PROFESSIONAL COMPETENCE –

COMPLEXITY, CONCEPTS AND CHARACTERISTICS

A CASE STUDY OF NEW ZEALAND PHARMACY

by

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Abstract

This thesis sets out to develop a model of professional competence that takes into account the complexity associated with pharmacy practice. The resulting model conceptualises competence in a way that recognises it is a multi-leveled entity that develops and changes over a practitioner's practicing life. The model enables the characteristics that differentiate between levels of performance to be identified and explored.

The thesis responds to the issues raised by the emerging emphasis on audit and competence assurance resulting from the introduction of The Health Practitioners Competence Assurance Act 2003 in New Zealand. It investigates the concept of professional competence as exhibited by experienced practising pharmacists, how it is defined, and how it evolves through ongoing practice. The research identifies behaviours that differentiate expert, competent and not-competent performance.

As a result of the research undertaken, a new model of professional competence for pharmacists is proposed. This model uses complexity theory to move beyond traditional conceptions of competence, which are based on performance of roles and functions and focus on separate tasks and knowledge. Instead, it proposes that professional competence is a complex, separate entity in its own right, which is reflected in the roles and functions pharmacists perform.

In the model, the ability to perform professional tasks competently is termed the domain of technical competence, but is only one component of professional competence. The other components are contained in four other domains of competence—cognitive, legal/ethical, organisational, and inter/intra-personal. Each of these domains is expressed in a continuum of behaviours, which at one end reflects the characteristics of the domain totally unconnected with the other domains. At the other end of the continuum the behaviour exhibited reflects the full integration of all the domains.

"Competent" pharmacists are able to integrate the five domains of competence when performing their professional roles. Conceptualising professional competence in this way enables the importance of complex integrated behaviours of professional practice to be recognised without trying to break them into component parts. An example is the ability to draw apparently unconnected pieces of information together when deciding on appropriate actions for particular situations.

"Not-competent" performance is characterised by a lack of ability to fully integrate the five domains of competence. This is often exhibited in a lack of ability to integrate one of the domains, for example, not applying legal or ethical judgments to decisions made or not communicating clearly in English. "Expert" performers on the other hand are able to integrate the skills and knowledge within each of the domains across a wider range of practice situations more consistently than competent performers. In doing so, experts are less reliant on standard professional and process knowledge, and instead use personal knowledge and experience to underpin their practice. This is reflected in their ability to act in more intuitive and creative ways.

The model also provides a means of differentiating between "specialist" and "expert" performers. While experts are able to integrate the domains of competence more consistently and across a wider range of practice situations than competent performers, specialists demonstrate a greater ability in just one or two of the domains. This is most commonly exhibited by a specialist having a body of in-depth clinical knowledge within the cognitive and technical domains, or a specialist manager having a high level of proficiency in the organisational domain.

In merging the domains together, the competent professional will perform professional tasks and functions and in doing so will exhibit patterns of behaviour appropriate to their situational context. Judgments of competence can be made based on such behaviours. Competence assurance is, therefore, viewed as situational, and evaluation methods are required that take this into account.

The thesis proposes that the methods used for competence assurance of health professionals should take a complex view of professional competence, and focus on the integrated behaviours that differentiate performance. It also proposes that the integrated, complex model of professional competence can have profound impacts on curriculum development for initial pharmacist education and continuing professional development activities.

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This thesis is dedicated to my friend Dr Pam Basill (1960 – 2004).

Table of Contents

Table of Illustrations

Table of Tables

Professional Competence – Complexity, Concepts and Characteristics
A case study of New Zealand pharmacy

Overview

This thesis aims to identify the characteristics and variables distinguishing the competent and expert performance of pharmacists, and to develop a model of professional competence based on these. The behaviours that characterise the model are investigated, using accepted psychometric techniques to determine which have the potential to discriminate between levels of performance and could, therefore, be used as the basis of a self-evaluation instrument. The resulting model and characteristic behaviours may be used to guide curriculum development, to determine continuing professional development (CPD) activities, and to develop an assessment regime for the assurance of ongoing competence.

The research centres on the pharmacy profession, and a systems approach is used to focus on the qualities exhibited by pharmacists that relate to professional competence, rather than considering in isolation the tasks and functions they perform or the work situations in which they practise. It explores notions of competent, expert, and specialist performance and their associated latent variables. This approach recognises that pharmacists work in a range of different practice situations and generally progress in their professional lives from being novice practitioners to becoming experienced and/or expert practitioners.

The ability of professionals to evaluate their own performances and to continue to learn and develop—using learning experiences encountered in the workplace—are recognised as key attributes of both professionalism and competence. These lifelong learning characteristics and their role in determining competence and expertise are considered during the model development. This is important in the context of the health scene in New Zealand, where the assurance of ongoing professional competence of health practitioners throughout their practice lives has been mandated by legislation.

The model of professional competence developed describes observed behaviours that are not reliant on or specific to the contextual aspects of the professional's practice situation, although the observed behaviour will be influenced by the function the professional performs. The model is thus independent of the constraints imposed by practice context, and this aspect provides a unique opportunity to describe behaviours that can be isolated and used in professional development activities, including self-evaluation of continuing competence.

Both the model of professional competence and the behaviours that characterise it reflect the importance of the ability of professionals to integrate their professional knowledge, attitudes and skills with their personal knowledge, attitudes and skills, and their ability to continue to learn and develop this knowledge through their professional lives using reflective practice. The model also recognises the importance of the ability of professionals to access information, to extrapolate known information to unknown situations, and to apply their knowledge in the face of unique day-to-day practice problems—all while demonstrating a high level of communication, interpersonal, and organisational skills, and a high level of integrity.

The integrated characteristics identified in the research could be used as the basis of a self-evaluation inventory, and point to the need to develop curriculum, and continuing professional development initiatives that develop the practitioner's ability to integrate knowledge, skills and attitudes, along with integrated assessment tasks that assess this ability.

The thesis is organised into four parts as follows:

Part One explores current concepts of competence and professionalism, and investigates contemporary models used to describe professional competence.

Part Two describes the methodology used to develop a model of professional competence for pharmacists, and describes the characteristics associated with the model.

Part Three tests the model to determine how it performs in both theory and practice. Validity and reliability of the model are investigated.

Part Four concludes this thesis and explores how the research may be used to guide curriculum development and ongoing professional development, and to assess professional competence. A self-evaluation instrument developed from the model is proposed.

Part One
Competence and Professionalism

In this part of the thesis, the background and context of the study is explored, and the importance of the research within the New Zealand health environment identified.

Chapter One describes the context for this research relating to what pharmacists do, the Health Practitioners Competence Assurance Act 2003, and the future of pharmacy practice. It sets out the aims, objectives and research questions this research seeks to answer.

Chapter Two explores the concepts and characteristics of professionalism, competence, and expertise, and examines their similarities and differences. The influence of social and cultural contexts is introduced and a way of linking the constructs of competence and professionalism concluded.

Chapter Three explores the qualities associated with professional competence. The importance of knowledge and learning in shaping professional competence is explored. The influence of values and attitudes is considered.

Chapter Four considers current models of professional competence, and methodologies used for their development. It identifies the importance of using holistic models to conceptualise professional competence, and identifies a way forward for developing such a model for pharmacists.

Chapter One
The research in context

1.1 Introduction

Pharmacy is a profession that plays an important role in the health-care system in New Zealand. Pharmacists are health professionals, and in order to practise, they must now be registered by the Pharmacy Council. (Prior to 2005 this was the role of the Pharmaceutical Society of New Zealand (PSNZ)). Registration has, up to now, carried with it the implicit assumption that pharmacists are competent to practise throughout their working lives. That is, once a pharmacist has been assessed as competent for registration, no further assessment of his/her ongoing capability has been made unless specific concerns regarding performance have been raised. This has now changed with the introduction of The Health Practitioners Competence Assurance Act 2003.

This Act now requires professional bodies to regularly quality assure their members, and while the Act does not prescribe how this will be done, it does define quality assurance as:

a. an activity that is undertaken to improve the practices or competence of 1 or more health practitioners by assessing the health services performed by those health practitioners (whenever those services are or were performed); and
b. includes the following acts that are done in the course of, or as a result of, that activity:
   i. the whole or part of any assessment or evaluation:
   ii. the whole or part of a study of the incidence or causes of conditions or circumstances that may affect the quality of health services performed by 1 or more of those health practitioners:
   iii. any preparation for that assessment, evaluation, or study:
   iv. making recommendations about the performance of those services:
   v. monitoring the implementation of those recommendations

(NZ Government, 2002, Clause 53).

The concept of competence is not new; however, exploring how it is expressed, evaluated, and assured in professional and lifelong contexts are the objectives of this research.

The American Heritage Dictionary (2000) defines ***competence*** as:

a. the state of being adequately or well qualified
b. a specific range of knowledge skill or ability

and ***competent*** as:

a. properly or sufficiently qualified; capable: *a competent typist.*
b. adequate for the purpose: *a competent performance.*
c. qualified or fit to perform an act.

Competence has traditionally been linked to the mechanistic performance of a task or function and this has led to much of the debate surrounding the applicability of competence-based education and assessment to professions. This research seeks to interpret and understand the competence associated with professionalism, moving away from purely mechanistic models to one that recognises the cognitive processes essential to professional practice. In doing so, it seeks to identify what makes a professional competent.

Understanding professional competence, how it develops within both professional and social systems, and how it can be assured are important issues for a number of reasons.

Firstly, professions occupy an important role within society. They provide necessary services and are given a great deal of autonomy, much of which is given on trust. Professions earn this trust and right to self-regulation by demonstrating that they are able to manage themselves and their members to maintain standards of practice. Having dependable and authentic quality assurance processes is an important way for professions to retain this trust and autonomy.

Secondly, professional practice is changing. The day of the sole practitioner, armed with his or her own clinical experience and what he or she can recall from a long undergraduate training, is fast disappearing. Both the profession and the public need to be able to assure themselves that professionals are up-to-date with modern practice. A model of professional competence that defines the essential qualities of professionals will assist this.

Thirdly, it is important for health professionals such as pharmacists, practising in a field that is always evolving, to have a method of periodically examining themselves to ensure they have the requisite skills and knowledge to perform to standards required.

Fourthly, the number of pharmacists in specialty practice and ancillary non-clinical roles has increased in recent years. This development has contributed to the need to understand more fully the components of both competence and expertise beyond the understanding gleaned from role delineation studies conducted in the 1980s and 1990s, which form the basis of current models of competence.

And finally, the government, which is the major funder of health-care, is seeking assurance that it receives the best possible return for its investment. It wishes to ensure that therapeutic outcomes are maximised while at the same time mistakes—with their associated costs of rectification—are minimised. This has led to what has been variously called the evaluative or audit state (Neave, 1990; Power, 1997) with its ever-proliferating forms of intrusive evaluation that, in turn, spawn more and more complicated internal quality assurance systems (Barnett, 1999).

1.2 The health-care system in New Zealand

The health-care system in New Zealand is divided into three main sectors—primary, secondary, and tertiary. The primary-care sector is based in the community and centres around care provided by private practitioners, including, among others, doctors, midwives, nurses, and pharmacists. The aim of the primary sector is to provide medical treatments and other health-care interventions to patients in the community in such a way as to cause as little disruption as possible to their day-to-day lives. It covers acute and chronic care, as well as health education and promotion, and health screening initiatives.

Secondary (acute) and tertiary (chronic) care are provided by health practitioners in community-based public or private clinics, or hospitals. Apart from hospital accident and emergency clinics, they can only be accessed by referral from a doctor (Ministry of Health, 2001; French, Old & Healy, 2002).

Pharmacists work as part of the health-care team in each of the primary, secondary and tertiary health sectors and, in doing so, provide services to patients and specialised information to doctors, nurses and other health professionals (Pharmacy Council, 2005).

1.2.1 What pharmacists do

Pharmacists, as the specialists in medicine use, are able to educate other health professionals and the public in the correct use of therapeutic agents, and in the maintenance of health. They understand the composition, chemical and physical properties, manufacture, uses, and side-effects of medicines, as well as their interactions with food and other substances.

Pharmacists dispense medicines and advise people how and when to take their medicines for maximum effect, how to reduce side-effects, and how to use specialised devices such as inhalers, syringes and nebulisers. In the words of the Pharmaceutical Society of New Zealand

> ... pharmacists are health professionals with the skills and knowledge to manage a patient's understanding and utilisation of medication, in order to optimise medicines related health outcomes. (PSNZ, 2003, p. 15)

Most commonly, pharmacists are the link between doctor and patient. In a community setting, the pharmacist may be the first person consulted by a patient in determining whether or not to visit his or her doctor. In such situations, pharmacists provide a preliminary screening of the patient and may determine that, rather than referring the patient, he or she can be treated by one of the many remedies available over the counter. Pharmacists have access to a comprehensive range of medicines that they can sell for this purpose.

In a hospital setting, pharmacists work with doctors, nurses and other health professionals caring for patients on the wards and in out-patient clinics. Some hospital pharmacists specialise and develop the expertise to work with particular groups of patients, such as children, the elderly, or those with cancer or mental illness. Age or illness often affect the way body systems work, so patients have special requirements and need medicine doses to be calculated on an individual basis.

Other specialist roles available to pharmacists are the provision of medicine information, "comprehensive pharmaceutical care"[1], manufacture and preparation of medicines and medicine products, and advisory services to doctors and other groups.

Thus, while pharmacists may exhibit a wide variety of complementary skills appropriate to the context in which they practise—for example, retailing cosmetics, selling Lotto tickets and so on—the professional practice of pharmacy primarily focuses on three activities. Firstly, the custody, preparation and dispensing of medicines and pharmaceutical products; secondly, the provision of advice on health and well-being, including appropriate medicine use and health screening; and thirdly, the selection and provision of non-prescription medicine therapies and therapeutic aids.

The practice of pharmacy is currently defined by seven competence standards that have been developed by the PSNZ, and are currently being used as the basis for the profession's competency-based pre-registration training programme, and to assess people seeking registration.

1.2.2 Competence standards

The standards were developed in 1996 from extensive work undertaken in both New Zealand and Australia, using traditional task and function analysis. These approaches have been used to establish standards for standards-based assessments and are discussed further in Chapter Four. The seven standards cover the professional functions performed by pharmacists, and are:

1. Practise pharmacy in a professional manner—covering the professional, legal and ethical responsibilities, and requiring pharmacists to belong to their professional body, to comply with its Code of Ethics, and to meet their legal obligations.

2. Contribute to the quality use of medicines—covering the selection, monitoring and evaluation of medicine therapy, and requiring pharmacists to use their technical,

[1] Comprehensive pharmaceutical care or CPC® is a patient-centred, outcomes oriented pharmacy practice that requires the pharmacist to work in concert with the patient and the patient's other health-care providers to promote health, prevent disease, and to assess, monitor, initiate and modify medication use to assure that drug therapy regimes are safe and effective (Pharmaceutical Society of New Zealand, 2005; section 1.4.7).

clinical and theoretical knowledge to provide advice and guidance to health professionals and the general public.

3. Provide primary health-care—encouraging and assisting people to take responsibility for their own health. This requires pharmacists to use their knowledge and technical skills to treat minor conditions and to promote health with screening, health promotion and self-care activities.

4. Apply management and organisational skills—requiring pharmacists to demonstrate their ability to organise themselves and others to ensure their practice is effective and efficient.

5. Research and provide information—accessing, providing and generating pharmacy information that requires pharmacists to be able to access, evaluate and synthesise often complex information from a range of sources so as to provide advice and to promote best practice.

6. Dispense medicines—covering the supply of medicines, including counselling patients about their medicines. This is the role most often observed by the general public and requires pharmacists to use their knowledge and technical skills to ensure the health professional's treatment intentions are fulfilled. This may include questioning the health practitioner's prescription and suggesting alternatives.

7. Prepare pharmaceutical products—covering the preparation of pharmaceutical products. This role requires pharmacists to use their knowledge and technical skills to prepare sterile and non-sterile medications such as injections, creams, ointments, and suspensions.

(Pharmaceutical Society of New Zealand, 2003)

The full standards are listed in Appendix 1.

Four of the seven standards focus on the functions pharmacists perform, and have been developed using functional analysis approaches. The strengths and weaknesses of such approaches will be discussed further in Chapter Four.

In addition to being used to assess competence for initial registration, these standards are also being used as the basis of a continuing professional development programme known as ENHANCE (Pharmaceutical Society of New Zealand, 2002). This programme is run by the PSNZ and uses a self-audit tool, known as the PRL—the Practice Review and Learning Plan—developed from the standards used for initial registration. Participating pharmacists use the PRL to guide reflection on their practice and create a personal learning plan.

Peer review of the PRL developed by individual practitioners as part of ENHANCE is used by the profession for the award of Annual Practising Certificates, as required under The Health Practitioners Competence Assurance Act 2003. The standards also guide the curriculum development for the undergraduate training of pharmacists.

