for interviews with nursing lecturers

Name: **……**

Signature: **……**

Position: **……**

Date: ……

Appendix K. Invitation to Participate - Interview

Massey University

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

INVITATION TO PARTICIPATE: Research Interview

INFORMATION

This flyer has been forwarded to you by your programme leader / head of school based upon your area(s) of teaching practice within the undergraduate + / or postgraduate nursing programme at xxxxxxxxxx.

You have been identified as a potential interview participant for the above research project

The purpose of the research project is to find out if there are any commonalities in nursing lecturers' experiences with bioscience teaching, learning and integration in clinical practice and how prepared they feel to integrate biosciences in their own teaching practice.

Project overview – the study
Nursing lecturers whose teaching practice requires some links to be made between biological science knowledge and nursing practice are invited to participate in individual interviews with the researcher. Study participants will be asked to talk with the researcher about their experiences with learning, using, and teaching bioscience concepts in nursing.

If you would be interested to participate in these interviews, the researcher will contact you to discuss the details of the project and send you a detailed information sheet about the project. The researcher will then contact you to arrange a mutually agreeable date and time to conduct the first interview if you agree to proceed. This should take no more than 50-60 minutes of your time.

- It is likely that you will be asked to participate in a further one or two interviews (at your convenience) in order to explore and discuss the topics fully.

You are under no obligation to accept this invitation.

If you would like to find out more and possibly participate in the project, please contact the researcher, **providing a brief outline of your experience** with bioscience integration in teaching and learning:

Via email Jane.Hardcastle@cpit.ac.nz
Or telephone 03 940 8273 (DDI)

By Friday 30th September, 2011.

Appendix L. Transcriber Confidentiality Agreement

Massey University

Te Kunenga ki Pürehuroa

College of Education
School of Curriculum and Pedagogy
Hokowhitu Campus
Palmerston North

Integrating Biosciences in Nursing Education

How do teaching and learning experiences influence nursing lecturer preparedness?

TRANSCRIBER'S CONFIDENTIALITY AGREEMENT

I ..... (Full Name - printed) agree to transcribe the recordings provided to me.

I agree to keep confidential all the information provided to me.

I will not make any copies of the transcripts or keep any record of them, other than those required for the project.

Signature: ..... **Date:** .....

Appendix M. Moustakas' modification of the Stevick-Collaizzi-Keen Method of Analysis of Phenomenological Data

Moustakas' modification of the Stevick-Collaizzi-Keen method of analysis of phenomenological data (1994, pp. 121-122)		Researcher adaptation
1.	Using a phenomenological approach, obtain a full description of your own experience of the phenomenon.	The researcher undertook phenomenological reduction to apprehend her own conscious experience and consider both the experience and how the experience came to be (reflecting the textural and structural components outlined within this method and the philosophy of noesis and noema). Here researcher presuppositions were identified and bracketed through the phenomenological process of the epoché rather than obtain a verbatim description of the entire experience. As the researcher's preparedness appeared to differ from that of many nursing lecturers prior to commencement of the study it was decided that the inclusion of her own experience in data analysis would a) compromise her ability to uphold a critical phenomenological attitude throughout the study b) not achieve the study aim to explore the experience of others as a means to enhance knowledge and understanding of the phenomenon.
2.	From the verbatim transcript of your experience complete the following steps: a. Consider each statement with respect to significance for description of the experience b. Record all relevant statements c. List each non-repetitive, non-overlapping statement. These are the invariant horizons or meaning units of the experience d. Relate and cluster the invariant meaning units into themes	The steps here essentially reflect the researcher's approach to data analysis within and across each participant's transcript. Steps b, c, d and e reflect the researcher's approach to horizonalizing, the crafting of horizon statements, identification of emerging

	e. Synthesize the invariant meaning units and themes into a description of the textures of the experience. Include verbatim examples. f. Reflect on your own textural description. Through imaginative variation, construct a description of the structures of the experience. g. Construct a textural-structural description of the meanings and essences of your experience.	themes and development of individual textural descriptions. The researcher added the identification of common and variant themes in order to include an early validation check to ensure that emerging themes were reflective of the participants' experience. The researcher also chose to compile a composite textural description rather than wait until step 4 in this method in order to summarise the group's experiences of learning and of teaching. This facilitated further verification of emerging themes and the identification of core and essential themes within textural accounts of the experience. Step 2 f was then undertaken for each participant to add greater depth of thinking and imaginative variation to look beyond what was experienced and to consider potential researcher assumptions and influence on the research process through continued reflexivity. The researcher again added the step of compiling a composite structural description in order to summarise how the group experienced learning and teaching. This facilitated validation of emerging structural themes and the identification of core and essential themes within structural accounts of the experience.
3.	From the verbatim transcript of the experience of each of the other co-researchers, complete the above steps, a through to g.	Completed per participant as outlined above
4.	From the individual textural-structural	As the researcher had

	descriptions of all co-researchers' experiences, construct a composite textural-structural description of the meanings and essences of the experience, integrating all individual textural-structural descriptions into a universal description of the experience representing the group as a whole.	compiled composite descriptions for both textural and structural descriptions these were used as the focus for intuitive integration to synthesise the essential textural and core structural themes into a statement of the essences of the phenomenon as a whole
		The researcher added further reflection to review researcher presuppositions and role on the research process
		Essences of the phenomenon were then presented for discussion