1.2.3 The undergraduate education of pharmacists

People seeking to be registered as pharmacists must complete an approved four-year undergraduate degree from either the universities of Auckland or Otago Schools of Pharmacy. The undergraduate curriculum covers a mix of science and applied studies, including chemistry, anatomy and physiology, biochemistry, epidemiology, microbiology, pharmacology and statistics. In addition, it includes technical studies applicable to the pharmacy profession such as pharmaceutics, pharmaco-economics, pharmacokinetics, pharmacy law and ethics, dispensing including sterile dispensing, and preparation of pharmaceutical products. Generic topics including information access, communication and management skills are also covered (Otago University, 2005).

Subjects are typically organised to develop skills progressively in preparation for real practice. Programmes also typically include externships—periods of practice in real work situations—although these are generally of limited duration.

Once they have graduated with their Bachelor of Pharmacy, prospective pharmacists must compete a structured internship training year that prepares them for registration. Assessment of competence for registration is undertaken by the Pre-Registration Assessment Board (PRAB), based on evidence of performance gathered from this

internship year. (I am the current Chair of the PRAB and have held this role since the Board was established in 1998).

An example of the curriculum of an undergraduate degree for pharmacy is included in Appendix 2.

1.3 The Health Practitioners Competence Assurance Act 2003

Strengthening the requirement of health professions to quality assure their members was one of the factors behind the introduction to Parliament—in 2002—of the Health Practitioners Competence Assurance Bill. It followed a number of high-profile cases of health professionals—mainly doctors—failing to provide adequate levels of care to their patients for reasons including poor skills, lack of up-to-date knowledge, or not displaying appropriate professional behaviour. This Bill—which passed into law in September 2003—requires health professions to give surety regarding the ongoing competence of their members.

To do this, the Act requires professions to prescribe their professional role and set boundaries for their practice domain. These are called "scopes of practice" and are defined under the Act (New Zealand Government, 2002, Clause 5) as:

a. any health service that forms part of a health profession and that is for the time being described under section 11; and
b. in relation to a health practitioner of that profession, means 1 or more of such health services that the practitioner is, under an authorisation granted under section 21, permitted to perform, subject to any conditions for the time being imposed by the responsible authority

Defining a scope of practice for pharmacy is the responsibility of the newly formed Pharmacy Council. Under the Act (clause 118), the Pharmacy Council will attest to the quality of their member by:

- prescribing qualifications required for scopes of practice;

- authorising registration;
- considering applications for annual practising certificates;
- reviewing and maintaining the competence of health practitioners;
- setting standards of clinical competence, cultural competence and ethical competence; and
- setting programmes to ensure the ongoing competence of health practitioners and determining how these link to the issuing of annual practising certificates.

The Act presents the Pharmacy Council with a number of challenges, including defining what is the scope of practice for pharmacy, how to assess ongoing competence, and how to recognise the future roles that pharmacists are likely to engage in.

1.3.1 Scopes of practice

The scope of practice that the profession defines for itself effectively creates a clinical boundary for its practice. The challenge for the Pharmacy Council is to define a scope that is specific enough to encompass the professional role of pharmacists, without unduly impacting on the legitimate role of other health professionals, while at the same time, not restricting the ability of pharmacists to develop to meet the future needs and opportunities emerging in the health-care system. The Pharmacy Council (2004, p. 8) has met this challenge by defining two broad scopes of practice. These are:

1. ***Pharmacist*** –The pharmacist acts as a medicines manager, ensuring safe and quality use of medicines and optimising health outcomes by contributing to the selection, prescribing, monitoring and evaluation of medicine therapy. The pharmacist researches information and provides evidence-based advice and recommendations on medicines and medicine-related health problems to patients, their carers and other health-care professionals. The pharmacist is an integral part of the health-care team.

2. ***Intern Pharmacist*** – The intern pharmacist, practising under the supervision of a practising registered pharmacist, acts as a medicines manager, ensuring safe and quality use of medicines and optimising health outcomes by contributing to the selection, prescribing, monitoring and evaluation of medicine therapy. The intern pharmacist researches information and provides evidence-based advice and recommendations on medicines and medicine-related health problems to patients, their carers and other health-care professionals. The intern pharmacist is an integral part of the health-care team.

The concept of "scopes of practice" suggests that a profession is expected to introduce some form of criterion-based or standards-based assessment as the basis for determining competence to practise.

1.3.2 Standards-based assessment

Standards-based assessment judges performance against predetermined standards rather than making judgments of performance based on how well one person performs in relation to his or her peers. Its strengths are its transparency, and its ability to provide evidence of how a person performs on a given task at a given time. Its weakness is that it is task-based, and in aiming to achieve perfect transparency, risks overemphasising observed behaviours from which knowledge and understanding and future performance cannot necessarily be inferred (Gonczi, 1999; Rust & Golombok, 1989). To achieve transparency of assessment a great deal of prescription has been used to ensure all possible permutations of performance are defined, and this has resulted in the generation and use of endless checklists reflecting Wolfe's (1993) assertion that perfect transparency in assessment is not achievable, and "merely produces atomised objectives in a forest of verbiage" (Wolfe, 1993, p. 10).

Traditional approaches used to define and test competence are based largely on analysis of roles and functions, and while often effective, can be criticised for being rigid and prescriptive, and for not reflecting change that may result from sources such as:

- new or altered legislation;
- new tools, procedures and understandings;
- cultural values and beliefs;
- changing social environments; and
- contributions by creator-leaders.

In addition, traditionally used approaches do not recognise performance that exceeds minimum levels and, as such, are unsuitable for practitioners who perform as experts or specialists.

One way to minimise these weaknesses is to develop holistic, integrated standards as the basis for assessment. This approach has been promoted by, among others Gonczi, Hager

and Oliver (1990), Gonczi and Hager (1991), Hager and Gonczi (1993), Hall (in press), and Cheetham and Chivers (1996) and is discussed further in the following chapters.

While the scopes of practice as defined for pharmacy could be a starting point for achieving such a holistic approach, the actual assessment processes currently used by the profession make use of the standards of competence for pharmacy, which are based on prescriptions of tasks and roles as described in section 1.1.2.

Another challenge presented by the Act is how to recognise emerging roles and changes to practice, and how to maximise the opportunities presented by these changes.

1.3.3 Coping with change

Changes in the health environment have led to many reviews of the roles of both pharmacists and pharmacies. One such review was conducted in 2003 by the Royal Pharmaceutical Society of Great Britain (Neilson, Burke & Wykes, 2003). The purpose of that review was to identify planned and anticipated changes to the roles of health-care practitioners and to use this information to identify the competencies pharmacists need for the future. The review analysed over 70 government policy documents, looked for changes to ways of working and the workforce competence required to support these, and as a result, signalled a number of key changes to pharmacist practice.

Firstly, and perhaps most importantly, changes to treatment are being driven by the need to consider the patient as a whole person. Associated with this is the concept that health, social care, housing and other services form part of a whole system that impacts on the patient. The implication is that treatment solutions must take into account all components of the patient's life, and an understanding of the way the various parts interrelate and impact on the patient is essential. Consequently, what is developing is a whole person focus to patient health that takes into account a whole systems approach—that is, the approach to determining appropriate treatment strategies combines a focus on the patient with consideration of their social, environmental, and cultural context in which they live. This approach attempts to treat the source of the problem rather than just the symptoms.

Secondly, patient involvement in decision-making has become a key principle underpinning health-care. When applied to identifying appropriate health interventions, it requires practitioners to use a patient-centred approach to the planning and delivery of services, which enable patients to make informed choices and take more responsibility for their wellness. This is the developing concept of the "expert" patient.

Thirdly, the use of multi-disciplinary teams in treatment is increasingly widespread. Team approaches carry with them the need to adopt new ways of working that break down the traditional barriers between professions and share accountabilities for patient outcomes. The introduction of new roles, such as pharmacist prescribing, where pharmacists are able to prescribe repeat prescriptions, is an example of these shared accountabilities. These changes require team-working skills, including the involvement of pharmacists as part of the primary-care team, a willingness to accept shared accountability, and more holistic decision-making to achieve better use of limited resources.

Fourthly, approaches to managing health-care include moves towards creative clinical and managerial leadership, developing a culture of continuous improvement and reduction in errors, and enhancing services through modernisation. These changes require practitioners to have high quality auditable systems and processes, to actively participate in the development of their community and health-care systems, to demonstrate leadership both within their profession and the wider community.

This review along with others (see, for example, Department of Health, 2000; NHSE & NPC, 2000; Levy, 1984; Droege, 2003; Silcock, Raynor & Petty, 2004) have identified future roles for pharmacists, including: supporting self-care; electronic prescribing; e-pharmacy; medicines management including clinical audit; patient partnership in medicine taking (concordance); and extending prescribing to make better use of clinical skills.

Implications for practitioners, who work in this emerging health environment, are that they must possess:

1. An ability to communicate with patients and colleagues orally and in writing, acting as a key informant; counselling and advising patients and care-givers; and engaging with fellow health-care professionals.

2. People skills and partnership-working skills, including the ability to work in teams; to build and sustain mutual trust, and to generate a common approach to a shared problem.

3. The ability to undertake care and risk assessments, and to prepare treatment plans, including pharmaceutical care plans. This requires practitioners to have the ability to take high-quality and complete medication histories, and to implement medicine management plans, including medications monitoring and repeat dispensing.

4. The capability to use information effectively and sensitively, including providing advice to health professionals on the administration of medicines, and supporting and encouraging patients to self-manage their medication. Information must be provided in a manner that enables recipients to interpret the information accurately while taking into account their own values and preferences.

5. An understanding of the principles and organisation of the health-care system, how care is managed, and an ability to apply that understanding to practice. This includes being able to apply knowledge of good management practices, and being able to integrate information from a range of different sources.

6. A core of technical and professional skills and knowledge that are maintained up-to-date with advances in practice. These include being able to use information and communications technology for measurement, monitoring and reporting.

7. Enhanced leadership and management skills, including the development of policy and strategy.

8. Personal and people development skills, including a self-awareness and self-development orientation, and a willingness and ability to keep skills and competence up to date.

9. Research and evaluation skills, including the ability to read, interpret and, where necessary, prepare biomedical reports and summaries.

These changes point to the need for pharmacists to have good, clear communication skills, including: openness and honesty; use of appropriate language for each group or individual they communicate with; appropriate use of body-language; sensitivity and understanding; use of appropriate method of communicating for each situation and individual; listening and being sensitive to reactions of others; and providing effective feedback.

These characteristics are essential components of the competent professional of the future, and competence models and assessment methods need to be able to recognise these.

The challenge for the Pharmacy Council is to prescribe standards of competence that meet the needs of the profession both now and in the future, while still being transparent and specific enough to enable the design of valid and reliable assessments. Addressing this challenge is the aim of this research.

1.4 Research aims and objectives

This research aims to develop a model of professional competence as it applies to pharmacists practising in New Zealand. The intention is to build a model that is applicable to all pharmacists, regardless of the nature of their practice, and that describes the characteristics of both professional competence and expertise without being restrictive, or constraining future practice.

The objective of determining such a model of professional competence is that this model, if valid, can guide the design of curriculum for the initial education and training of professionals and for the creation of continuing professional development (CPD) initiatives. It can also provide a framework for the construction of assessment methodologies and tasks. These assessments could be used as quality assurance mechanisms for the profession both through the determination of the fitness of novice practitioners for initial registration as pharmacists, and for evaluating the ongoing competence of practitioners.

Having said that, the assessment of initial competence is philosophically different from the assessment of ongoing competence. When assessing competence for initial registration, assessors start from the assumption that the person is not-competent and gather comprehensive evidence against all the attributes and standards used to define competent performance in order to make a judgment. Assessment of continuing competence on the other hand, begins from the assumption that the practitioner is already competent and therefore looks for the initiatives the practitioner has undertaken to maintain that competence. This approach has led to professions developing relicensing practices, based on practitioners undertaking a set number of hours of CPD—see, for example, the New Zealand Institute of Chartered Accountants, who require chartered accountants to undertake 20 hours of structured CPD and 20 hours of unstructured CPD annually to maintain their right to practise (Institute of Chartered Accountants, 2001).

A model of professional competence that identifies those characteristics that specifically differentiate levels of performance could enable CPD activities to focus on these. It would enable self-evaluation and peer assessments to be developed that evaluate only those attributes that are associated with the evolution—and possibile loss—of competence and expertise. This would have the benefit of providing a basis for assuring that health professionals were performing satisfactorily from the view of the individual, the profession and the public, based on empirical evidence. The benefit would be the development of competence assurance procedures based on valid and reliable assessments that are cost-effective to administer.

1.4.1 Research questions

In developing a model of professional competence that meets the aims and objectives described above, the research sets out to answer the following questions:

1. What are the characteristics of competent and expert performance and how do they differ from not-competent performance?

2. What specific characteristics differentiate the performance of not-competent, competent and expert performers?

3. Do practitioners agree that these characteristics are important?

4. How can these characteristics be conceptualised to establish a framework for explaining professional competence in pharmacy?

5. Can these characteristics be used to form the basis of a self-assessment instrument?

6. Does a self-assessment instrument created from these characteristics enable practitioners to make a judgment of their competence?

7. How reliable are such judgments?

1.4.2 Why me?

The idea for this study was born a number of years ago when I was an elected Councillor for the Pharmaceutical Society of New Zealand—the body charged under the Pharmacy Act 1970 with the governance of the profession. I served three, three-year terms on the Council and during that time I worked on a number of projects, including:

1. The development of a competence model and assessment methodology to be applied to people seeking initial registration to practise as a pharmacist, and the development of this model to be used to ensure maintenance of practice standards;

2. The establishment of the New Zealand College of Pharmacists (a professional College whose mission is to support the ongoing professional development of pharmacists), and then for approximately 12 years, an active role in its academic guidance and governance; and

3. The establishment of quality standards and audit systems for pharmacies, which was the subject of my Masters thesis.

During this period, I chaired a Competence Working Party that sought to develop a model of competence that took into account developments in practice beyond initial registration and that reflected notions of specialisation and expertise. This work was put on hold when

the issue was found to be highly complex. What was identified was that professional practice tends to develop a wide variety of specialist, complementary, or expert roles that are not easily incorporated into standard, functionally-determined models of competence.

Arising from the exercise was a recognition of the need to develop a model of competence that:

- recognises all roles pharmacists engage in;
- recognises expert and specialist practice;
- is able to adapt to changes in the pharmacy, health and social environments; and
- supports lifelong learning.

The introduction of The Health Practitioners Competence Assurance Act 2003 has provided the impetus to readdress this issue.

1.5 Research approach

The research uses evaluation methods that combine qualitative and quantitative data to develop a model of professional competence and a self-assessment instrument based on this model. By focusing on professional competence as a construct in its own right, rather than focusing on functional competence, which considers professional roles and functions in isolation, it is hoped to overcome most of the weaknesses and criticisms associated with traditional approaches used to conceptualise and assess competence. These are discussed further in Chapter Two. The professional competence model and self-assessment items developed in the research are based on this construct.

The methods used are described in detail in Chapters Five and Eight.

1.5.1 Why self-assessment?

Self-assessment—while used extensively in professional courses and CPD activities—is associated with a number of criticisms. Its use assumes that participants are both willing and able to rate themselves accurately. Issues with self-assessment include the risk of halo effects—participants presenting a distorted or socially acceptable view of themselves—participants agreeing with everything in the questionnaire, being indecisive and not

choosing any option, or choosing only extreme options. These tendencies can be overcome by good questionnaire design and by using self-assessment in situations where there is no reason to fake results, that is, where there is little risk that the results can be used to make judgments that will impact on the participant (Rust & Golombok, 1995; Grönlund, 1985). Having said that, the ability of a professional such as a pharmacist to accurately evaluate his/her own performance is a hallmark of professional practice and is embodied in the concept of reflective practice (Schön, 1983; 1987).

These weaknesses suggest that if self-assessment is used to make assessments of capability to practise, it should be combined with peer and even, possibly, consumer assessment to ensure objectivity. Further discussion of self and peer assessment is provided in Chapters Three and Eleven.

1.5.2 Delimitations on the research

The research approach used imposes some delimitations on the scope of the investigation. Firstly, the research method used to define the qualities associated with professional competence uses pharmacists who have been actively engaged in reflective practice. While this group can be expected to provide a considered perspective of the state of the profession, it could be argued that this group is not totally representative of the profession as a whole.

Secondly, the data obtained to test the professional competence model are based on self-assessments of performance. In relying on self-assessment as a measure of performance it is likely that results will be biased in some way, either in under reporting of competence by experienced pharmacists who—through their experience—know what they do not know, or in overly confident reporting by novice pharmacists who are as yet unaware of all the complexities of practice. Consideration was given to obtaining peer assessment results to validate the self-ratings obtained but it was felt that introducing peer assessment would make participants less willing to engage in the research.

Thirdly, the research uses a self-assessment instrument that asks participants to determine the extent to which they exhibit the behavioural characteristics of professional competence when undertaking their professional role. The resulting scores—while being analysed to

identify latent variables—cannot be scored as right or wrong. This means that it is difficult to evaluate its validity and reliability as an assessment of competence using standard methods.

Management of these issues is discussed in the Chapters Five and Eight.

1.6 The importance of this research

Competence has been linked with many aspects and theories on learning and has been at the core of much research and practice underpinning education theory and development. It has been shaped by theories of experiential, workplace and situational learning and, in turn, has influenced much of the work on standards-based/criterion-referenced assessment and problem-based learning. The role of knowledge in the development of competence and how competence develops into expertise has also influenced, and been influenced by, modern theories of learning.

The concepts associated with professional learning and development, and assuring quality and high standards of performance through assessment are embedded in both the literature surrounding the nature and development of professionalism and expertise, and that encompassing education and standards-based assessment. This literature has informed this study.

The abilities to continue to learn and to cope with ongoing change are considered to be hallmarks both of professionalism and effective professionals. The ability of the individual and the profession as a whole to engage in ongoing learning will continue to be important in shaping the future roles of pharmacists. Exploring the characteristics associated with both the constructs of professionalism and competence, their commonalities and unique characteristics, also provides a rich source of information to assist in building and evaluating a holistic model of professional competence that can recognise levels of performance and potentially extend our understanding of these issues.

Chapter Two
Conceptions of competence and professionalism

The concepts of competence and professionalism are both prevalent, and are often used interchangeably to describe practitioners who do their job well. Being described as a person who exhibits professionalism in a role is tantamount to saying that the job is being done well. This suggests that the two terms are closely linked and have many qualities in common.

Before beginning to conceptualise professional competence and to develop a model to explain them, it is important to first explore the constructs of competence and professionalism. Understanding how expertise develops from competence provides a further dimension, which is important to understanding these constructs.

2.1 Competence

In the competency-based education movement, competence is a concept that has been linked to the successful performance of occupationally specific tasks. Thus, someone can be competent at driving a car, making an ointment, or dispensing a medicine pursuant to a prescription.

Describing a person as competent presumes that the person has been assessed, evaluated or judged and has met the standards required. Therefore, implicit in the concept that carries is the postulation that an external standard has been met, as judged by a third party against that standard. This is seen in the literature, where discussion of competence is often linked with discourse on its assessment.

2.1.1 Characteristics of competence

According to most conceptions of competence, a person is classified as competent if he/she can demonstrate, in a variety of practice situations, that he/she possess the knowledge, skills, values and attitudes required for the role he/she are being judged on, and are able to use them in various combinations to undertake occupational tasks—for example, having

the knowledge, attitudes and skills necessary to dispense a prescription for antibiotics for a child being supervised by its parent at home. This task requires a pharmacist to have: firstly enough knowledge of the medicine prescribed to determine that the dose, the formulation, and the period of treatment are appropriate for the child; secondly, the skills to provide instructions for appropriate use and to communicate with the parent; thirdly, the skills to prepare the medicine so it is safe to use; and finally, the values, which are culturally appropriate and respectful to perform in a manner that meets professional standards.

Thus discussion of competence is always contextual and situational, and the context and situation are usually included, either implicitly or explicitly, when determining whether someone is competent. Thus a pharmacist can be competent at, for example, dispensing medicines, competent in advising doctors on the efficiency and effectiveness of their prescribing, or competent at devising formulations for medicines.

Gonczi (1999, p. 182) concurs, stating a "competent person is one who possesses the attributes necessary for job performance to the appropriate standard". This definition suggests that an interpretation of someone's competence is specific to a set task in a given arrangement of circumstances, and this indeed has been the approach that has driven the development of many of the models used to define competence. To enable judgments of competence to be made under this approach, more and more specificity is required to cover all circumstances and tasks the practitioner performs. This necessitates the development of more and more standards and checklists to provide specificity in assessment, which in turn leads to what many critics of the competency movement call the trivialisation and never-ending specification of tasks (Wolfe, 1993). For example, if one looks at the competence standards for pharmacy, while there are seven standards, four of which relate to specific functions pharmacists perform, there are 46 sub-components to these standards and 149 evidence statements. A typical example is standard 6—dispense medicines, which requires eleven sub-components, and 41 evidence statements to elucidate it.

Other criticisms levelled at this type of approach to conceptualising competency include lack of a conceptual and analytic base (Raven, 1996), trivialisation of the importance of knowledge, and lack of applicability to high-level cognitive competencies (Churchman & Hall, 1997).

Gonczi and others (Gonczi *et al.*, 1990; Gonczi & Hager, 1991; Hager & Gonczi, 1993; Gonczi, 1999; Hall, 2000) suggest that these problems have arisen from the way in which competence has been conceptualised. They suggest that the traditional approaches used to develop competency standards concentrate only on the tasks that need to be performed or the generic capabilities or capacities that are said to underpin competency irrespective of the contexts in which these need to be applied. They describe such approaches as reductionist in that they break the task or competence into its component parts rather than looking at competence as a whole. Instead, they suggest that an alternative approach is to use holistic, integrated models for viewing competence. Such approaches often use "open" systems thinking to conceptualise competence, and in doing so provide an alternative analytical framework.

2.1.1 Systems thinking

Systems thinking is based on systems theory and considers both the whole and the inter-relationships between the component parts to identify patterns and come up with solutions.

Systems theory was developed by von Bertalanffy (1968) and suggests that systems including both physical and human systems—for example, a profession or an individual competent practitioner—are whole and complete entities made up of interconnected component parts that are open to, and interact with, their environments. Open systems are not rigid or static. Instead they are oriented towards growth and can acquire new properties through emergence resulting in continual evolution. Two types of systems have been described—complicated systems and complex systems.

Systems that act in a predictable, mechanical manner with foreseeable causes and effects are called complicated systems, and a clock is often quoted as being a typical example of such a system. Complicated systems are orderly, predictable, controllable, and governed by central rules. They are the sum of their parts and therefore analysable. Viewing systems as complicated and reducing them to their fundamental parts has been the way Western science has traditionally sought to understand how things work. This approach assumes that if the performance of the various parts can be defined tightly and accurately, then the performance of the whole can be predicted (Davis, Surmara & Kuce-Kapler, 2000). This

thinking can be seen in the functional analytical approaches commonly used to define competence.

Many human-mediated systems, however, do not fit this mechanical model. They are spontaneous, unpredictable, volatile, cannot be understood by breaking them into their component parts, and are non-summative. In other words, the whole is more than the sum of its component parts. These are complex systems and they cannot be understood strictly through the means of traditional analysis and assessment. Instead their behaviour is described by complexity theory.

Complex systems can adapt to their changing environment and alter their structure. They are emergent, self-regulated, maintain balance, and are interdependent (Johnson, 2001). They are best understood as complete entities, recognising that the smallest change within one part of the entity can have unpredictable effects on the whole. This effect is known as the "butterfly effect" (Gleick, 1987).

2.1.2 Systems thinking and competence

Much of the current thinking about competence and its assessment is based on complicated as opposed to complex models. For example, the way competence for pharmacy is currently conceptualised is complicated and so is the way it is assessed. In the pharmacy model, the approach taken to determine competence for registration as a pharmacist is based on assessing individual competence standards in a sequential and linear way, and is mechanistic. A person is deemed competent and fit for registration if they have an approved undergraduate degree, have undertaken 52 weeks of practical training, and passed assessments for each of the competence standards. The process is linear and based on inputs and outputs; input knowledge and skills training then determine whether appropriate outputs—behaviours deemed to be associated with competent performance on each of the standards—are observed.

On the other hand, thinking about competence from a complex viewpoint provides another frame for conceptualising competence, and this is what Gonczi (1999) calls his "integrated holistic approach" to conceptualising competence. This approach suggests that while a

person may have all the components necessary for competent performance, competence itself maybe something more.

Complex approaches to determining competence and competent performance enables consideration of the interaction of the individual with his/her environment, and the impact of social factors. Individual competence is conceptualised as one "whole" or subset, nested within a number of other "wholes" that make up the social, cultural and physical environment, or context, in which the individual works, and this whole context needs to be taken into account when attempting to understand its parts.

Thus competence is one whole, within a larger profession "whole", which in turn is influenced by both the health system and wider society. This is illustrated in Figure 2.1.

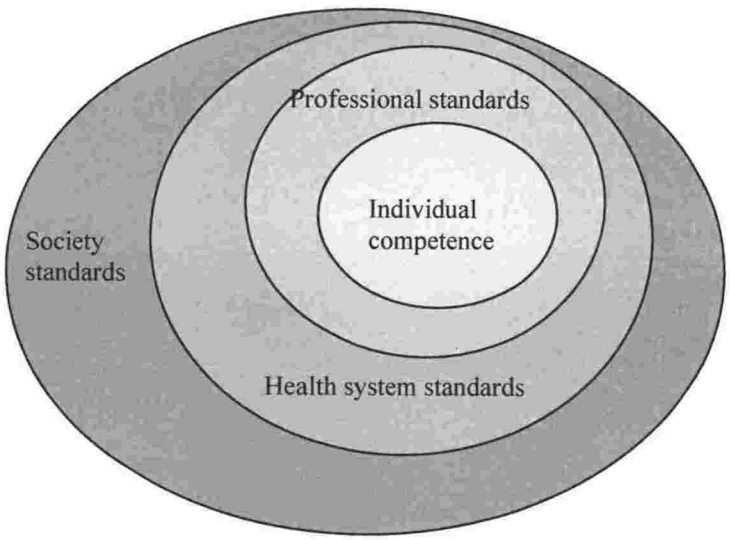

Figure 2.1 – A systems view of pharmacist competence

2.1.3 Integrated approaches to conceptualising competence

In a holistic, complex approach, a person considered to be competent is seen as having the ability to assimilate knowledge with the necessary skills and behaviours in the performance of required tasks, all while demonstrating the professionally, socially, and culturally acceptable attributes such as values and ethics.

Critics of current approaches to determining competence point out that tasks are seldom performed in isolation and that the tasks themselves are complex and should be thought of

as complete wholes rather than attempting to break them into component parts. For example, a person may be able to dispense medicines competently, prepare pharmaceutical products, advise people on the appropriate use of medicine and on primary health-care but he or she may not necessarily be competent to practise as a pharmacist. To be competent as a pharmacist, he or she needs to be able to perform these tasks at the requisite level while at the same time demonstrating the required professional attitudes and values.

In the integrated view, competence develops in a continuum of practice from beginner or novice practitioner, through minimum competence and proficiency to expertise (Dreyfus & Dreyfus, 1980; Dreyfus, 1981). Experts and masters exhibit "mastery" or "artistry" (Schön, 1983; Benner, 1984; Dreyfus & Dreyfus, 1977) developed through situational learning that cannot easily be understood by formulaic, analytic approaches. What sets them apart is not easily defined as they often appear to work intuitively.

Gonczi describes this development of competence as "normative". He states that

> as practitioners engage in work they increase their understanding of the culture and content of their occupation and of their workplace. As their participation in work moves from being peripheral to becoming more central, they are increasingly capable of meshing this cultural understanding with their technical knowledge and their skills and knowledge. This combination of attributes enables them to make increasingly informed individual judgments about how they should act. (Gonczi, 1999, p. 184)

According to many researchers, it is this ability to make judgments and stand by them that marks the emergence of proficiency and expertise.

2.2 Expertise

Research on expertise suggests that it develops through sustained practice and experience where theoretical notions are challenged, refined, or disconfirmed by the actual situations encountered (Heidegger, 1962; Gadamer, 1970). Benner (1984) suggests that expertise develops "when the clinician tests and refines propositions, hypotheses, and principle-based expectations in actual practice situations" (p. 3).

According to Schön (1983), experts demonstrate artistry. He suggests that highly competent professionals practise from a "core of artistry" where artistry is "an exercise of intelligence". He further states (p. 13):

> In the terrain of professional practice, applied science and research-based technique occupy a critically important though limited territory, bounded on several sides by artistry. There are an art of problem framing, an art of implementation, and an art of improvisation – all necessary to mediate the use in practice of applied science and technique.

Experts often appear to work holistically and intuitively. They are able to perceive the situation as a whole, use the accumulation of experience with a variety of cases in a variety of situations as the basis for developing new ways of working, and are able to zero in on the problem without wasting time considering irrelevant options or mentally reviewing all the various rules and procedures learned in training (Dreyfus, 1979; Dreyfus, 1981; Curry & Wergin 1993). Schmidt, Norman and Boshuizen (1990) call this ability "knowing-in-action".

Another view of expert performance is provided by Stacey (1993), who suggests, in contrasting ordinary and extraordinary managers, that ordinary managers use control mechanisms, logical, and analytical processes to carry out day-to-day problem-solving to achieve planned outcomes. Extraordinary managers, on the other hand, enable organisations to cope with situations of ongoing change. They use tacit knowledge—that is knowledge that cannot be easily analysed into antecedent reasoning (Polanyi, 1966)—intuition, creativity, and the ability to work in the absence of hard evidence. They are able to manage the interface between analytical, rational processes and creative, intuitive practice, and move seamlessly between the worlds of rationality and creativity.

In other words, experts operate by conceptualising and managing problems and situations as complex wholes rather than seeing them as separate parts. That is, they are able to use complex systems thinking in their practice.

2.2.1 Characteristics of expertise

The development of expertise then, is associated with three general characteristics. Firstly, experts move away from a reliance on abstract theories and principles to the use of

experience in decision-making. Secondly, they develop the ability to see a situation as a complete whole in which only certain bits are relevant, rather than a situation made up of a compilation of equally relevant bits. Thirdly, they move away from being a detached observer to being an involved performer (Dreyfus & Dreyfus, 1980; Dreyfus, 1981; Gonczi, 1999).

The combination of these attributes means that experts often appear to work intuitively, are able to make decisions without all the necessary information, and have confidence in their ability to consider problems and identify solutions.

The characteristics associated with expertise enable expert performers to demonstrate a range of common qualities. A number of researchers, for example Chi, Glaser and Farr (1988), Gentner (1988), and Tennant (1999), summarise these as:

- having a deep knowledge in their domain of expertise;
- having an ability to perceive meaningful patterns in their domain of knowledge;
- being faster and more economical;
- being good at anticipating required actions and events;
- having superior memory;
- using principled and abstract approaches to problem formation, problem-solving and decision-making;
- using analytical approaches to tasks;
- being flexible and having the ability to adapt to changes in the environment;
- possessing strong self-monitoring skills, including recognising errors and the need to address these proactively; and
- being highly self-aware.

The qualities associated with expert performance, then, mirror those associated with competence, but are practised at a level that is less formulaic, more creative and holistic. Researchers such as Schön (1983; 1987) emphasise the importance of creative approaches to tasks rather than reliance on formulaic, rule-bound ways of working. They also recognise the importance of self-awareness and a willingness to reflect critically on practice. These qualities require a high degree of what has been described by Goleman as "emotional intelligence" (Goleman, 1996).

While many of the characteristics associated with expertise also characterise competence, the degree to which experts work in a holistic manner appears to be one of the features that sets the two constructs apart. Many of these qualities are also seen as characterising professionalism.

2.3 Professions and professionalism

When used to describe a person, professionalism implies that the practitioner exhibits the professional norms and behaviours of a profession and/or is attached to a defined profession.

Cruess and Cruess (2003, p. 2) define a profession as

> an occupation whose core element is work based upon the mastery of a complex body of knowledge and skills. It is a vocation in which knowledge of some department of science or learning or the practice of an art founded on it is used in the service of others. Its members possess a commitment to competence, integrity, morality, altruism, and the promotion of public good within their domain. These commitments form the basis of a social contract between a profession and society which in turn grants the profession the right to autonomy in practice and the privilege of self-regulation. Professions and their members are accountable to those served and to society.

Professionalism, then, encompasses the notions of competent performance—having the knowledge, skills, and attitudes expressed as integrity, morality, altruism and the promotion of "public good", to perform to the standards set by the profession. While there are many similarities in the concepts of professionalism and competence, there are also some differences.

One of the key differences is that of autonomy and control. Professionals are members of professional bodies in New Zealand that are established under law and have the right to self-management. Professions are awarded this autonomy so as to act in the best interests of both their clients and society, and this autonomy is given on both an individual and collective level (Friedson, 1970; Starr, 1984). At a collective level, all members of that

profession must belong to the professional association in order to access this autonomy (Cruess and Cruess, 1997; Friedson, 1970; Starr, 1984).

In return for this autonomy, the public expects professions to ensure their members act morally and with integrity, and to work to maintain a level of mutual trust between the profession and the public. Thus the professional body is the agent responsible for the competence of its members and also the profession as a whole.

Professions develop a set of norms and cultures that are used both to shape and govern the behaviour of their members (Paine, 1994). These professional norms and cultural behaviours are part of the social and cultural context in which the professional practises, and are embodied in codes of ethics, standards, and codes of practice (Krause, 1996; Starr, 1984). These codes and standards represent the applied morality of the profession, and exemplify the laws, and societal, cultural and ethical norms of the society in which it operates. They serve as rules for behaviour of members of the profession and include requirements to ensure confidentiality and to avoid conflicts of interest. As such they are holistic in nature and cover all work that professions do rather than focusing on only specific tasks. Pharmacy has such codes and standards and these are discussed further in section 7.4.

Collegiality within the profession is used to establish common goals and to encourage compliance with them. This includes setting and maintaining standards and a commitment to quality. It also includes cultural procedures associated with maintaining discipline and discouraging amoral, unethical, or incompetent behaviour; maintaining educational programmes; and guaranteeing the competence of members. This is what Vygotsky (1978) describes as a community and culture of practice, and it is a major influencer of what knowledge and skills are valued by the profession and its approach to continuing professional development (CPD).