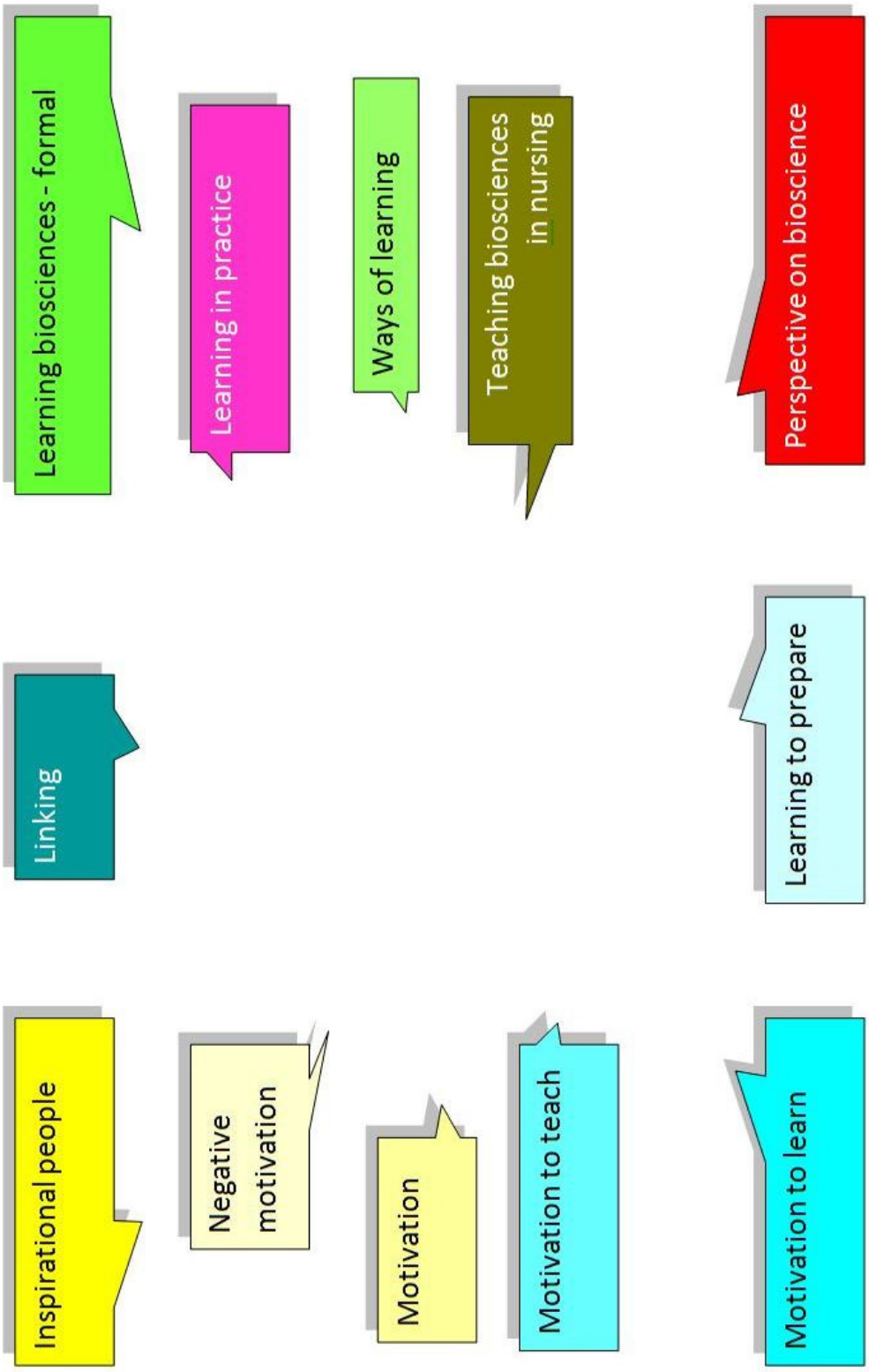
Appendix N. Moustakas' modification of the van Kaam Method of Analysis of Phenomenological Data

Moustakas' modification of the van Kaam method of analysis of phenomenological data (1994, pp. 120-121)		**Researcher adaptation**
Using the complete transcription of each research participant		
1.	*Listing and preliminary grouping* List every expression relevant to the experience. (Horizonalization)	The researcher felt it was important to dwell on the data first by repeated re-listening and re-reading transcripts, then identify all relevant statements as horizons after writing a summary of the sense of the whole experience for each person
2.	*Reduction and elimination:* To determine the Invariant Constituents: Test each expression for two requirements: a. Does it contain a moment of the experience that is a necessary and sufficient constituent for understanding it? b. Is it possible to abstract and label it? If so, it is a horizon of the experience. Expressions not meeting the above requirements are eliminated. Overlapping, repetitive, and vague expressions are also eliminated or presented in more exact descriptive terms. The horizons that remain are the invariant constituents of the experience.	The researcher did not agree with the testing requirements here as they were too narrow and suggestive of essential constituents too early in data analysis It was important to look beyond the immediate description to identify all statements that related to the participant's experience These were crafted into a composite of horizon statements clustered around emerging themes to better illustrate each participant's experience
3.	*Clustering and Thematizing the Invariant Constituents:* Cluster the invariant constituents of the experience that are related into a thematic label. The clustered and labelled constituents are the core themes of the experience.	Identification of core themes here was thought to be too early – the researcher identified emerging, *broad* themes in the process of crafting horizon statements above (as a means of checking researcher assumptions and potential influence)
4.	Final Identification of the Invariant Constituents and Themes by Application: *Validation* Check the invariant constituents and their accompanying theme against the complete record of the research participant. (1) Are they expressed explicitly in the complete transcription? (2) Are they compatible if not explicitly expressed? (3) If they are not explicit or compatible, they are not relevant to the co-researcher's experience and should be deleted.	This was undertaken as early validation of the horizon statement content but the researcher did not want to impose any finality regarding themes until the context had been fully explored to ensure that emerging themes were consistent with the participant's experience as a whole

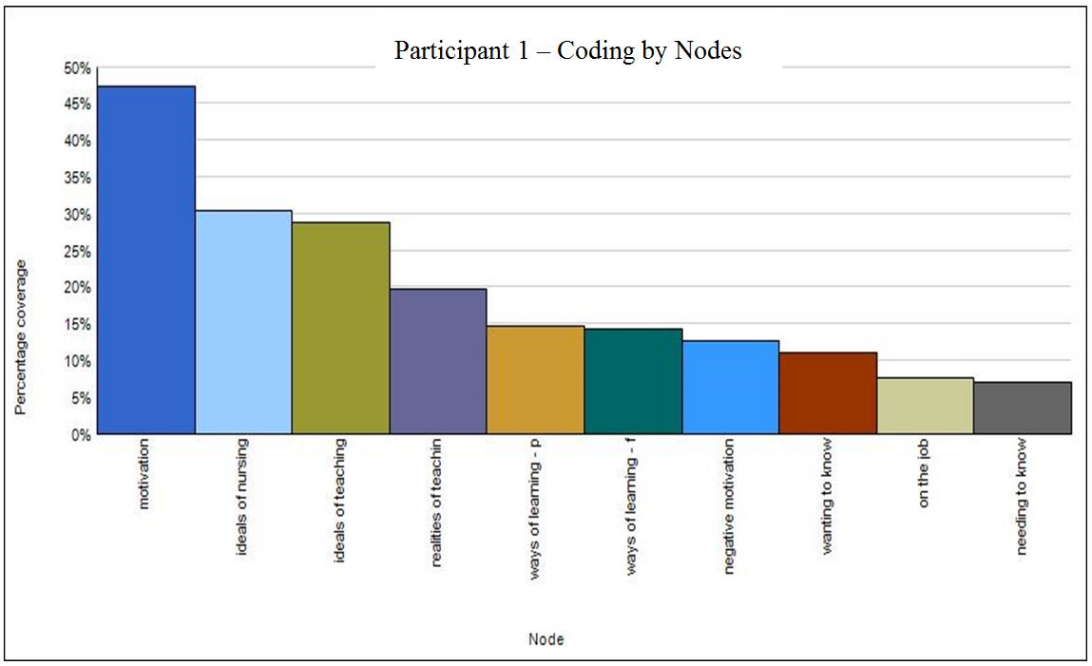
5.	Using the relevant, validated invariant constituents and themes, construct for each co-researcher an *Individual Textural Description* of the experience. Include verbatim examples from the transcribed interview.	This was undertaken but the researcher wanted to do further validation after writing each description to make sure she hadn't imposed any influence on the analysis and to further qualify the meaning within emerging themes – enabling more specific and relevant clusters of meaning and themes to emerge
		A composite textural description was crafted from each individual to summarise and focus on the 2 interrelated experiences of 'learning' and 'teaching'
		Core themes were then identified from the composite descriptions as they more closely reflected the essential textural themes
6.	Construct for each co-researcher an *Individual Structural Description* of the experience based on the individual Textural Description and Imaginative Variation.	This was done in a more comprehensive manner by re-listening to interview recordings following preliminary imaginative variation to look beyond the experience to the participants' experiencing of the phenomenon Individual structural themes were then written
		From the descriptions - emerging structural themes were considered for each participant and across participants These were condensed into core-themes and sub-themes
		Core and sub-themes were validated by cross checking against individual structural descriptions
		A composite structural description was crafted from each individual to summarise and highlight the core and essential themes