2.3.1 Characteristics of professionals

A professional then, demonstrates the attributes espoused by the profession. Professionals possess and have stewardship over a complex knowledge-base, with an associated responsibility to use and share this knowledge responsibly (Krause, 1996; Freidson, 1970;

Starr, 1984). They have a willingness to reflect on their performance and to continue to learn. This includes being self-aware and recognising the need to continually up-date their knowledge-base. It is estimated that approximately 50 percent of knowledge acquired during training is no longer relevant after five years (Kozlowski & Farr, 1988).

Professionals possess a commitment to serve others, assisting both individual clients and society, and to use their knowledge objectively for this (Sullivan, 1995). The relationship between a professional and a client is one of service that cannot be achieved without the expertise of the professional and it cannot be achieved without strong communication skills. Professionals must be able to communicate with a wide range of clients, and clients must be able to understand them (Caldwell, 2002).

Professionals are altruistic. There is an expectation that in return for both the trust placed in professionals and their privileged status, they will act altruistically, consistently placing the interests of individual clients and society above their own (Friedson, 1970; Sullivan, 1995; Mechanic, 1996; Perkin, 1989; Pellegrino, 1991; Stevens, 2001). They have a partnership approach. Modern professional practice recognises the autonomy of the patient and requires the professional to develop a partnership with the client to ensure mutually agreed outcomes are achieved (Pellegrino, 1991).

Professionals are accountable and accept responsibility for their actions to both their clients and to the profession as a whole (Friedson, 1970; Perkin, 1989; Stevens, 2001). This responsibility is both public and personal (Caldwell, 2002). In being held accountable, professionals commit to maintaining their competence and practice standards throughout their career (Caldwell, 2002). As health-care becomes more important to society as well as more expensive, new levels of accountability have emerged including economic (to payer) and political (to the wider public) (Emanuel & Emanuel, 1996).

Professionals act morally, ethically and with integrity. They are expected to be honest and moral and carry out their activities with integrity (Sullivan, 1995; Perkin, 1989; Kultgen, 1988). Integrity is summarised by Basill (2001) as including conscientiousness, dependability, trustworthiness, reliability, social conformity and honesty.

Many of these characteristics are also found in descriptions of competent and expert performance, so what is the relationship between these constructs?

2.3.2 What competence and professionalism have in common

The characteristics of competence, expertise and professionalism share many common themes. These can be summarised as:

1. Possession of a wide range and depth of knowledge, and a commitment to maintain this, embodied in an ability and willingness to continue to learn.
2. Having the technical cognitive, psychomotor and interpersonal skills to perform the role.
3. Having the requisite attitudes, including having integrity, and an ability to work ethically, legally and morally, and being altruistic.
4. Having the organisational skills to manage him or herself and others, to source and evaluate information, and to work efficiently and effectively.
5. Being self-aware, able to reflect on current performance and to recognise strengths and weaknesses and plan for future development.

There are, however, differences between how the constructs are conceptualised and used in practice.

2.3.3 Differentiating competence and professionalism

A competent professional must meet the standards of performance set by the profession in the same way that a competent person must meet the standards set for whatever they are being measured as competent in doing. The difference is in the nature of the standards—professional standards by their nature tend to be holistic and encompass an entire role, while competence standards are specific and behaviourally based.

This suggests that the major differentiating factor between competence and professionalism is in the degree to which each of these constitute a holistic view of performance. Competence, as already identified, is generally used in relation to the performance of a specific task or function, while professionalism is an all encompassing term that governs not only the work professionals perform and how they do it, but also

their values, attitudes, ethics and morals which extend beyond work. Thus a professional is expected to be a professional in every aspect of his or her life.

Having said that, the concepts of competence and professionalism are both based on requiring practitioners to meet standards of performance, and to demonstrate appropriate knowledge, skills and attitudes. In the case of professionals it is the profession that sets the standards; in the case of other occupations it is the body tasked with setting those occupational standards that have the say. This may be an industry standards-setting body, such as an industry training organisation (ITO), or an education provider such as a university or an institute of technology.

One further difference between the two concepts is that in belonging to a professional body, professionals are required to continually meet the standards set by the profession, to maintain their skills and knowledge, and to commit to continue to learn. In this, professionalism shares many of the characteristics of expertise.

The assessment of competence on the other hand, is often a one-off event. While occupation relicensing in some fields requires the practitioner to undergo reassessment, many tests of competence are for life. For example, in passing a driving test, an individual is deemed as being competent to drive and is not reassessed until age reduces his or her physical capability to drive.

These two approaches highlight what Gonczi (1999, p. 184) calls "the distinction between the potential richness of the notion of competent performance and the tendency towards behaviourist reading of competence as performance". This in turn points to the value of considering professional competence, itself, as a construct.

2.3.4 Professional competence

Professionalism embodies two concepts—individual competence and professional standards. Professional standards describe the profession's view of itself, its knowledge, skills, ethics, values, standards and behaviours. Professional competence, on the other hand describes the acceptable level of individual personification of these concepts. In this way it could be said that **professional competence is the individual demonstration of the collective manifestation of professionalism**.

Professional competence then, is not so much about individuals performing tasks professionally, but rather about their demonstrating a pattern of competence that enables the performance of their professional roles as judged against professional standards (Raven, 1996). Focusing on patterns of competence recognises that the nature of a professional's work is a complex whole and is non-standard. A pharmacist, for example, must be able to adapt his or her practice to meet the needs of the client who presents to him or her. In some cases the client may be a patient and in some cases it may be another health professional. Each has his or her own needs and the approach taken by the pharmacist will depend on ascertaining accurately what those needs are. Thus, in a given situation one person's approach may differ from another's, while still achieving a satisfactory outcome.

This suggests that competent performance as a professional is idiosyncratic and judgments of professional competence should be made considering the whole performance, not just the parts. The context in which the professional practises also needs to taken into account.

This nesting of units in other units is accounted for in both the theories of spiral dynamics (Graves, 1981) and integral theory (Wilber, 1998; 2001). Wilber calls these nested parts "holons" because while they are whole and complete in themselves, they are also nested within a greater whole.

2.3.5 Integral theory

The core principle of integral theory is that any entity, concept or issue has four aspects that must always be taken into account for a complete understanding. This suggests that if this theory is applied to understanding the pharmacy profession, each individual pharmacist is a holon within the pharmacy profession holon, and that each of these holons, while whole and complete in itself, is made up of an interior/exterior dimension and an individual/collective dimension.

Integral theory proposes that a person and the system in which he or she exists is made up of:

- an internal, first person dimension encompassing self-awareness, immediateness of feelings, desires, consciousness, understandings, vision and so on; this is called the "I" and is reflected in consciousness and the science of psychology;
- an objective "it" dimension encompassing physical and observable items such as matter, energy, objects and observable behaviours; this includes the observable aspects of brain, body, and behaviour;
- a group or collective consciousness dimension encompassing inter-subjective awareness, and culture in its broadest sense; it covers world-views, shared values, shared feelings and so forth; this is the "we" dimension of culture and values;
- an exterior dimension encompassing the social aspects and observable behaviours of the group; this is also called the social dimension (its) and includes the norms associated with both society and institutions.

Merali's (2001) concept of collective mind provides a useful example of such an integrated approach. The concept of collective mind describes the way members of a group or profession make sense of their environment, integrate their knowledge and commit to action. The collective mind, also known as cognitive infrastructure, is made up of four components:

a. The dominant logic
b. The roles people take on and the way they determine how they interact
c. The relationships between individuals that determine the content and structure of the knowledge networks used to share and diffuse ideas
d. The shared self-concept and sense of identity.

Similarly Hall's (2004) model of adult development recognises that the individual is one holon in the midst of other holons and that these other holons interact with and impact on the holon that is the learner.

Viewing professional competence in this way recognises that competence is best viewed as a sub-component of professionalism that in turn is a complex system made up of four major components:

- the individual professional as they understand themselves, the individual internal dimension of self;

- the way professionals are seen to perform by others, the individual external dimension of personal competence;
- the collective view of how the profession views itself, the collective internal dimension of codes and standards; and
- the view society has of the profession, the collective external dimension reflected in the autonomy society awards to the profession.

An integral, systems approach to professionalism, then, would reflect not only the individual performance of a professional (the focus of the construct of competence), but also the impact the profession (its knowledge, values, ethics, standards and processes) and society as a whole, along with general and scientific knowledge, has on that performance.

Integral systems thinking thus provides another frame for viewing the issues of professional practice and how it is influenced by professional knowledge, learning, and day-to-day practice. This is important because, as already identified, knowledge and learning are central to professionalism, competence and expertise, and in the development of a model of competence that is able to accommodate the changing and developing roles of pharmacists, all parts of the system and their inter-relatedness need to be taken into account.

This is illustrated in Figure 2.2.

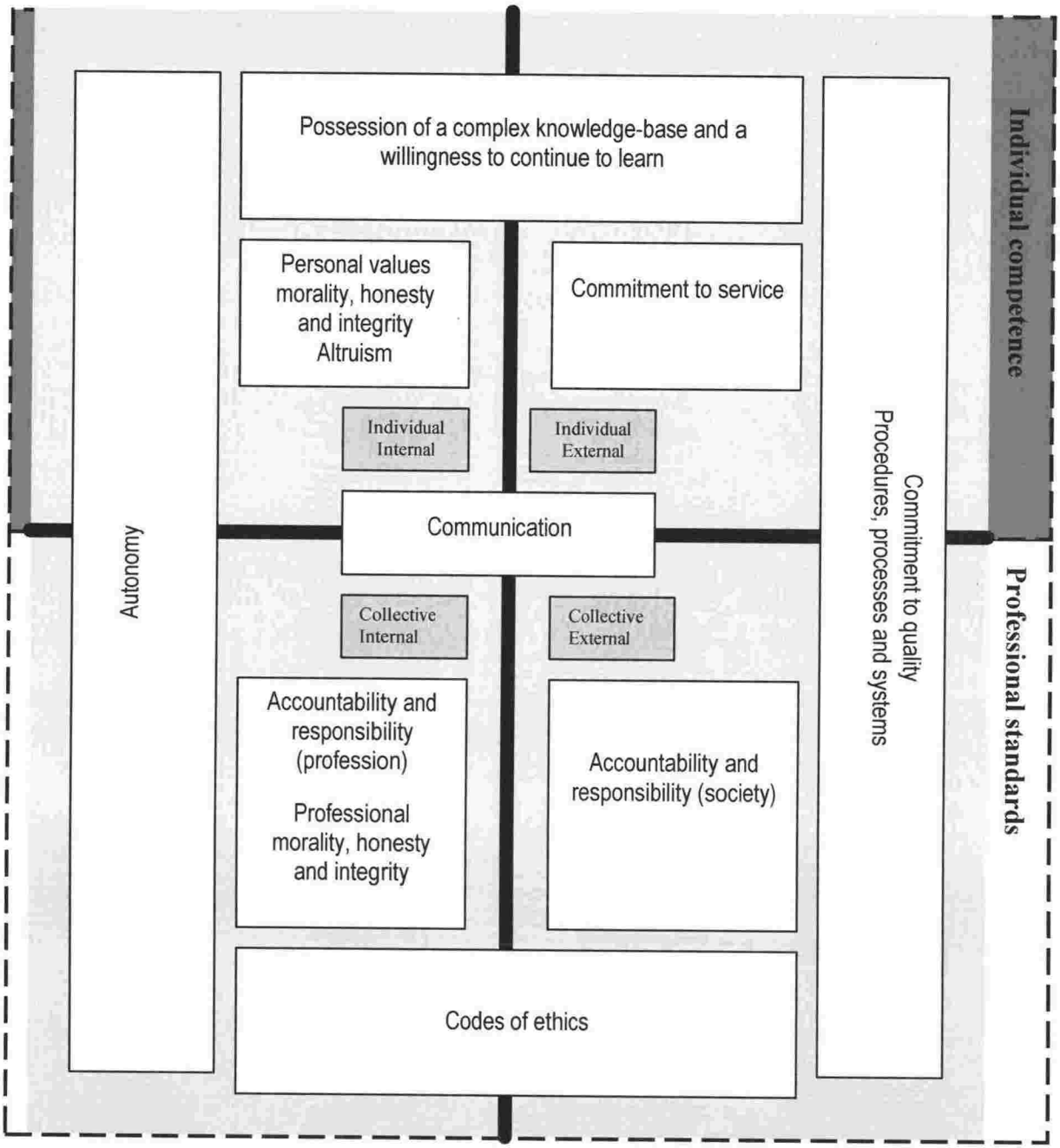

Figure 2.2 – An integrated map of professionalism

These, then, are important components of an integrated model of professional competence.

2.4 Utilisation of constructs of professionalism and competence

Competence and professionalism are useful constructs for defining and maintaining professional standards, and for ensuring ongoing protection of a profession. Gonzci, Hager and Oliver (1990) defines a number of broad uses for setting standards of competence and

professionalism, namely maintaining professional standards, ensuring labour market efficiency, and promoting equity.

2.4.1 Maintaining professional standards

Defining competence provides explicit statements of what people must be able to do to practise successfully as professionals. Having clear standards helps to remove misunderstandings from both inside and outside the profession and assists in making judgments in cases of professional misconduct or poor performance. Clear standards offer a sound basis about entry to, and progression within, the profession. They also provide guidance for education providers developing curricula to prepare people for entry into the profession and/or progression within the profession.

2.4.2 Promoting professional development

Standards of competence and professionalism can be established to recognise the outcomes associated with all levels of competence from entry level to "Master", expert or specialist categories. Doing this enables (in theory at least) the focus of assessment for registration to be on what the practitioner can do, rather than simply relying on formal indicators such as qualifications. Adopting an approach that recognises what practitioners can do, enables practitioners to both enter the profession at an appropriate level, and to progress. Such standards can provide a basis for the development of career structures, remuneration scales, education programmes, and other initiatives to promote efficiency.

Standards also protect autonomy and exclusivity of the profession while enabling transfer of learning across international jurisdictions. Global trade liberalisation impacts not only on goods but also on services. There are growing expectations that professionals will be able to work across international jurisdictions; thus, having clearly defined standards of competence and professionalism protects both the consumers of professional services and the profession itself from inadequate performance.

2.4.3 Equity

By focusing on competence, regardless of how it may have been developed, competency-based standards will help certain groups whose skills may not at present have received due

recognition, for example, new migrants. These issues are of particular importance at times of labour shortage.

The delineation of professionalism and competence also promotes debate about professional practice and ongoing development. Drawing attention to the complexity and richness of professional knowledge and practice has the potential to encourage excellence and boost morale. This is particularly important in the current economic climate where payment for pharmacy services is being constrained by government policy.

2.4.4 Importance of competence

The uses of competence standards, described above, point to the importance awarded to recognition of competence via registration, certification or licensing in society today. They also suggest that competence will be increasingly important as governments and society in general demand greater transparency and accountability from the people and organisations from which they contract services. This can be seen by the introduction of regulatory instruments by the government for a wide range of occupations, for example, in the construction industry and the health professions.

The requirement that occupational groups and professions should prove their competence is not a bad thing. It does require, however, clear understanding of what type of competence is important. It is not enough to know that a person has the skills, knowledge and attributes to perform a role or a task under current circumstances; it is also important to know that the person has the ability to deal with complex and ever changing circumstances, to be able to learn and develop his or her skills and knowledge, and to be able to adapt to changes in society's expectations. All this affects the model of competence required. For example, if the profession is only interested in determining whether a pharmacist can dispense a prescription accurately—the role they are remunerated for by the government—then the profession can set standards that a pharmacist must pass in order for him or her to demonstrate his or her competence. If something changes, for example, making a serious dispensing error and not rectifying it, the pharmacist would demonstrate that he or she does not have the right attitude to be considered competent, thus the right to practise unsupervised may be removed.

If, however, the profession is interested in ensuring that the person has the attributes necessary for him or her to be adaptable, socially aware, committed to ongoing development, and self-reflective, then these are the attributes that need to be assessed.

These arguments suggest that it is the model used to conceptualise competence that guides the development of assessment, initiatives for continuing professional development, and even the design of initial education programmes. The model of competence chosen to use as this blueprint, then, is extremely important.

2.5 Summary

The complexity of professional practice suggests that professional competence is best conceptualised as a complex, integrated whole, which has been developed using systems thinking and complexity and integral theories.

An integrated, holistic model of professional competence should not only take into account knowledge, cognitive and technical skills, values, attitudes, the ability to learn and adapt, and the ability to integrate these skills together, but should also consider the context in which the professional operates. It should take into account current thinking about professional knowledge and learning theory that emphasises both the lack of separation between knowing and doing, and the individual nature of learning (Gonczi, 1999; Lave, 1988; Brown, Collins & Duguid, 1989; Raizen, 1994; Greeno, 1997).

Before an attempt is made to construct such a model, current thinking on knowledge, learning, the development of skills and the roles of attitudes, values and ethics, should all be explored further, along with approaches that have been used to construct such models to date.

Chapter Three
The components of professional competence

As identified in the previous chapter, competent and expert professionals exhibit a number of common characteristics. Such professionals:

- Possess a wide range and depth of knowledge, and have a commitment to maintain this, which is embodied in their ability and willingness to continue to learn.
- Have the technical, cognitive, psychomotor, and interpersonal skills to perform their professional role to the standards required, along with the organisational skills to manage themselves and others, to source and evaluate information, and to work efficiently and effectively.
- Have the requisite attitudes, including being altruistic, having integrity, and the ability to work ethically, legally and morally.
- Are self-aware, able to reflect on their current performance and to recognise their own strengths and weaknesses. They are able plan for their future development.

These characteristics are essential to competent performance; however, they do not exist in isolation. In day-to-day practice they are interlinked and are both impacted by, and impact on, the social, cultural, political and environmental contexts in which the professional works.

In this chapter, current thinking on these characteristics, their interrelatedness, and the impact of context, is explored.

3.1 Knowledge

The knowledge that underpins professional competence is a complex mix of specific disciplinary knowledge, applied knowledge, and general knowledge. It is both practical, procedural knowledge, "knowing how", and theoretical, propositional or declarative knowledge, "knowing that" (Eraut, 1985; 1992; 1994; Benner, 1984; Polanyi, 1966).

3.1.1 Professional knowledge

Professional knowledge is at the core of professions and professional practice. Eraut (1992), who has investigated the nature of this knowledge, identifies that professional knowledge is both an individual characteristic and a collective attribute of a profession as a whole. The professional knowledge of both the individual and the whole profession is made up of two distinct types: propositional knowledge and process knowledge.

3.1.2 Propositional knowledge

Propositional knowledge is the codified body of knowledge of the profession and the individual, and is made up of discipline-based theories and concepts. At the individual level, propositional knowledge is shaped by everyday activities, social interactions and observations of events, and in this process, theoretical knowledge becomes personalised. This personalised propositional knowledge influences the way individual professionals think and behave, and is developed through experience and the subsequent emergence of expertise. It enables individuals to develop their own preferred approaches to problems and underpins continuous practice improvement.

Personal propositional knowledge reflects the importance placed on it by those generating it. In different settings, knowledge will have different practical and theoretical characteristics, but will be influenced by both theory and practice (Billet, 1997).

Personal propositional knowledge can be shared with the profession through research and publication and, in this way, can become professional propositional knowledge, that is, part of the profession's body of codified knowledge.

3.1.3 Process knowledge and skills

Process knowledge, on the other hand, is defined by Eraut (1992) as the knowledge of how to conduct the various processes that contribute to professional action. As such, process knowledge describes the processes by which professionals apply knowledge by integrating it with skills and attitudes to perform their role.

Process knowledge is also closely integrated with propositional knowledge in that it enables practitioners to access and make effective use of the theoretical knowledge

associated with the profession. This type of knowledge is also called "applied knowledge", as it refers to how people make use of knowledge in their professional work, and is exhibited in action. Process knowledge is thus linked inexorably with skilled behaviour, including the exhibiting of technical, cognitive, psychomotor, organisational and interpersonal skills.

Eraut (1992) identifies a number of "higher order" generic qualities that are embedded in process knowledge. The first of these is the ability of the professional to acquire information, which requires them to possess a conceptual framework to guide enquiry, and skills in collecting and interpreting information and then integrating it with their existing knowledge-base. For pharmacy, these skills include the ability to interview clients, interpret prescriptions, and to evaluate data. These skills are also called information access skills and include components of communication and organisational skills.

The second higher order quality referred to by Eraut is the ability of the practitioner to use his or her knowledge to perform complex actions that have become routinised through practice and experience, and in doing so, to demonstrate skilled behaviour.

The third higher order quality is the ability of practitioners to use their knowledge to undertake deliberative processes such as planning, problem-solving, analysing, evaluating and decision-making. Professionals often must practise these skills in less than ideal situations, for example, without access to all information, under tight time constraints or where there is no obvious practice, process or action to follow. Such deliberative processes are creative, and integrate propositional knowledge with professional practice in ways that are meaningful to the contexts and problems encountered. In this, deliberative processes are similar to the intuitive qualities described by Chi *et al.* (1988), Gentner (1988), and Tennant (1999) as being characteristic of expert performance.

The fourth higher order quality is the ability of practitioners to provide information, that is, to present propositional knowledge in a form suitable for their audience. The successful professional must be skilled at imparting information, and this requires both skilled interpersonal behaviour in reading a client's situation, and ability to understand and to communicate effectively. It also requires an understanding and appreciation of the cultural and social contexts in which the client operates.

The final component of process knowledge is the ability to use knowledge of oneself to control one's own behaviour. For Eraut, controlling one's own behaviour concerns ... "the evaluation of what one is doing and thinking, the continuing re-definition of priorities, and the critical adjustment of cognitive frameworks and assumptions" (1992, p. 112). In essence, controlling one's behaviour encompasses self-management, self-evaluation, meta-cognition, and active advancement of knowledge and skills.

Eraut's concepts suggest that professional knowledge is not fixed or absolute, but emergent. He further suggests that the moral, ethical, social, cultural and environmental aspects in which the professional practices, and interactions between these, contribute to the ongoing generation of professional knowledge. Schutz (1967) called this ability of professionals to make use of personal knowledge and impressions, so as to interpret and shape their environment, as using "schemes of experience". Schemes of experience are defined as personal interpretations of theoretical knowledge that have developed from personal experience.

3.2 The integration of knowledge and learning

This ability of professionals to develop and use personal knowledge in new ways based on experience has been explored by Schön (1983, 1987) who calls the processes involved, knowledge-in-action, reflection-on-action and reflection-in-action. In using knowledge-in-action and reflection-on-action, practitioners learn from the actions taken and uses this knowledge to develop their practice further. In reflection-in-action practitioners use reflection while they are performing tasks or functions so that reflecting and acting are indistinguishable.

3.2.1 Reflection

Reflection, according to Schön (1983; 1987) is the art of applying technical problem-solving to practice problems to elicit new understandings and/or solutions, and is primarily a learning function. While it is recognisable when it occurs, individuals are typically unable to describe easily the separate components of the reflective process—reflecting and acting—used to make changes to their behaviour (Schön, 1983). In this, reflection is akin

to the intuitive behaviour identified by Dreyfus and Dreyfus (1980) as being central to expert performance. The manner in which intuitive behaviour integrates knowledge and action as one seamless whole also reflects the concepts of professional process knowledge described by Eraut (1992).

Another view of the reflective process is that of Mezirow (1990), who focuses on the critical nature of the reflective process. In Mezirow's view, reflection is not a passive process. It is active and involves the skills of critical thinking, analysis, evaluation and synthesis. Boud agrees, stating that reflection "is associated with questioning, uncertainties, discrepancies and dissatisfactions, and requires learners to construct their own meanings within a community of professional discourse" (Boud, 1999, p. 123).

Practitioners who engage in reflection think one step ahead, are critical thinkers, store experience for the future, analyse information and situations they encounter, and participate in peer review.

Reflection can also be likened to the process by which experts use their experiences to develop knowledge. Experience in this context results when preconceived notions and expectations are challenged, refined or disconfirmed by actual situations (Heidegger, 1962; Gadamer, 1970). Experience, therefore, requires the following on the part of the practitioner:

- a willingness to consider new ways of doing things;
- an openness to question oneself and one's practices;
- an ability to recognise that one does not have all the answers;
- an ability to see patterns; and
- a willingness to share knowledge and ideas with others.

The qualities required to turn experience into practice are the focus of reflective practitioner programmes that are used widely in the education of professionals and in their continuing professional development. They are also incorporated into many assessment practices, particularly those built around self-assessment, peer assessment, and practice audit. Two of these, self-assessment and peer assessment are particularly important in professional practice and these are discussed further in sections 3.4, 11.2 and 11.3.

3.2.2 Knowledge-in-action

Knowledge-in-action describes the ability of practitioners to apply their knowledge both explicitly and implicitly, and is exhibited when professionals operate spontaneously in a professional situation—not by thinking first what to do, then acting, but by carrying out a single composite action, which is an immediate response to the situation they encounter (Churchman & Hall, 1997). Professionals act in a particular way because, like experts, they instantly and instinctively know or judge this to be the appropriate action (Schön, 1983).

Schön recognises that for professionals, knowledge and skills are not distinct, but are instead inextricably interlinked through practice. Rogoff (1990) and Billet (1999) agree, identifying that professionals learn throughout their lives by participating in everyday activities, and through moment-by-moment learning that uses learning processes that are products of everyday thinking and acting.

Knowledge and learning are also inextricably linked to competence. Indeed, Mathews and Candy (1999) state (p. 51) that:

> Irrespective of the form of learning, or of its location, there is now considerable evidence to suggest that the effective practitioner today is one who actively seeks out opportunities for new learning and who is constantly scanning the environment in an attempt to predict what the major new directions will be.

Learning is the process by which the professional develops his or her individual knowledge-base from experience. In turn, through the learning process, practitioners apply their theoretical and experiential knowledge to develop their practice. Learning, then, is an essential component to the development and maintenance of competency.

3.3 Learning theories

In an applied discipline such as pharmacy, the knowledge development associated with emerging competence requires novice practitioners to use their theoretical discipline knowledge—often learnt in the classroom—in practical situations. In this process they

extend, personalise, and share their knowledge through clinical experience and evidence-based investigations that they encounter in day-to-day practice. The knowledge created through this process will be both explicit and social, tacit, implicit and personal (Sternberg, 1994; Kolb, 1984; Valsiner & Leung,1994). The type of learning associated with the development of such knowledge is referred to as "generative" or "anticipatory" learning (Botkin, Elmandjra & Malitza, 1979).

Three learning theories are particularly pertinent to the way professionals are thought to learn and have thus influenced the way they have been educated and assessed for membership to their profession. These theories are briefly discussed in this section, particularly the notions of objectivity and reinforcement, which underpin behaviourist approaches to education, modelling (from social learning theory), with its links to apprenticeship models of learning, and personal and collective interpretation of meaning as exhibited in constructivism and social constructivism.

3.3.1 Behaviourism

Behaviourist theory underpins many of the approaches currently used to conceptualise competence. Behaviourism views development of the individual as resulting from learning through experience, with positive reinforcement being used to ensure that learning conforms to socially accepted norms. Learning is highly structured and purposeful, and development is measured by observing changes in behaviour.

Behaviourist approaches to education are based, at least in part, on the behaviourist psychology espoused by Skinner (1957). In behaviourist views, mental functioning that underpins learning cannot be seen and so cannot be measured. Behaviourists assert, therefore, that the focus of teachers in determining whether learning has taken place should be on overt behaviours that can be observed and recorded (Davis, Sumara & Kuce-Kapler, 2000). In this view, development is behaviour, the two are the same. What someone knows and has learnt can be measured from the behaviours they exhibit.

Behaviourist theorists argue that thought processes are subjective and idiosyncratic while physical behaviours are obvious and measurable, and can be influenced by direct interventions such as positive reinforcement. This thinking, which has underpinned much

of the development of the competency-based movement, is based on complicated systems thinking with its focus on direct cause and effect. As stated by Davis *et al.* (2000):

> Specifically this framework seeks to identify and to train associations between particular events and particular behaviours. It was demonstrated, for example, that people tended to develop and act on associations among disparate phenomena—that is, they were self-trained in very much the same way that dogs can be trained to salivate at the ringing of a bell if, for a period, it is rung just before feeding time. Similarly, and once again supported by research on both humans and other species, it was demonstrated that long chains of complicated and counter-instinctive behaviours can be taught through careful administration of rewards, promises of reward, punishments, and threats of punishment. (Davis *et al.*, 2000, p. 57)

Behaviourism therefore emphasises feedback and reward systems, well sequenced and incremental learning structures, and clearly articulated learning goals.

Critics of Skinner's view argue that it does not recognise the importance of cognition. They argue that behaviour, environment and cognition are key factors in development and this view is at the heart of social learning theory.

3.3.2 Social learning theory

The major difference between the two theories of development is that social learning theorists believe people can control and regulate their behaviour while behaviourists do not (Santrock, 1999). Social learning theorists emphasise the importance of people's ability to reason, imagine, plan, expect, interpret, believe, value and compare. Bandura (1977, 1986, 1997) identifies the importance to effective learning of observing what others do. This form of learning has been termed "observational learning", "modelling" or "imitation" and underpins expert-apprentice models of education. Social learning theorists differ from Skinner's behaviourist view in recognising that people can regulate and control their own behaviour. This control is mediated through the thoughts and cognitive processes in which a person engages.

Until recently, investigations of learning have focused largely on the individual rather than considering the individual within his or her social context. Recent research by Bandura (1986, 1997), however, has shown that the person, their behaviour, cognitive and other

personal factors and the environmental influences operative interactively. Behaviour can influence cognition and vice versa. Bandura believes that an important person factor in learning is self-efficacy, the expectation that one can master a situation and produce positive outcomes.

This concept is reflected in Tennant's theory of situational learning (1999). Tennant's theory suggests that the context in which learning occurs strongly impacts on the knowledge and skill acquired. This implies what professionals learn through problem-solving will be very much influenced by the learning opportunities they encounter and the context in which they operate. His situational learning theory mirrors the concept of the development of expertise and is underpinned by four propositions. Firstly, high-level or expert knowledge and skill can be gained from everyday experiences at work, and in community and family life. Secondly, domain-specific knowledge is necessary for the development of expertise. Thirdly, learning is a social process, and finally, knowledge is embedded in practice and is transformed through goal-directed activity.

Other researchers have also shown that culture both influences and is influenced by the behaviours, values and beliefs that are central to knowledge creation, sharing and application. De Long and Fahey (2000) have shown that culture shapes one's assumptions about what knowledge is and which knowledge is worth managing. Culture also influences who controls specific knowledge, including using, sharing and/or hoarding it; for example, culture establishes the context for awarding rights to a profession. Culture in the broadest sense also shapes the process by which knowledge is created, verified and distributed.

Recent research into learning-in-context and apprenticeship models has extended definitions of learning to include how it induces change at a group or even organisational level (Lave & Wenger, 1991; Moll, 1990; Sternberg, 1994; Vygotsky, 1978). This thinking is in line with complex theories of learning that suggest learning is not only about acquiring or accumulating information, nor about a taking in or theorising about a reality that is separate from the learner. Complex theories suggest that learning is principally a co-evolution of knower and known, which transforms both, and is achieved through participation in the world and keeping pace with one's evolving circumstances. Knowledge, in this context, is contingent, contextual and evolving; never absolute, universal or fixed (Davis *et al.* 2000). These ideas about learning are embodied in the

literature of constructivism and social constructivism with some of the key theorists being Vygotsky, Schön, Kölb and Piaget.

3.3.3 Constructivism and social constructivism

Constructivism emphasises the active role of the learner in building understanding through direct experience with a dynamic and responsive world. Constructivism postulates that while knowledge is constructed by and within the individual in interaction with the world, it exists only in the minds of people. People interpret events based on what they know already and while there are no absolute truths, there are accepted truths, but these may change as situations change. In this model, knowledge and learning are active processes, and are influenced by the motivation and mediation of the individual (McInerney & McInerney, 2002).

Piaget (1968) was one of the first researchers to describe the personal nature of learning. His theory on learning identifies that learning is made up of three separate processes—assimilation, accommodation and equilibrium (Beard, 1969). He suggests that people seek to make sense of what they encounter in their day-to-day experiences through the process of equilibrium, whereby they integrate new information with what they already know and make sense of what they encounter throughout their lives. Equilibrium encompasses the processes of assimilation and accommodation, where assimilation is linking existing knowledge to an activity or stimuli, and accommodation is the process of developing new knowledge when faced with a novel situation.

These ideas link with recent work, which proposes that learning occurs through two sorts of problem-solving: routine and non-routine (Anderson, 1993; Shuell, 1990). Routine problem-solving is analogous with assimilation and reinforces what the professional knows he or she can do, and therefore reinforces and refines existing knowledge. Non-routine problem-solving, on the other hand, is analogous to accommodation and develops new knowledge as it requires professionals to engage in new tasks and activities.

Three variants of constructivism have been described. The first of these is personal or radical constructivism, which stresses the individual nature of learning and knowledge as self-discovery. It focuses on the internal processes of learning and presents the view that

knowledge is not transmitted from one person to another, but is the active response of the learner. People understand in their own terms, and common understandings occur because people use similar physical apparatus for learning.

The second view is called social constructivism, and it focuses on the construction of shared knowledge. The process of learning is collaborative, and construction comes about as learners become socialised to the knowledge symbols of their society. Vygotsky's "Zone of Proximal Development" (Vygotsky, 1978, p. 86) is an example of this.

The third view is information-processing constructivism that links learning to the processes by which people memorise and learn (see, for example, Boulton-Lewis, 1998).

Vygotsky was among the first to describe a dynamic process of learning within an individual's immediate context or environment. He postulated what he called a "Zone of Proximal Development", where the context in which an individual lives and practises is the arena for learning and development. An individual's knowledge is the product of previously internalised learning, which once it becomes conscious forms the basis of a set of tools for new thinking and learning. Vygotsky's contribution is twofold: firstly, in focusing on the learner's context as an important variable, and secondly, in shifting the focus from what has been learned to the learning capability that has been produced through the learning process itself (Moll 1990).