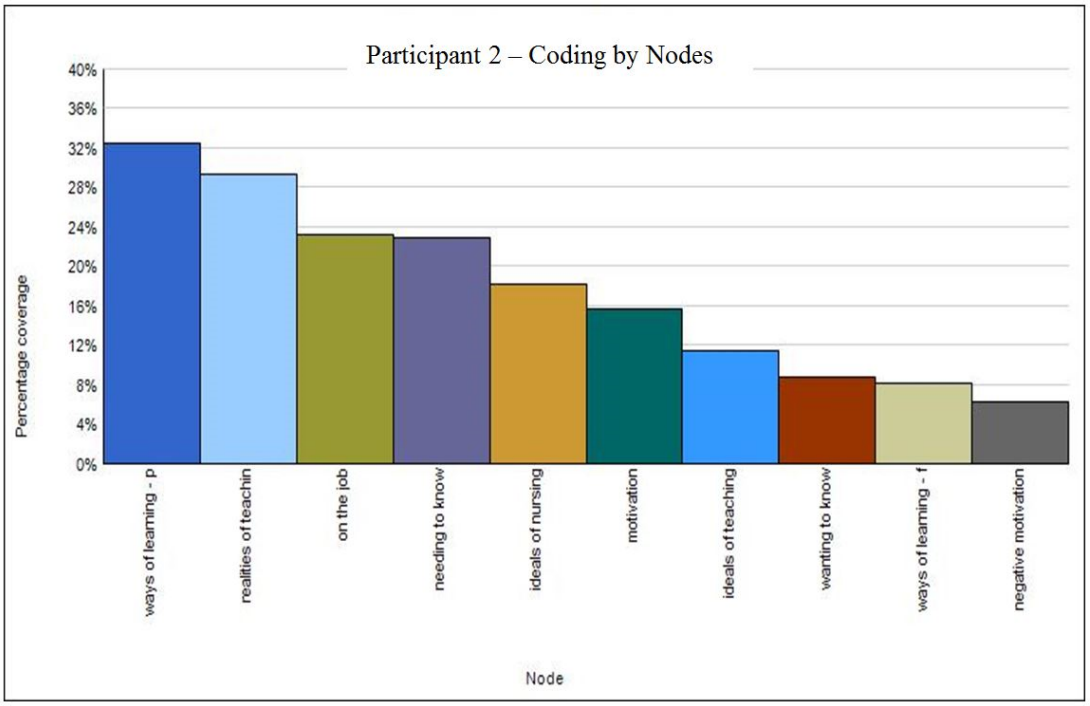
7.	Construct *for each research participant* a *Textural-Structural Description* of the meanings and essences of the experience, incorporating the invariant constituents and themes.	The purpose of data analysis was to identify essential essences of the phenomenon – the researcher favoured the earlier use of composite descriptions to facilitate identification and validation of core and essential themes within textural and structural descriptions *prior* to undertaking intuitive integration – to explore both composite descriptions to identify universal qualities and universal essences of the whole experience prior to synthesis of the essential essences of the experience
From the Individual Textural-Structural Descriptions, develop a Composite Description of the meanings and essences of the experience, representing the group as a whole.		
		The researcher added further reflection to review researcher presuppositions and role on the research process
		Essences of the phenomenon were then presented for discussion

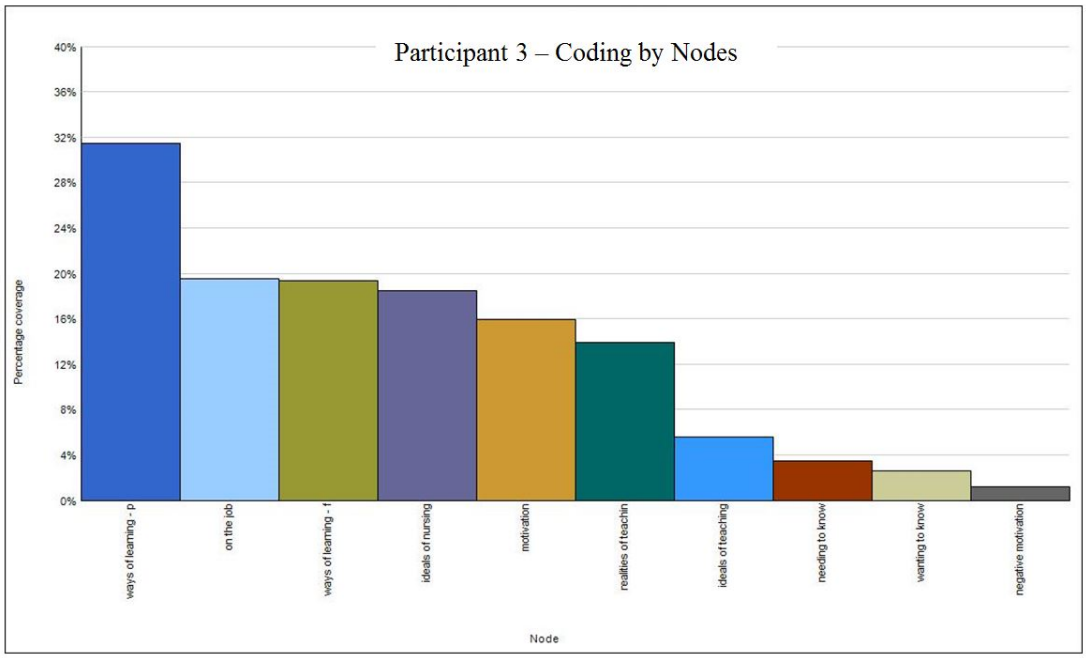
Appendix O. Emerging Textural Themes and Colour Codes