Lave and Wenger (1991) propose that learning involves participation in a community of practice, for example, a profession, with its associated traditions, stories and ways of working. At first this participation is peripheral, but it increases gradually in engagement and complexity until the learner becomes a full participant in the socio-cultural practices of the community. They claim that the idea of reflection on practice or action is misconstrued because there is a difference between talking about practice from the outside and talking within it. This mirrors the model of the development of expertise described by the Dreyfus model of skill acquisition (Dreyfus & Dreyfus, 1980; Dreyfus, 1981).

In their model of learning, Lave and Wenger (1991) integrate aspects of behaviourism, by emphasising the relative importance of having strong goals for learning, and social learning theory, by supporting learning modes that emphasise observation, mentoring, and

guidance over instruction for effective professional learning, with constructivism. They see learning as not so much a matter of individuals acquiring mastery over knowledge and processes of reasoning, but rather as a matter of co-participants engaging in a community of practice. The internship year for the pharmacy profession could be argued to provide these opportunities for practitioners seeking admission into the profession.

3.3.4 Integrating knowledge and skills

These approaches to interpreting professional learning and knowledge development processes suggest that professional knowledge and learning is inextricably linked to practice and, hence, attempting to isolate knowledge from skills is counter productive. While a professional may demonstrate knowledge through actions and behaviours, the mix of propositional, personal, process and tacit knowledge makes it difficult to assess that knowledge independently from the skills used. This will have implications for the way professional competence is conceptualised and assessed. Indeed, this issue is at the core of many of the current criticisms of competence.

Most current conceptions of competence are based on behaviourist frameworks, which break competence down into the performance of discrete tasks. These approaches are criticised for ignoring: the connections between tasks (Hall 2000; in press); the attributes that underlie performance of those tasks, including the disposition to act, the context of performance; and the impact of interpersonal and ethical aspects (Hyland, 1994).

3.4 Peer and self-assessment in learning

As indicated in the discussion so far, competent professionals are reflective practitioners, able to evaluate critically their performance and to learn from experience. They are generally willing to participate in peer review and assessment where this is focused on continuous improvement of practice. In undertaking these activities they use self and peer assessment primarily as tools for learning rather than for summative assessment (Brown, Bull & Pendlebury, 1997; Boud, 1999). According to Brown, Bull and Pendlebury:

> providing and giving feedback is central to management tasks in any organisation and self-assessment provides the basis for reflective learning and career planning". (p. 173)

3.4.1 Self-assessment

Self-assessment is central to the practices of reflection, lifelong learning and professional competence, and people able to use self-assessment effectively are self-aware and self-monitoring (Brown, Bull & Pendlebury, 1997; Boud, 1999; Heron, 1988).

Nisbet and Shouksmith (1984) describe the capability of professionals to develop their cognitive and learning processes through self-assessment as the development of a "seventh sense" of meta-cognition. This builds on the sixth sense of intuition, which has been identified as a characteristic of both experts and professionals. Boud, Keogh and Walker (1985) also comment on the role of self-assessment in learning to learn. They identify that self-assessment is useful for diagnostic and remediation purposes and promotes good learning practices. It helps people to consolidate their learning over a range of contexts and promotes self-knowledge and understanding.

Self-assessment, like its sister, peer assessment, may be used to assess product, performance and processes. Self-assessment encourages the internalisation of accountability, and when linked to professional standards, may be used for quality assurance and social control, for example, when linked to audit and peer review.

3.4.2 Peer assessment

Peer assessment is associated with concepts of evaluation of work by people of equal status, giving and receiving feedback, and generally has an element of mutuality associated with it. Research evidence on peer assessment indicates that it is useful in developing skills in critical thinking and task management, and increases a participant's self-confidence, willingness to take responsibility and awareness of group dynamics. Its strength is in assessing processes rather than outcomes (Brown, Bull & Pendlebury, 1997). This points to the usefulness of peer assessment as a learning tool.

When used summatively, peer assessment can face some difficulties. Many people distrust the process and the ability of their peers to judge them. Others do not want to accept the responsibility of assessing others' work, instead they would rather trust the judgment of an "expert". In a profession such as pharmacy, many people are already involved in peer

assessment. In the internship programme, pharmacist preceptors make judgments on interns' competence for registration. To support their ability to make such judgments, they receive training in assessment. In the ENHANCE programme, the personal development plan created as a result of the self-review is peer reviewed in order to issue an Annual Practising Certificate.

The issues associated with using self and peer assessment for summative assessment purposes are discussed further in Part Four of this thesis.

3.5 Professional skills

Competent professionals possess a wide range of generic and specific skills. These include specific technical skills, clinical skills, interpersonal and communication skills, problem-solving, self-directed learning, and reflection, and cognitive skills, for example, the ability to put theory into practice to achieve an acceptable outcome (Norcini, Swanson, Grosso, Shea & Webster, 1984; Norman, Nuffield, Woodward, McConvey & Walsh, 1985; Patel, Evans, & Gröen, 1989). These are developed throughout the practitioner's practising life—in initial training, on-the-job, through experience, or through self-assessment and reflection.

As many researchers have identified (for example, Eraut, 1992; Evers, Rush & Berdrow, 1998), skills are not possessed in isolation. They are associated with other skills, knowledge—both theoretical and practical—and personal attributes, and they reinforce each other. For example, competent pharmacists use a mix of cognitive skills, organisational skills, psychomotor skills and interpersonal skills when performing their roles.

This linkage of knowledge with skills and attitudes creates a capacity to make decisions and act from a basis that is called by Sveiby (2002) "justified true beliefs". "Justified true beliefs" include facts, assumptions and values, and are derived from resources such as procedures, rules and mental and physical abilities. Such behaviour points to the ability of practitioners to integrate knowledge and skills with values and other attributes that are inextricably linked with competent performance.

Professional skills, then, include not just the specific technical skills associated with the tasks professionals perform, but also the so-called "generic" skills of communication, problem-solving, learning, personal organisation, decision-making, managing conflict, leadership and influence, planning and organisation, creativity, risk-taking, and conceptualisation skills (Evers, Rush & Berdrow, 1998).

3.6 Values, Ethics and Attitudes

Attitudes are also known as dispositions and include values, ethics, interests and abilities (Perkins, Jay & Tishman, 1993). Attitudes are important because they influence how practitioners perform. For example, pharmacists could use their knowledge and skills to dispense medicines accurately, but to be considered competent, they must do this in a way that meets the needs of the patient. Pharmacists must be responsive, timely, and ethical. From another view, pharmacists would not be considered competent if they engaged in competitive activities and worked to discredit other health practitioners, or if they served the public dressed in greasy overalls and with dirty hands!

Attitudes, then, influence the way in which practitioners behave and perform their professional role.

3.6.1 Values

Competence and professionalism are both characterised by having an emphasis on possession of appropriate values, morals and ethics. The context of learning, as well as taking into account the physical, social and cultural environments in which professionals operate, needs to consider the individual and group values of those involved. Values held by the competent individual and the profession as a whole determine the types of knowledge that are constructed, what is prized, and what is emphasised (Harris & Volet, 1996; 1997). Values can also encourage participation and acceptance of other people's ideas—an important consideration for pharmacists, who must work to ensure that patients participate effectively in their treatment.

3.6.2 Integrity

Integrity is a value often associated with both professionals and competent performers. Halfon (1989) considers that persons of integrity are characterised by maintaining their commitment to do what is best—especially under conditions of adversity. In many respects, the term integrity is often equated with honesty or an ethical manner of behaving. In this sense, a professional has integrity if he or she complies with the profession's code of ethics, and a profession has integrity if it holds its members to account in respect of meeting both the requirements of the code of ethics and the standards of practice considered acceptable by the profession. Thus, if a profession subscribes to a code of ethics and a set of standards, they create professional integrity.

3.6.3 Ethics

Eraut, Steadman, Cole & Marquand (1994) identify three main ethical issues encountered in the work-place. These are deciding the appropriate courses of action to take in a given situation; managing conflict resulting from interpretation of overlapping sets of values; and determining actions to take after observing unethical behaviour by others. They identify four overlapping sets of values commonly encountered in the workplace. These are: operating within the law and other mandatory systems; adopting appropriate professional values, including relationships with clients and other professionals; maintaining appropriate organisational values, including relationships with colleagues, staff, customers and general public and appropriately exhibiting personal values, including individual beliefs and behaviours.

3.7 Summary

People who are considered to be competent in performing their professional role have a number of characteristics in common. They have a broad knowledge of their profession, which includes not just theoretical knowledge, but also the knowledge of how to perform as a professional. They are able to adapt what they know to meet the needs of the day-to-day situations they encounter, and in doing so, learn from the experience and grow their knowledge. They can organise themselves and others, access information and balance conflicting work demands. They are self-aware and able to reflect accurately on their performance, and are able to plan for their future learning and development. They are able

to apply the profession's code of ethics to their work, and to respond in ways that are legal, ethical, and culturally appropriate.

Knowledge, the ability to apply that knowledge in performance, and to learn from the experience, underpin all of these abilities. While a large proportion of a profession's knowledge and competence resides in three reservoirs within individuals, namely their cognitive understandings, their learned skills, and their deeply-held beliefs, it is the ability to bring these three together that differentiates extraordinary performers from the ordinary (Quinn, 1992).

It is the ability to integrate knowledge, skills, values and attitudes that differentiates the competent from the not-competent professional, and these are not absolute. Rather than following a set formula for approaching a particular problem, the competent professional will use a unique pattern of competence to perform and produce the desired outcomes (Raven, 1996). This suggests that methods of conceptualising and testing competence must move away from rigid prescriptive methods, focused on discrete components, such as knowledge and skills.

Gött (1995) supports this view. She argues that as the skills needed in the workplace become more cognitive, they become more difficult to observe and separate into discrete components. Rather than focusing on individual skills and knowledge, models are needed for conceiving, teaching and assessing competence based on whole system thinking, which integrates all kinds of procedural and process knowledge and learning with real-world practices. This reflects Gonczi's (1999) call for developing integrated models to conceptualise and assess competence.

In the next chapter, models of professional competence are explored along with the methodologies commonly used to develop them.

Chapter Four
Models of professional competence

As described in the previous chapter, professional competence is a complex combination of theoretically and personally derived knowledge, skills, and attitudes that, when combined together, enable professionals to perform their professional role. Performing their role requires professionals to be cognisant of, and responsive to, the cultural, social and professional contexts in which they work. Proficient professionals are expected to exhibit patterns of competence that enable them to adapt their performance to the evolving circumstances encountered.

The ability to adapt practice to fit the situation, to personalise knowledge and skills, and to continue to learn and develop suggests that a holistic, integrated model of professional competence is needed to account for these aspects of practice. Creating such a model would go beyond the simplistic, behaviourist approach to determining roles and functions and should recognise the complexity of the world in which professionals work.

Gonczi (1999) and Hall (in press) argue that this level of complexity can only be catered for using an integrated and holistic approach to conceptualising professional competence. Complexity and integral theories provide a useful framework for developing such an approach to conceptualising professional competence as they enable individual performance to be modelled as one part of a wider system that encompasses professional, social and cultural perspectives.

In this chapter, current models of professional competence are considered for the purpose of determining the best approach to be used for the development of a holistic, integrated model of professional competence for pharmacy in New Zealand.

4.1 Approaches to modelling competence

Traditionally, approaches used to model competence have concentrated on either the observable tasks that needed to be performed to accepted standards, or on observed

behaviours related to the generic attributes or capabilities that are said to underpin competency. These approaches reflect behaviourist thinking and its use of functional psychometrics to design measurement scales. As described in section 3.3.1, behaviourist thinking focuses on the measurement of performance that can be observed and measured directly. The strength of this approach is that the performance to be measured maps directly onto the functions derived from analysis of the performed role and the standards required of that performance. The functional model insists, almost to the point of principle, that only performance matters and no intervening variables or traits can be relevant. The weakness of this approach is that, on its own, it can only test performance in a particular situation—it does not produce results that can be generalised. The alternative approach is defined as trait-based psychometrics (Rust & Golombok, 1989).

Trait-based psychometrics aims to measure the traits regarded as representing variation in personality and aptitude within the construct being measured, in this case, professional competence. It recognises that personality and aptitude combine to create traits that reflect performance, and can be measured. The advantage of trait-based psychometrics is that because it is not focused solely on the tasks currently being performed, but rather on the aptitudes required to support successful achievement of that task, it enables judgments of future performance to be made (Rust & Golombok, 1989).

In their work, evaluating current approaches to defining competence, Gonczi *et al.* (1990) and Jessup (1991) recognise the influence of both behaviourism and psychometrics, and describe three broad approaches that are widely used.

The first of these uses detailed and specific analysis of the work—in terms of roles and functions, and hence tasks and sub-tasks—that a professional performs. This approach uses functional psychometrics and focuses on the ***performance*** aspect of a competent professional. It is the approach that has led to the development of the current competence standards for pharmacy.

The second approach uses analysis of the knowledge, skills and attitudes required by the individual professional. This approach uses trait-based psychometrics and focuses on the ***attributes*** of a competent professional. Examples of researchers using this approach to develop models of competence include Boyatzis (1982), whose model of managerial

competence focuses on individual attributes, personal characteristics and behaviours, and the Education Council of the American Academy of Physician Assistants (1996), who delineate two broad domains of traits within professional competence, proficiencies and general characteristics. Proficiencies are capabilities specific to the profession and include discipline-specific knowledge, technical skills, and problem-solving ability. General characteristics include intellectual ability, personality traits, motivation, attitudes, and values.

The third approach analyses the professional knowledge, skills and attitudes in the ***context*** of the performance of realistic tasks. This approach, while focusing on functions performed in association with a role, shifts the definition of competence from tasks and procedures to the purpose and outcome of the work activity. In doing so it integrates both attributes and performance into a single framework, producing a more holistic model of competence. This approach makes use of both functional and trait-based psychometrics and is described by Gonczi and Hager (1991). It produces a multi-dimensional matrix of competence, which recognises that the situation in which the professional works impacts on the way his or her professional roles are performed.

All three approaches produce models based on performance that have been criticised by a number of researchers and educationists.

4.1.1 Issues with traditional approaches

Use of functional approaches to modelling competence assume that all competent performance is demonstrated through behaviour, and judgments of competence are made from observing a practitioner's level of performance that meets or exceeds minimum standards or criteria. This is justified because in functional psychometrics, possession of knowledge and the ability to apply that knowledge, along with having the appropriate professional attitudes, can be inferred from performance.

Functional approaches, like the behaviourism that underpins them, are based on complicated systems-thinking. It suggests that professional practice can be divided into a collection of cohesive units, which together map the scope of a profession.

As identified in the previous chapter, critics, for example, Hall (1994), NZVCC (1994), and Viskovic (1993) point out that these behaviourist and reductionist approaches are unsuitable for use in most general and professional educational contexts where knowledge and cognitive processes are important. By concentrating on discrete skills, these critics believe functional approaches are in distinct danger of dealing only with the superficial aspects of professional practice, while ignoring the holistic way in which knowledge and skill is integrated and coordinated in actual "real-life" performance. They argue that conceptualising competence as a collection of discrete tasks does not reflect a good understanding of the processes professionals engage in or how these can be effectively described. Indeed, functional notions of competence fail to take into account those attributes of professionalism that encompass a willingness to participate in learning processess including reflection, accommodation, assimilation, self-audit and peer review. Nor do they take into account individualised knowledge or ways of doing things developed from practice—the "patterns of competence" described by Raven (1996)—and the implications of these for interpreting standards (Codd, 1995; Hall, 1997; Snook, 1993).

4.1.2 An argument for a complex approach

Traditional, functional approaches to conceptualising competence fail to recognise that most educational and vocational domains are complex in nature and cannot be specified using standards in a meaningful or easily interpreted form (Elley, 1995, 1996; Hall, 1995a, 1996, 1997). They also do not take into account excellence or expertise (Hall, 1994, 1995b; Irwin, 1994; Peddie, 1995). It should be noted that the concerns these critics express pertain particularly to the functional approach to competence analysis developed in New Zealand for prescribing vocational qualifications for the National Qualifications Framework.

In addition, many critics point to the inability of traditional, complicated thinking about competence to account for real professional work. Indeed, anyone who observes a professional at work can see that competence is not quite as simple as performing one or more tasks competently. Tasks in the real world, are rarely isolated from other tasks, performed one at a time or within ideal conditions and therefore cannot be thought of in isolation (Gonczi, 1990). For example, a pharmacist dispensing a medicine will not only be suppling the medicine as prescribed by the doctor, but also using their understanding of

themselves and others to provide information and advice to clients. Pharmacists will contribute to the prescribing process with advice to the prescriber on potential problems or appropriate medicine choices, and they will also perform their role within the economic and cultural constraints of society and its professional rules and codes. Pharmacists will also invariably be doing more than one job at once.

The context—environmental, social, cultural—in which the task is performed will not only have an impact on components of the task itself, but also on the way in which it is performed. As Gonczi (1999, p. 182) states:

> Some tasks in some contexts will be quite specific and will require simple specific combinations of attributes. In other contexts, similar tasks will require more complex combinations of attributes because they have, say, to be completed more quickly or in more difficult circumstances.

It is often these less tangible aspects of competence, rather than the practitioner's technical skills, that distinguish the successful from the less successful, and the expert from the merely competent.