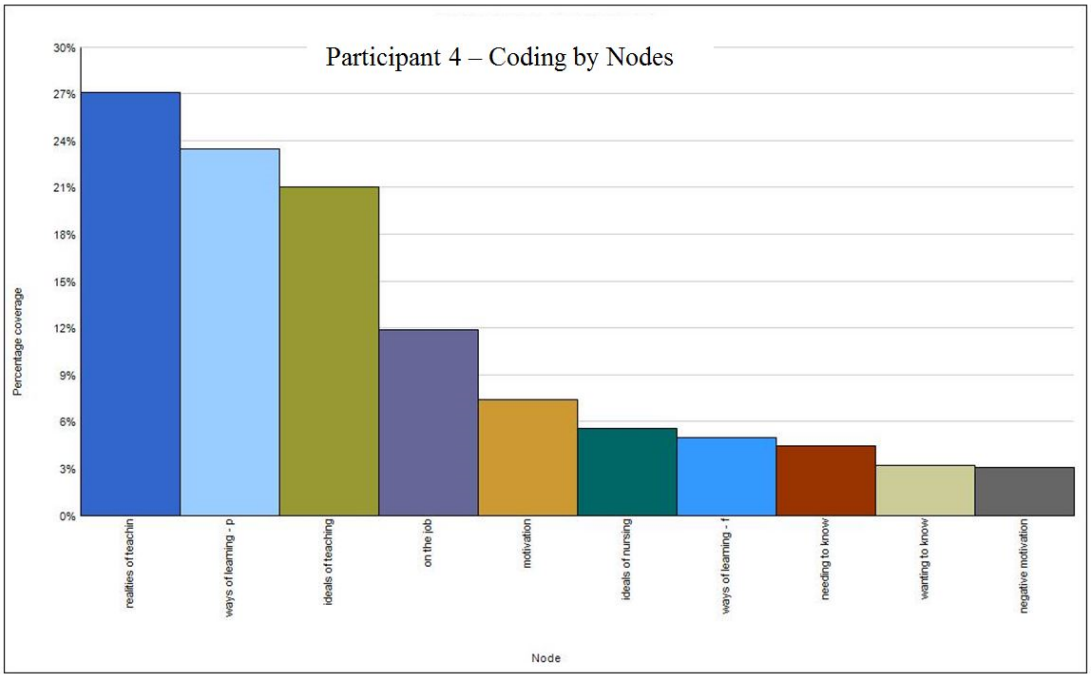


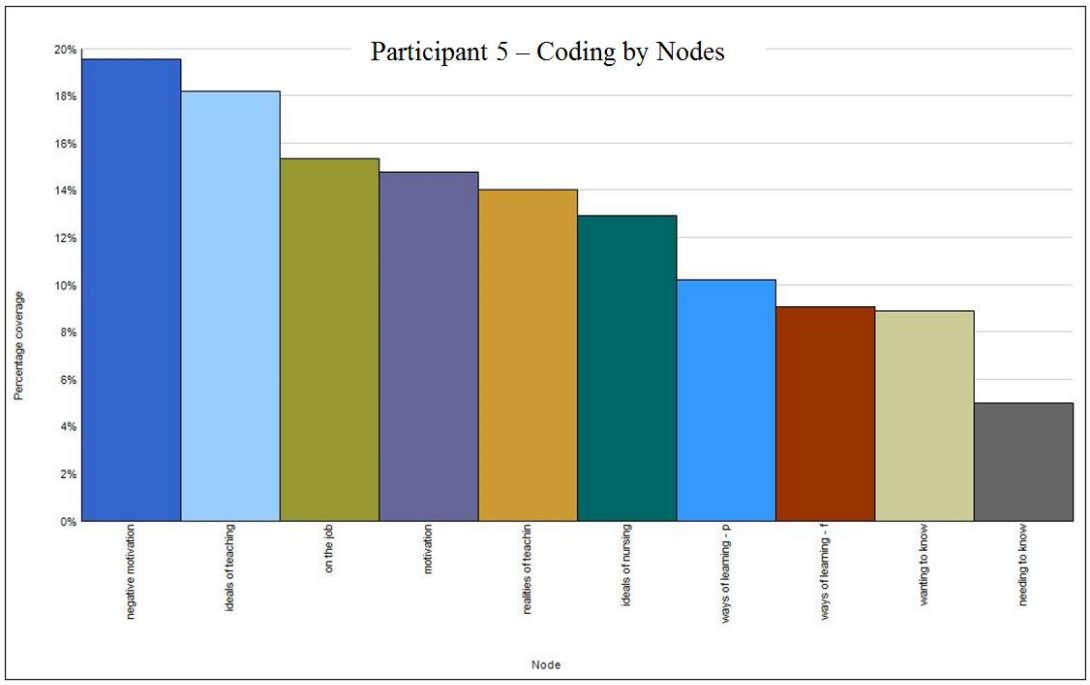
Appendix P. Coding Distribution of Core Themes

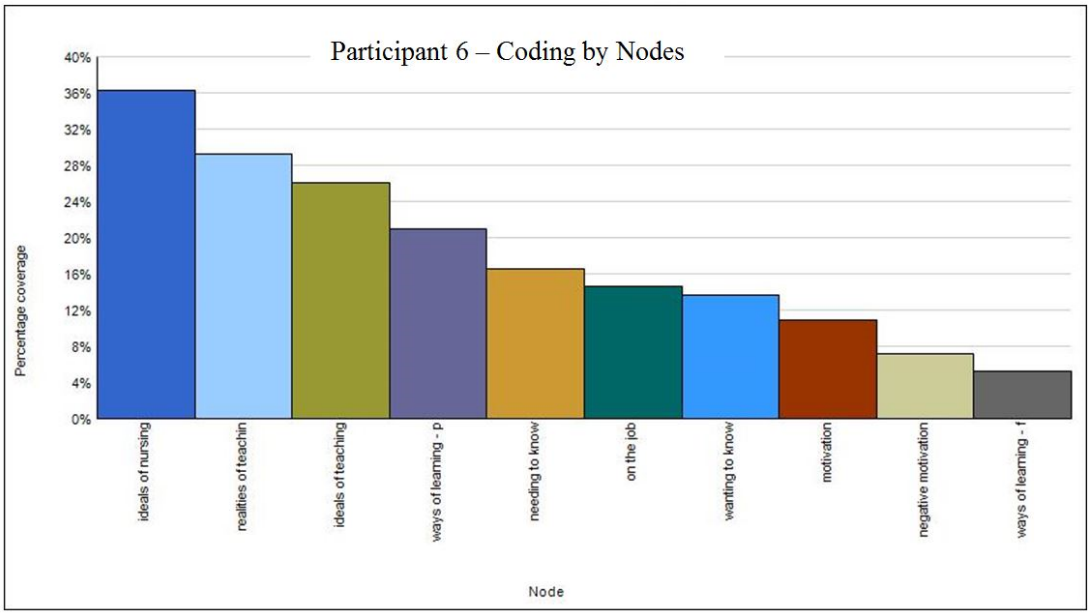


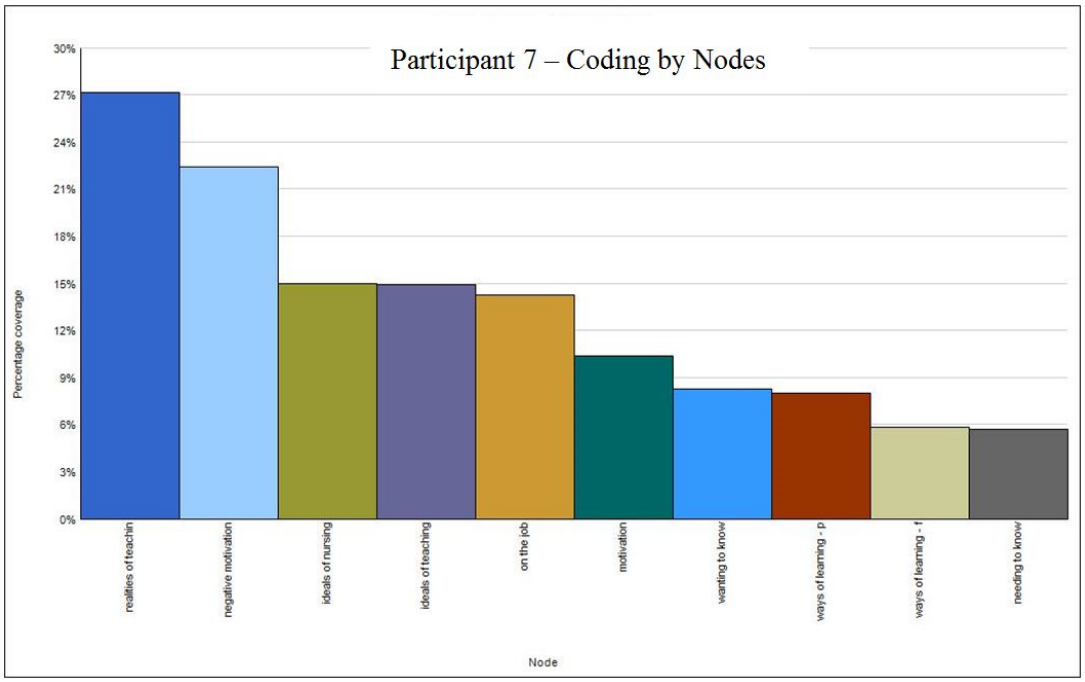


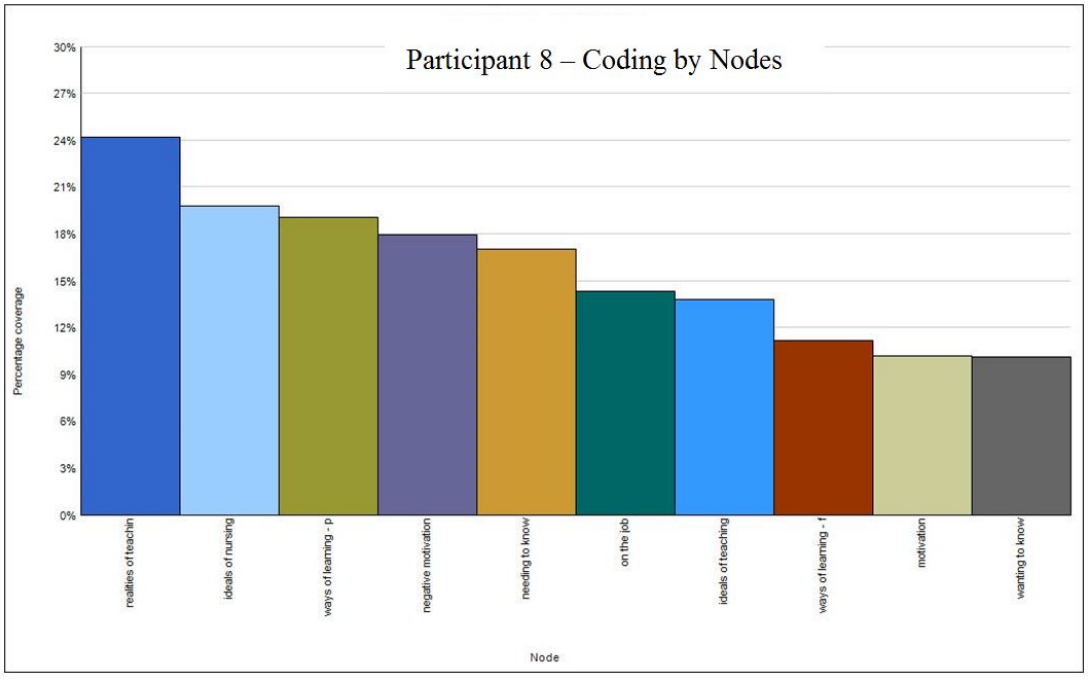

Participant 3 – Coding by Nodes
Percentage coverage
40%
36%
32%
28%
24%
20%
16%
12%
8%
4%
0%
ways of learning - p
on the job
ways of learning - f
ideals of nursing
motivation
realities of teachin
ideals of teaching
needing to know
wanting to know
negative motivation
Node


Participant 4 – Coding by Nodes
Percentage coverage
30%
27%
24%
21%
18%
15%
12%
9%
6%
3%
0%
realities of teachin
ways of learning - p
ideals of teaching
on the job
motivation
ideals of nursing
ways of learning - f
needing to know
wanting to know
negative motivation
Node


Participant 5 – Coding by Nodes
Percentage coverage
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
negative motivation
ideals of teaching
on the job
motivation
realities of teachin
ideals of nursing
ways of learning - p
ways of learning - f
wanting to know
needing to know
Node


Participant 6 – Coding by Nodes
Percentage coverage
40%
36%
32%
28%
24%
20%
16%
12%
8%
4%
0%
ideals of nursing
realities of teachin
ideals of teaching
ways of learning - p
needing to know
on the job
wanting to know
motivation
negative motivation
ways of learning - f
Node


Participant 7 – Coding by Nodes
Percentage coverage
30%
27%
24%
21%
18%
15%
12%
9%
6%
3%
0%
realities of teachin
negative motivation
ideals of nursing
ideals of teaching
on the job
motivation
wanting to know
ways of learning - p
ways of learning - f
needing to know
Node