Gonczi (1999) sums it up well when he argues that rather than being a prescribed and predetermined set of behaviours, competence is an "ever-evolving reality" that by its nature is normative. He points out that as practitioners become more experienced, they are increasingly able to make informed individual judgments about how they should act in a given situation, and in doing so, are adapting and clarifying the explicit nature of competency in their occupation every time such decisions are made. They are able to take into account the social and environmental systems in which they practise.

Using complexity theory in developing models of professional competence provides an

4.2 Models of professional competence

There are several models commonly used to describe professional competence. Each model and approach has its particular strengths and weaknesses. Much of the work done on professional competence has looked at managers. Mansfield and Mathews (1985), Schröder (1989), and Boyatzis (1982) have all described models of managerial competence. Others have focused on other professions, for example, Kennie and Green (2001) analysed the surveying profession, Ayling and Constanzo (1984) the law profession, and Benner (1984) the nursing profession. Still others have attempted to develop generic models of professional competence, for example, Donaldson (1997), and Cheetham and Chivers (1996; 1998).

Some models of competence have focused on skills, for example, the job competence model of Mansfield and Mathews, while others have focused solely on attributes and traits. Donaldson's model of "emotional competence" is an example of this approach. Other models use a blend of the two approaches.

4.2.1 Skills-based models

Conceptualising professional competence from a skills perspective emphasises performance and functional psychometric approaches discussed previously in this chapter.

The current standards of pharmacy competence discussed in Chapter One is an example of an approach to defining professional competence that focuses on skills. This current definition of pharmacist competence proposes seven standards that are further delineated by 46 sub-components, and 149 performance criteria.

This approach to defining competence attempts to cover all aspects of pharmacy practice, but suffers from duplication of content; for example, communication is included as a sub-component in each of the seven standards. It also covers only the fundamental tasks and roles that a pharmacist performs, rather than explicitly taking into account specialist or expert roles, and does not take into account how the roles interrelate in competent performance.

Another approach to defining professional competence from a skills perspective is the managerial job competence model of Mansfield and Mathews (1985). In their approach, Mansfield and Mathews propose that professional competence is conceived as resulting from the interrelatedness of four sets of skills: task skills, which are the routine and largely technical components of an occupation and can be compared with process knowledge; contingency management skills, which are the skills a professional uses to recognise and deal with irregularities and variances in the immediate working environment—what Piaget terms assimilation; task management skills, which are the skills to manage a group of tasks and to prioritise them—what Eraut (1994) calls process knowledge; and role/job environment skills, which are the skills necessary to work with others and cope with environmental factors and to fulfil the wider role expectations. The competent professional is able to integrate these skills to produce results.

The Mansfield and Mathews model builds on the work of other researchers who have also identified the significance of such skill sets. For example, Bruner (1966) recognises the importance of being able to manage multiple tasks and conflicting priorities. He suggests that rather than this being solely a skill, it is in fact a significant aspect of intellectual development, professional learning and adaptation, and is inextricably linked to knowledge. He states:

> Intellectual development is marked by increasing capacity to deal with several alternatives simultaneously, to tend to several sequences during the same period of time and to allocate time and attention in a manner appropriate to those multiple demands. (Bruner, 1966, p. 6)

Another approach to defining professional competence that focuses on skills is that of Donaldson (1997). Rather than focusing on practical skills as Mansfield and Mathews do, Donaldson considers the interrelatedness of cognitive, behavioural, and interpersonal skills as necessary for differentiating performance.

In her model of emotional competence, Donaldson proposes that competent performance results from the ability to mix a range of intra and interpersonal skills in an interdependent framework, which she calls "emotional smarts". This model echoes the emotional intelligence concepts of Goleman (1996). Donaldson states that in today's workplace,

practitioners need to be more than technically proficient, they need to also demonstrate high self-awareness, behaviour, contact and decision-making skills.

Four skill-sets make up her model. The first of these is awareness skills, which cover emotional self-awareness, emotional management, assertiveness, goal achievement, and optimism. People with these skills are able to recognise, identify and appropriately acknowledge their feelings in both personal and professional settings. They monitor their feelings and engage in behaviours that are appropriate to the situation they are in, and state and support thoughts, opinions, or beliefs on a consistent basis while remaining positive. They are also able to assist others to realise their potential.

The second set of skills is contact skills, and these cover relationship-building skills, empathy, and the ability to take social responsibility. These include the ability of a person to present his or herself as being likeable, trustworthy and capable, and the willingness and capacity to contribute actively to the well-being of his or her community.

The third set of skills is decision-making skills and includes problem identification, creativity, selecting solutions, and reality testing. People with this skill set are able to make decisions on the best information available, and to evaluate problems and make decisions in terms of the day-to-day reality.

The final set of skills is behavioural skills, which embrace independence, stress management, impulse control, and conflict management. This skill set includes the ability to address conflict situations in culturally and interpersonally appropriate ways.

Donaldson asserts that people are considered to be competent when they are able to demonstrate these skill-sets alongside their technical proficiency.

Although focusing on skills, the models of Mansfield and Mathews, and Donaldson emphasise integration of skills as important for differentiating competent performance. They also point implicitly to the importance of knowledge as underpinning skills. Other models developed are more explicit in incorporating knowledge with skills.

4.2.2 Models that mix skills and knowledge

Ayling and Constanzo (1984), who investigated the characteristics of competent lawyers, identified that professional competence is hugely influenced by the practitioner's knowledge and ability to use that knowledge in the demonstration of technical and generic skills. Their model of professional competence integrates three types of knowledge with fifteen unique skills.

The types of knowledge identified in their model are basic concepts, principles and rules; theoretical knowledge and principles; and knowledge of rules and procedures. These reflect Eraut's (1994) concepts of professional knowledge, namely propositional and process knowledge. The skills Ayling and Constanzo identify as underpinning professional competence are a mixture of cognitive and generic skills—including basic skills such as organising information, using acceptable grammar, listening, and interpersonal skills—technical skills such as legal decision-making skills, and organisational skills such as the ability to manage, perform with insight, and the capacity to deliver and produce.

Competent performance, in Ayling and Constanzo's model, requires the combined use of all three types of knowledge and all fifteen skills.

Benner (1984) is another researcher, who in developing a competency model for nursing investigated the importance of knowledge and experience. In her model, Benner uses a situation-based approach to describe levels of nursing practice. In doing so, she attempts to address some of the problems of reductionism inherent in task analysis, and of global and overly general descriptions, arising from process categorisation approaches. She describes seven domains of nursing practice, which are all described in behavioural terms that encompass the application of knowledge, skills and experience in achieving successful patient outcomes in specific situations.

Benner's domains of nursing practice are a mixture of roles, functions, competencies and behaviours. They include: the helping role, the teaching-coaching function, the diagnostic and patient monitoring function, and the effective management of rapidly changing situations. Also included are the ability to administer and monitor therapeutic interventions

and regimens, and the ability to monitor and ensure the quality of health-care practices, organisational, and work-role competencies.

In Benner's model, expert performance is differentiated from competent performance by the ability of practitioners to use their experience to develop their practice. Experience, in her view, is a process of active learning and development of personal knowledge. This ability to develop and use knowledge is also central to Schröder's (1989) model of high performance managerial proficiency.

4.2.3 Models that differentiate performance

In Schröder's model, he proposes four clusters of process behaviours, incorporating eleven competencies that differentiate high-performing managers. These competencies define a relatively stable set of behaviours that produce significantly superior workgroup performance in more complex organisational environments.

Cognitive competence is the first of Schröder's four competency clusters. People with this competence demonstrate behaviours, including gathering a rich variety of information from many different sources about the internal and external environment, processing this information to form new ideas or meanings, and identifying possible strategies, methods, improvements or changes. They then compare the pros and cons of different options before implementation.

The second competence cluster is the motivating cluster. It includes self-awareness, managing interactions with others, and having a development orientation. People with the competencies included in this cluster value the ideas of others, position themselves to find out what others are thinking and feeling, and use behavioural strategies to understand the ideas of others, including subordinates, supervisors, peers, and customers. They are able to build cohesive teams, energising and involving others. At the same time, they hold high expectations about the potential of their people, providing them with the resources, feedback, coaching and training that they need to allocate responsibility to the lowest level. This is similar to Donaldson's awareness and contact skills-sets, and is significant in that it identifies the importance of seeing the potential in others.

The third competence cluster—known as the directional competencies—include self-confidence, presentation, and impact. People with these strengths can present their own views and the views of others so the message is expressed clearly and is understood by everyone. They are successful in using modelling, recognition, alliance formation and other forms of persuasion to get others to behave in ways consistent with their goals.

The final cluster are the achieving competencies, and include proactivity and achievement orientation. Rather than wait and react, people with these strengths initiate ideas and take responsibility for the implementation of plans. They are action and results oriented, set challenging standards for themselves and their groups to do things better, and they measure progress and provide feedback about success.

According to Schröder, in achieving consistently high performance, managers use these process behaviours in an integrated manner, making judgments from moment to moment as to the appropriate mix of competencies required to perform. In this, proficient managers are displaying through their behaviours Schön's knowledge-in-action and artistry.

Schröder's work builds on that of Boyatzis (1982) and has many similarities. In Boyatzis' studies into the competencies that differentiate between the managers of average and high performing workgroups, he identified ten competencies that merge technical and cognitive skills with attitudes, behaviours and knowledge-use. They are:

1. Efficiency orientation, enabling people to set challenging and moderately risky goals, to strive to improve what they are doing, to do it better, and to focus on the outcomes achieved judged against a standard of excellence.

2. Proactivity, whereby people implement or initiate activities, proposals or communications to accomplish a task, rather than wait for a problem and then react to it. In the event of a problem or their expectation of a problem, they search for a broad range of information, and formulate multiple options or alternatives.

3. Diagnostic use of concepts, whereby the practitioner uses concepts, theories or models to diagnose or "figure out" various situations.

4. Concern with impact, which encompasses people's ability to use power, reputation, and the objects and behaviour associated with status to persuade others.

5. Self-confidence or "presence", enabling people to be confident about what they are doing and believe in their own success. It encompasses the behavioural elements of being forceful and expressing little ambivalence about making a decision whether or not they see alternatives to that decision.

6. Oral presentation, including verbal presentation skills, which is concerned with communicating ideas clearly. It includes the ability to use symbolic and non-verbal behaviour to reinforce the content of the message.

7. Conceptualisation, which emphasises cognitive skills and knowledge use in forming concepts about information, observations or actions. This competency includes the ability to take input, feedback or data across time or from different sequences or situations and to come up with an idea, new meanings or new perspectives. It also includes the ability to review information and see new ways to perform a task or do things.

8. Use of socialised power, which encompasses the ability to use influence to build alliances and teams and to act as a team members. This competency enables people to build involvement through modelling the behaviour they want others to adopt, and by recognising it in others. Instead of demanding compliance, they build alliances in order to bring conflicting individuals into resolution.

9. Managing group process to enable people to work effectively, including the ability to build group identity, pride and trust so that members are committed to the group task.

10. Perceptual objectivity, that is, the ability to view an event simultaneously from multiple perspectives.

These ten competencies are combined to produce the patterns of competency observed in the performance of effective managers. The patterns of competence demonstrated by a practitioner will vary depending on the situation and context in which the manager is

working. Thus, in Boyatzis' conception of professionalism, there is not one set of behaviours that can be attributed to competent performance. Instead, competence is inferred from the appropriateness of the behaviours demonstrated in a given situation. This is similar to Raven's (1996) concept of patterns of competence.

The work of Driver and Streufert (1969) and Streufert and Swezey (1986) in investigating expert performance provides further insight to how these patterns of competence may discriminate performance. They observed that team members performing at the highest levels display significantly more skilled cognitive behaviours than other teams. These behaviours include gathering more diverse kinds of information from a greater variety of sources and events; seeing more linkages between feedback and information obtained over time, and using these ideas to search further for information; generating more alternatives and options when choosing solutions and making decisions; and taking the time to gain a more detailed understanding of the ideas, concepts, attitudes and values of others.

Cognitive skills and the behaviours associated with their use appear, then, to be significant for differentiating performance. This is echoed in the model of skill acquisition proposed by Dreyfus and Dreyfus (1980), which suggests that as people progress from being novices to expert performers they pass through three stages. In the first of these stages they develop their ability to convert theoretical knowledge to personal knowledge; in the second stage they are able to see a situation or task as a complete whole rather than a collection of sub-tasks; and in the third stage, they develop their ability to be active participants in achieving the outcome sought rather than being detached observers.

Peters and Waterman (1982), in exploring what sets apart excellent organisations from the rest, identified the importance of being able to cope with change and to adapt performance to fit the situation. In their study, they observed a number of themes that differentiate excellent organisations from others, and these provide further insights into the attributes of expertise.

The themes extracted from this research suggest that excellent performers are adaptable. They use information and informed opportunism to develop alternative ideas, options, plans and strategies; to replace cumbersome, inflexible and bureaucratic controls and monitor progress; and to remain flexible. This enables them to capitalise on opportunities,

and prepares them to meet the unexpected. Excellent performers empower others to use initiative and to take responsibility. They encourage others to identify their own directions and ways of doing things, and to experiment within broad boundaries. Effective managers pay attention to the important things they want to happen, and design ways to meet, listen to, and stay in touch with others. They have positive expectations about how people will behave, and as a result, people share a common set of goals and feel trusted. Informal teams and networks are encouraged to enable important information to travel rapidly.

Peters and Waterman identify that effective managers recognise the importance of altruism, of people feeling as though they are making a worthwhile contribution. They are able to generate support for and commitment to causes by presenting them in a manner that arouses a sense of achievement, defines a common bond, and makes work more worthwhile and fulfilling.

The concepts below echo many of the factors identified by researchers discussed in this chapter and suggest there is a common set of factors that can differentiate the performance of professionals. These common factors include:

- having the ability to use information and experience to adapt practice to meet complex demands, being flexible;
- being results-oriented; looking for the best ways to achieve outcomes for the client that is holistic and meets all their needs;
- having the ability to integrate a range of skills, knowledge and behaviour to achieve ever-evolving patterns of competence appropriate to situational contexts;
- being self-confident and able to build trust in others; having a positive attitude;
- possessing the ability to source, evaluate and integrate new information with existing information to enhance personal propositional and process knowledge;
- possessing the ability to communicate and to use interpersonal skills to share information and concepts, to develop teams, and to build confidence in and commitment to the solutions proposed to meet outcomes sought;
- having a sense of higher purpose, a commitment to a cause, and being altruistic;
- being proactive and willing to initiate action rather than just responding to issues that arise;
- having the ability to empower and develop others.

A model of professional competence that integrates these characteristics and uses them to distinguish performance would provide a useful blueprint for developing assessment tools, continuing professional development activities, and curriculum. A number of integrated, holistic models of professional competence have been developed and, in the next section, two of these are investigated to determine how they accommodate these differentiating qualities.

4.3 Complex, holistic models of professional competence

There have been some recent attempts to draw the various characteristics associated with competence and expertise together, and to develop holistic and integrated models of professional practice that reflect complexity thinking. These include models developed by Cheetham and Chivers (1996; 1998), and Kennie and Green (1998; 2001).

4.3.1 The provisional Cheetham and Chivers 1996 model

In 1996 Cheetham and Chivers developed a model that sought to draw together the characteristics of competence into a single framework. At the heart of the model are a number of meta-competencies, including communication, problem-solving and self-development. These meta-competencies interact with and influence the underpinning four core components, all of which are considered important to effective performance. Rather than describing these as separate entities, the Cheetham and Chivers (1996) model defines the core competencies as being interdependent, complementary, equally important, and links them to the meta-competencies.

The core component competencies of their model are:

1. knowledge/cognitive competence;
2. functional competence;
3. personal or behavioural competence; and
4. values/ethical competence.

Cheetham and Chivers suggest that the cognitive component has four constituents:

- Tacit/practical—this is knowledge exhibited by the individual which develops from experience in a role, that is, what Schön (1983) refers to as "knowing-in-action".
- Technical/theoretical—this is the underlying knowledge-base of the profession and includes principles, theories, and facts and their application, transfer, synthesis, extrapolation and so on, and reflects Eraut's (1994) concept of procedural knowledge.
- Procedural—the how, what, when and so on of the more routine tasks within professional activities that Eraut (1994) calls process knowledge.
- Contextual—general background knowledge including organisation specific, profession, sector, society and so on.

Personal/behavioural competence has two constituents:

- social/vocational behaviours, which relate to performance of the main body of professional tasks—self confidence, task centeredness, stamina and so on; and
- intra-professional behaviours, which relate mainly to interaction with other professionals—collegiality, adherence to professional norms.

Functional competence has four components:

- occupational specific—the ability to perform the numerous tasks that relate to the profession, for example, dispensing, preparing batches, and advising on appropriate medicines.
- organisation/process—generic tasks such as planning, delegating, and evaluating.
- cerebral—skills that are primarily mental in nature, for example, literacy, and numeracy; and
- psychomotor—skills of a physical nature such as counting, pouring, preparing pharmaceutical products, and keyboarding.