Participant 8 – Coding by Nodes
Percentage coverage
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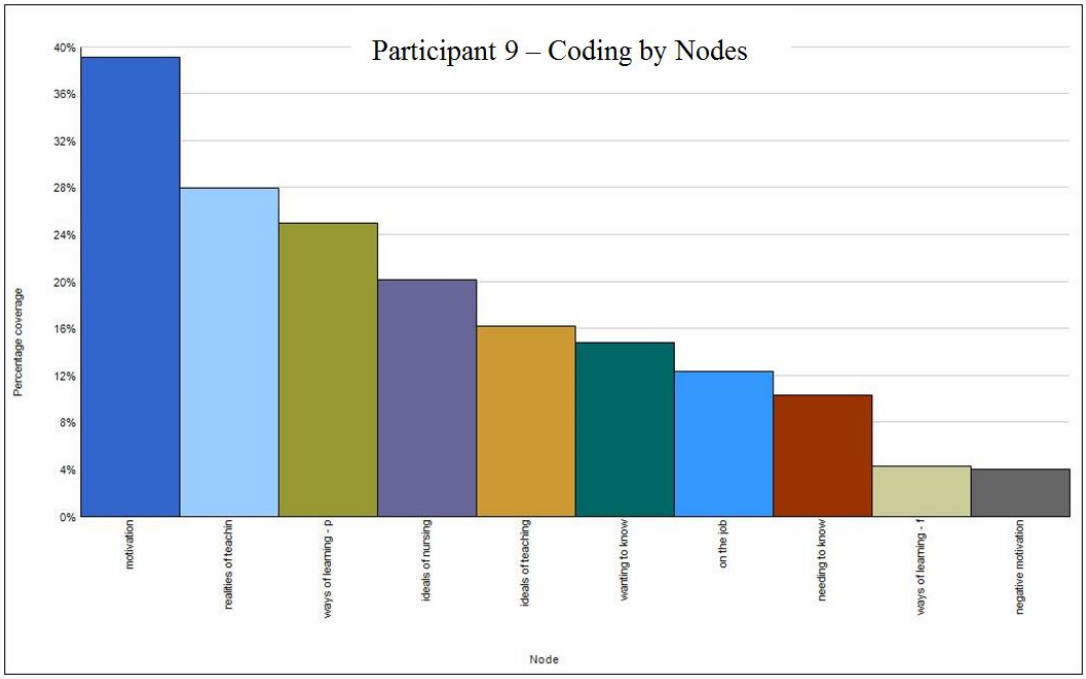
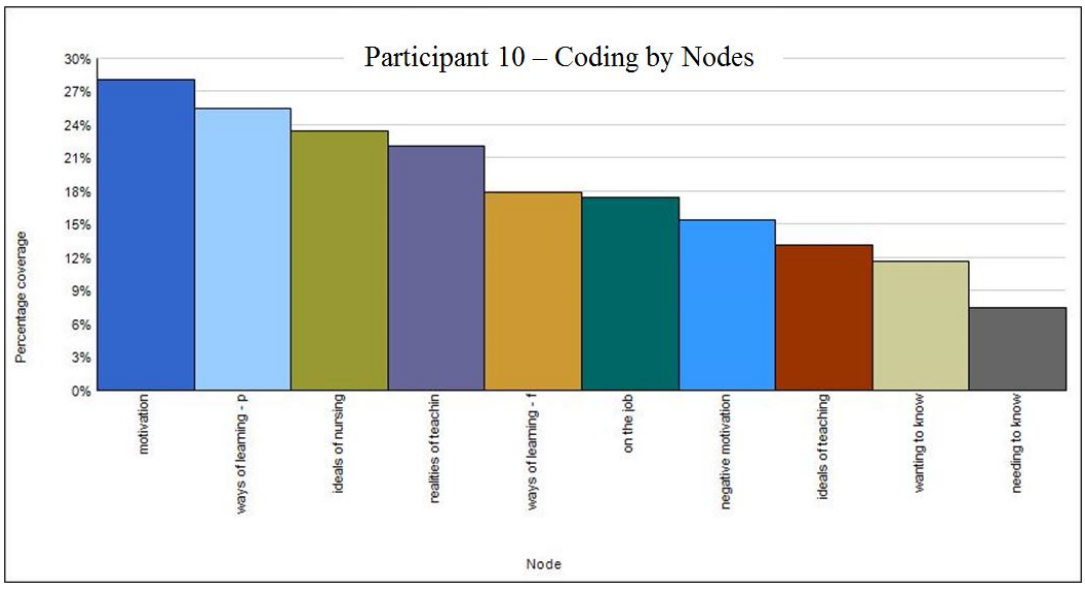
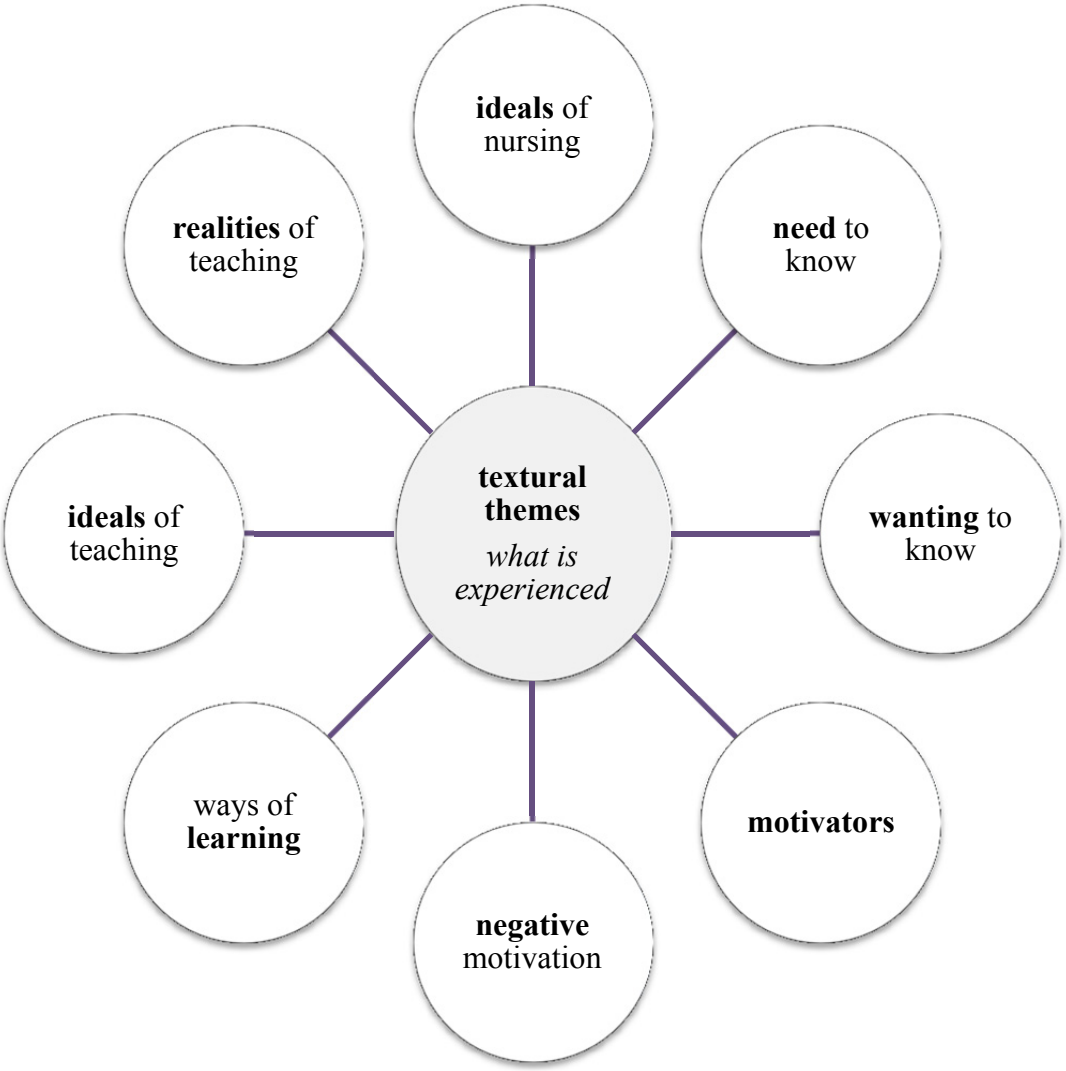
27%
24%
21%
18%
15%
12%
9%
6%
3%
0%
realities of teachin
ideals of nursing
ways of learning - p
negative motivation
needing to know
on the job
ideals of teaching
ways of learning - f
motivation
wanting to know
Node

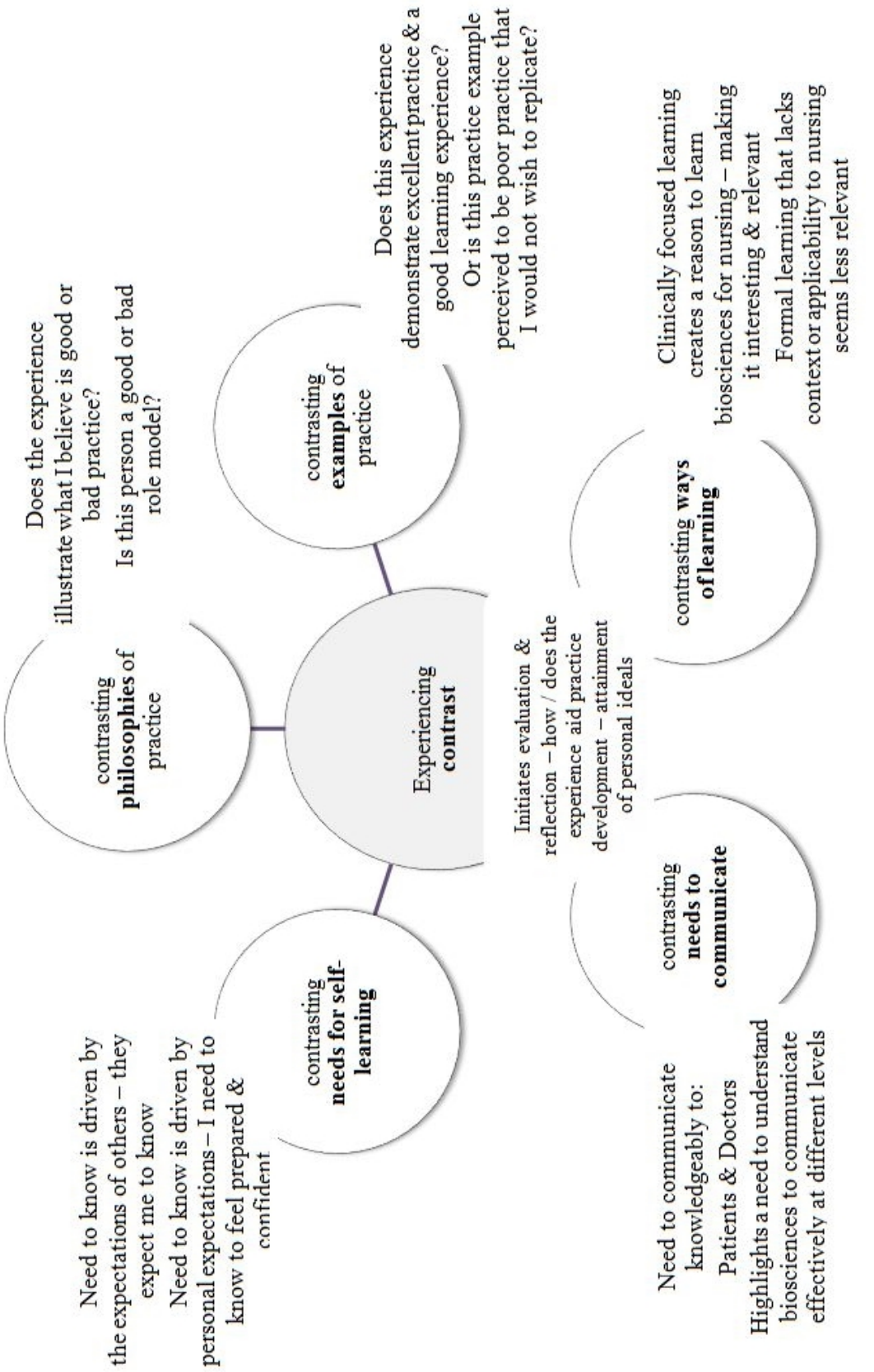

Participant 9 – Coding by Nodes
Percentage coverage
40%
36%
32%
28%
24%
20%
16%
12%
8%
4%
0%
motivation
realities of teachin
ways of learning - p
ideals of nursing
ideals of teaching
wanting to know
on the job
needing to know
ways of learning - f
negative motivation
Node

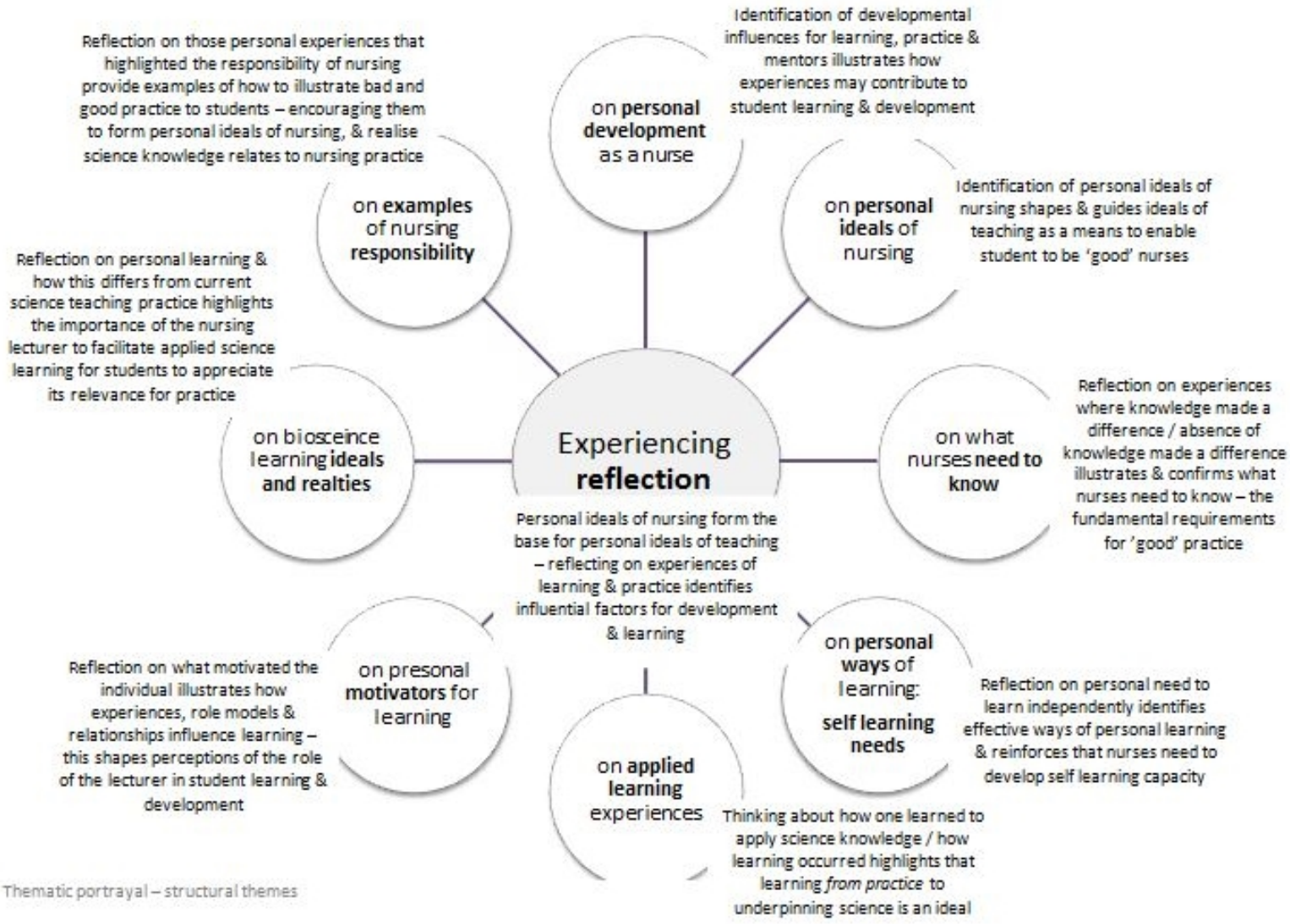

Participant 10 – Coding by Nodes
Percentage coverage
30%
27%
24%
21%
18%
15%
12%
9%
6%
3%
0%
motivation
ways of learning - p
ideals of nursing
realities of teachin
ways of learning - f
on the job
negative motivation
ideals of teaching
wanting to know
needing to know
Node

Appendix Q. Verified Core Textural Themes

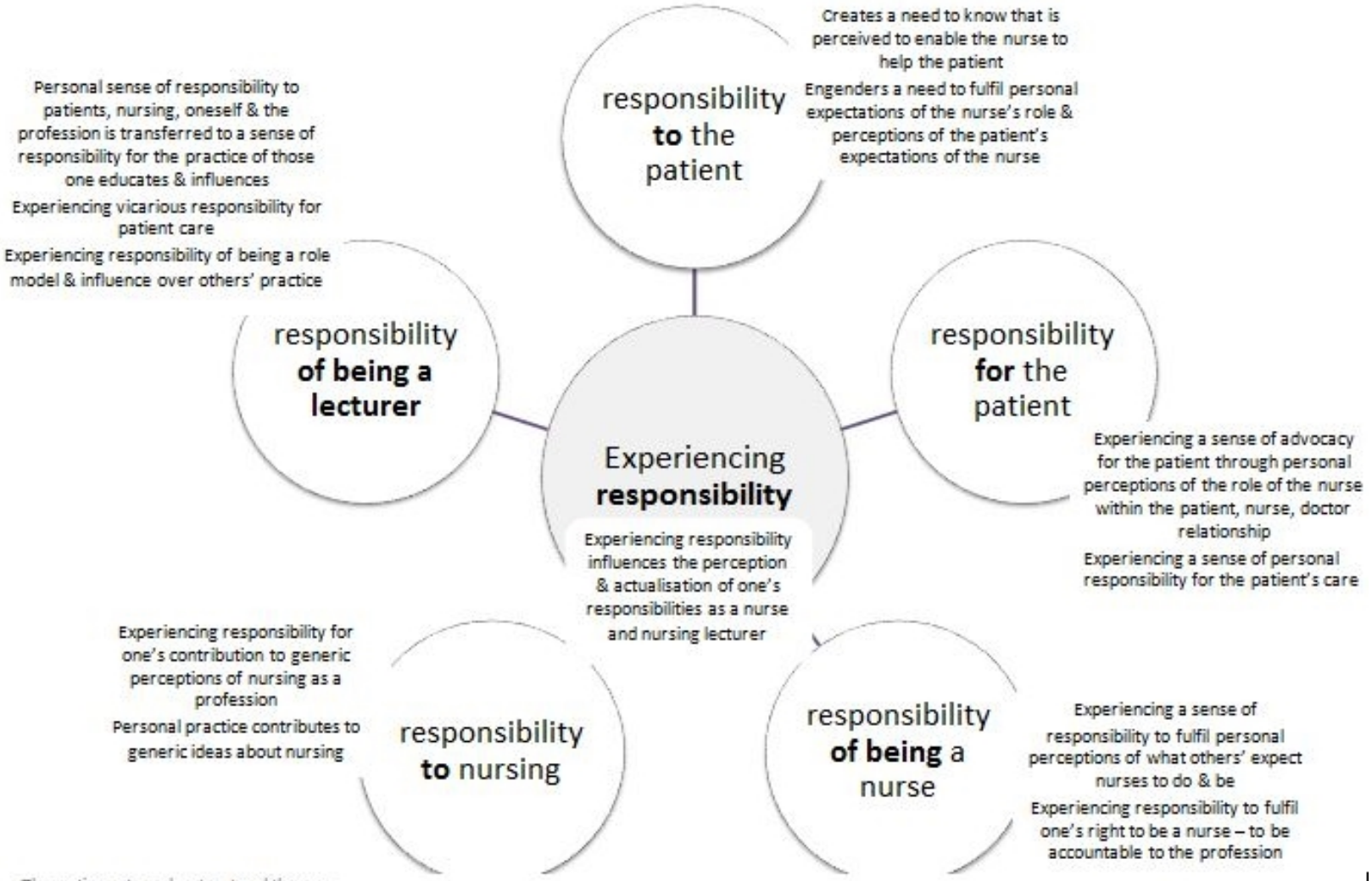


Appendix R. Core Structural Themes and Contextual Sub-Themes





Thematic portrayal – structural themes


Experiencing responsibility
Experiencing responsibility influences the perception & actualisation of one's responsibilities as a nurse and nursing lecturer
responsibility to the patient
Creates a need to know that is perceived to enable the nurse to help the patient
Engenders a need to fulfil personal expectations of the nurse's role & perceptions of the patient's expectations of the nurse
responsibility for the patient
Experiencing a sense of advocacy for the patient through personal perceptions of the role of the nurse within the patient, nurse, doctor relationship
Experiencing a sense of personal responsibility for the patient's care
responsibility of being a nurse
Experiencing a sense of responsibility to fulfil personal perceptions of what others' expect nurses to do & be
Experiencing responsibility to fulfil one's right to be a nurse – to be accountable to the profession
responsibility to nursing
Experiencing responsibility for one's contribution to generic perceptions of nursing as a profession
Personal practice contributes to generic ideas about nursing
responsibility of being a lecturer
Personal sense of responsibility to patients, nursing, oneself & the profession is transferred to a sense of responsibility for the practice of those one educates & influences
Experiencing vicarious responsibility for patient care
Experiencing responsibility of being a role model & influence over others' practice

Appendix S. Universal Essences and Emerging Relationships