Values and ethical competence has two constituents:

- personal—the adherence to personal moral and/or religious codes; and
- professional—the adherence to professional codes, client-centredness, environmental sensitivity, and so on.

The overarching meta-competence includes social behaviours and skills such as communication, interpersonal relationships, perceptual objectivity, questioning, listening,

empathy, and self-awareness. It also includes management skills such as self-confidence, the ability to stay calm in stressful circumstances, self-awareness, reflection, and the willingness to develop one's own learning and performance.

In their model, Cheetham and Chivers identify that a competent professional possesses not only the meta-competencies but also the core competencies. This model is shown in Figure 4.1.

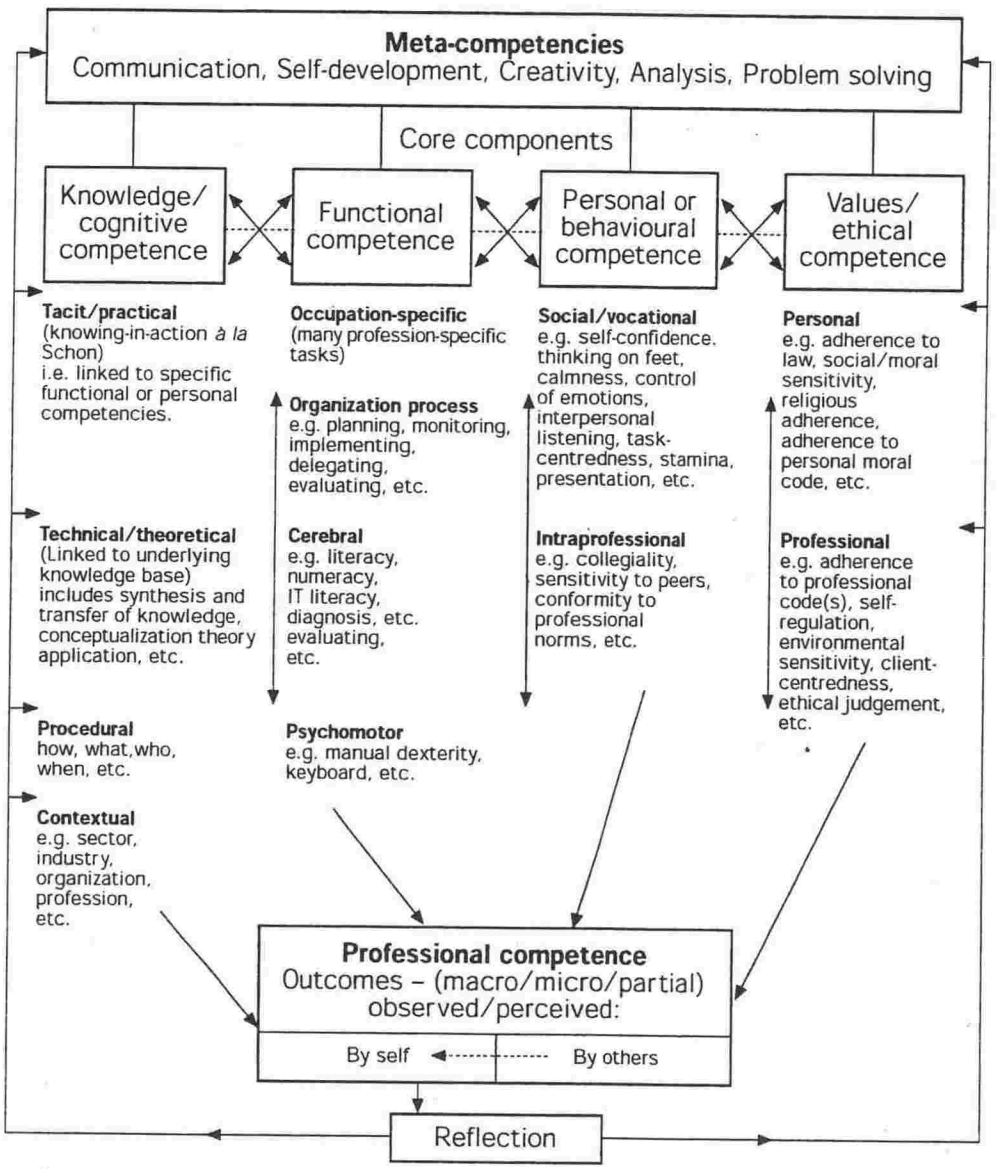

Figure 4.1 – The Cheetham and Chivers (1996) model of professional competence

The model explains the competent performance of professionals by their ability to use the meta-competencies, including the four core components and their various constituents, in an integrated manner to produce outcomes that can be observed by themselves and others. Typically, the types of professional outcomes exhibited in the application of the model will include macro-outcomes, which are the broad, overall or long-term results of professional activity, and micro-outcomes, which are associated with specific activities, and partial outcomes from partially completed activities. Thus, the model can be used across all types of professional activity. It is not solely dependent on the outcomes that professionals produce, the processes they use, or the knowledge they possess.

Reflection and self and peer-perception of outcomes are core to professional performance and lead to behaviour modification. As such, they are fundamental to the operation of the model as indicated in the diagram above.

Having developed the model, Cheetham and Chivers sought feedback on it by publishing their model and asking others to determine its applicability to their profession. As a result of this feedback, Cheetham and Chivers developed a revised model in 1998.

4.3.2 The Cheetham and Chivers 1998 model

The amended model (Cheetham & Chivers, 1998) takes into account the importance of reflection, motivation and personality in developing professional competence, and the influence of the environmental context in which a practitioner operates. The resulting model is thus a more complete, holistic model than the original. The amended model is shown in Figure 4.2.

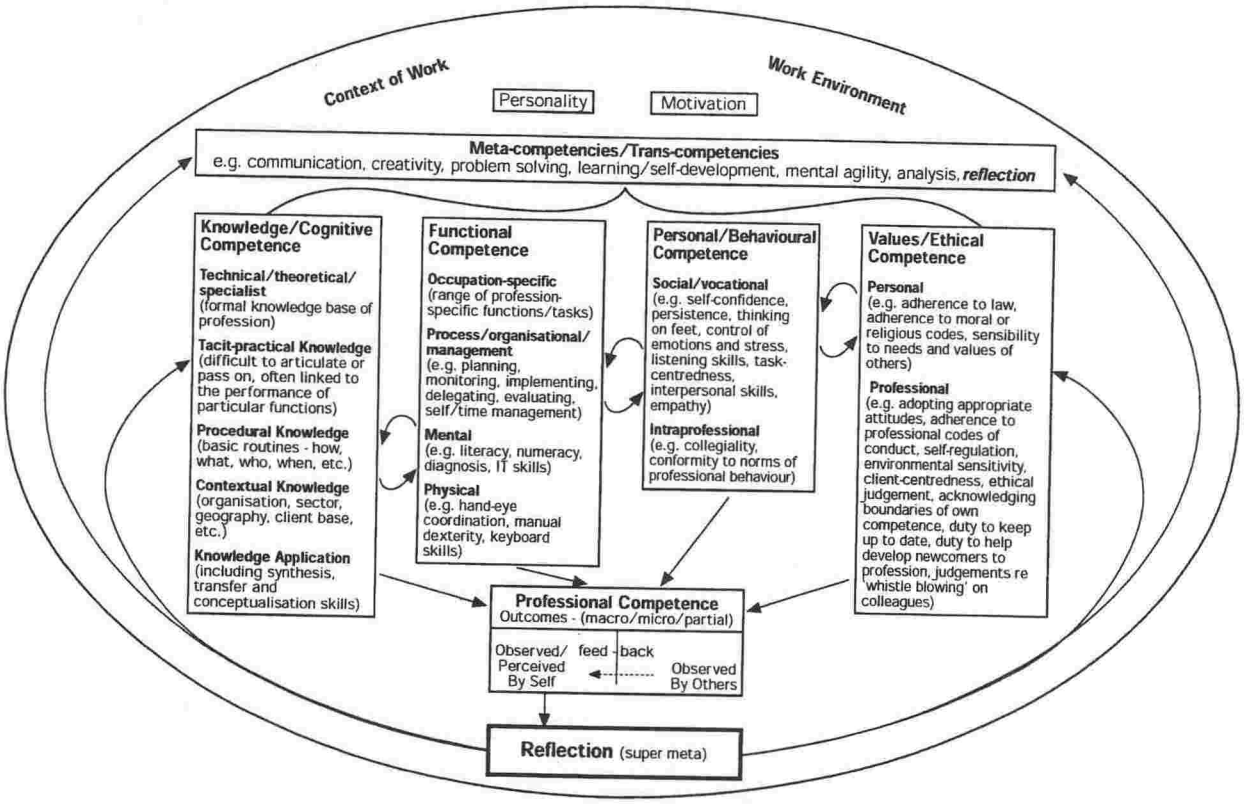

Figure4.2 – Cheetham and Chivers (1998) model of professional competence

This model adopts a whole systems approach to professional competence. It takes into account the internal and external aspects of professional practice as well as the individual and collective components, and as such, it provides a useful framework for considering professional competence in the pharmacy context.

4.3.3 The Kennie and Green model

Keenie and Green (2001) took the Cheetham and Chivers model and applied it to the surveying profession. In their research, they focused on being professionally competent and the mental models used by professionals to define professional competence.

In developing their model, Kennie and Green recognised that the provisional model proposed by Cheetham and Chivers in 1996 did not adequately account for the business roles that professional surveyors engage in. In the surveying profession, surveyors are

expected to undertake tasks including costing jobs, preparing invoices, and managing budgets and business operations. To account for this aspect of professional practice they included business competence in their amended model.

Through their research, Kennie and Green also identified that rather than being a meta-competency, the abilities to manage oneself and others and to operate legally and ethically, are core to all the other competencies. They also identified that technical competence is exhibited in the ability to use knowledge to solve problems, and that knowledge overlaps with, and is a component of each of the other competencies.

As a result of their work they developed a four-component model of professional competence that combines knowledge competence, cognitive/problem-solving competence, business competence, and ethical/personal behavioural competence. Ethical/behavioural competence sits at the centre in this model indicating that without the ability to behave ethically or to manage oneself and others, a professional cannot be considered competent.

This model is shown in Figure 4.3.

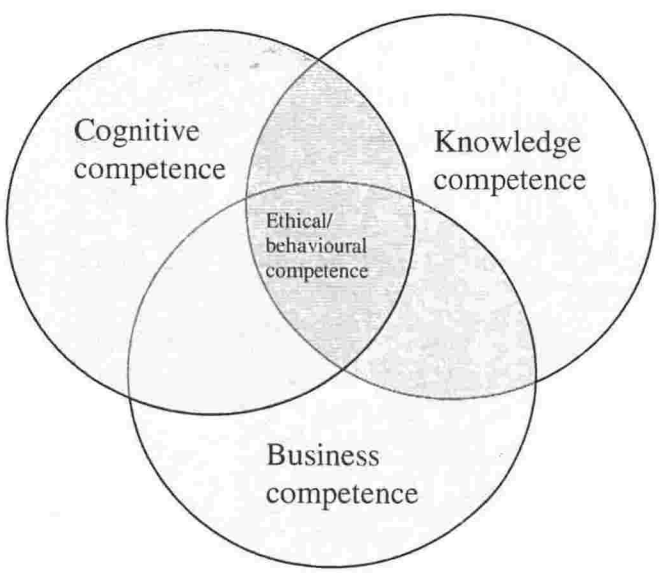

Figure 4.3 – The integrated model of professional competence of Kennie and Green (2001)

In this model, professional competence is determined by the ability to integrate the competencies of cognition/problem-solving, knowledge, and business with ethical and personal behavioural competencies. The model produced appears to be generic and potentially could map onto other professions such as pharmacy.

Applying the Cheetham and Chivers model framework, as adapted by Kennie and Green to the current competence standards for pharmacy provides a starting point for the development of a model to describe pharmacist professional competence.

4.4 A complex model of pharmacist competence

When the adapted Cheetham and Chivers framework is used to map the current pharmacist competence standards, a simplified, complex model of pharmacist competence as shown in Figure 4.4 is produced. The model contains an overall meta-competency, practice pharmacy in a professional manner, and five underpinning competencies—technical/functional competence, cognitive competence, behavioural competence, ethical competence, and business competence.

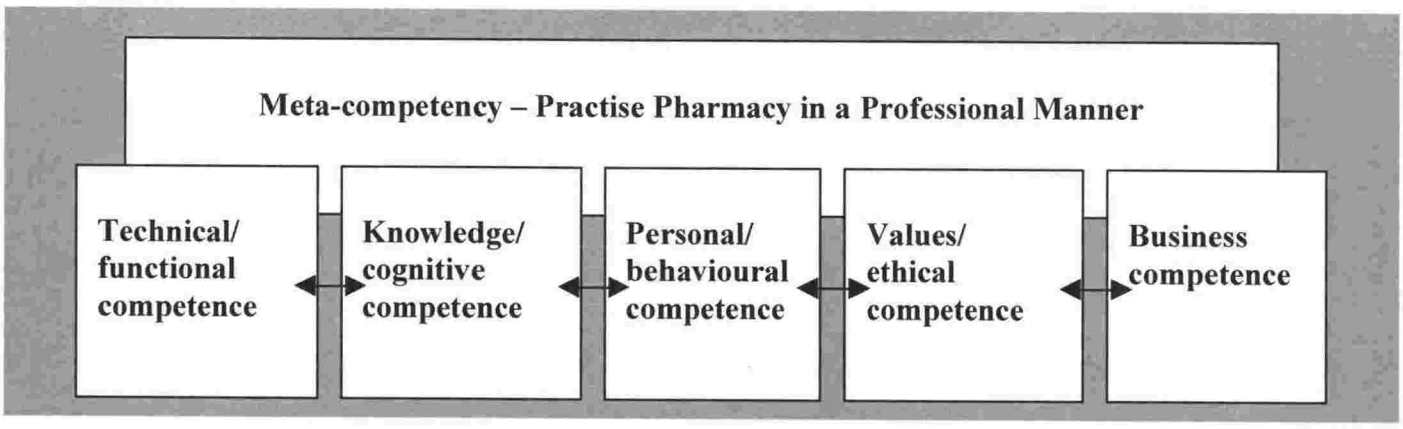

Figure 4.4 – Holistic model of pharmacist competence

The mapping exercise reduces the seven current pharmacy competence standards to six and removes much of the duplication at an element level as shown in Table 4.1. The competencies, as they relate to the amended Cheetham and Chivers model, are listed in this table along with a brief description. The performance criteria of the existing standards for

pharmacist competence are listed in the third column, while the last column provides a numerical reference to the current competence standard and element to which they relate.

Table 4.1 – Pharmacist competence

Competency	Description	Activity	Elements
Meta-competency	Communication Self-development Creativity Analysis Problem-solving Ability to improve own performance	Works within limitations of own professional expertise	1.1
		Solves own problems	1.2
		Reviews own professional practice Undertakes professional development	1.3
		Uses active listening techniques and asks questions relevant to the situation Tailors information to fit the patient and the situation Checks patients' understanding	3.8
		Evaluates situation to determine if able to provide information to the required level or needs to refer	5.2
		Identifies research opportunities in the workplace Gathers information and resolves identified problems	5.4
		Responds to queries and requests for medicines and health-care information Communicates verbal and written information fit for the receiver Communicates effectively with other health professionals and patient	5.5
		Explains the general potential for errors in the dispensing process Acts to minimise the effects of dispensing errors Rectifies dispensing errors immediately	6.9
		Communicates effectively with prescribers Uses language and non-verbal communication to suit the patient Tailors information to suit the patient Asks relevant questions	6.11
Functional/ technical competence	The ability to perform a range of work-based tasks effectively to produce specific outcomes. • occupation specific • organisational/process • cognitive • psychomotor	Maintains a consistent standard of work Works accurately	1.1
		Speaks clear English Writes clear English	1.6
		Accesses patient medicine records Interviews individual patients or their caregivers and/or other health professional to obtain history of medicines and other therapies if necessary	2.1
		For each medicine, checks the dosages and methods of administration are optimal Identifies which adverse drug reactions should be reported to the Centre for Adverse Reactions Monitoring and facilitates the reporting of these	2.3
		Recommends the optimal medicine, dose form and method of administration for the patient On request monitors the medicine therapy of individual patients	2.4
		Elicits relevant patient history information	3.1

Table 4.1 – Pharmacist competence cont'd

Competency	Description	Activity	Elements
		Selects non-prescription medicines to meet patient's acute needs Counsels patients about the use non-prescription medicines	3.3
		Explains the use and purpose of diagnostic products Advises and counsels patients about the use of diagnostic aids	3.4
		Applies emergency first aid measures Provides treatment for minor injuries Advises on the use of bandages and dressings	3.6
		Informs and advises patients about screening programmes and community programmes relating to health-care and medicines	3.7
		Works with the documented procedures and systems	4.2
		Ensures work areas are safe and hygienic Ensures the safe handling, storage and disposal of potentially hazardous materials Follows the safety procedures to be implemented in the event of an emergency	4.3
		Describes reference sources	5.1
		Checks prescriptions are complete, legal and authentic Obtains information needed to make prescriptions complete and correct	6.1
		Determines whether individual prescriptions should be dispensed Follows workplace dispensing criteria when dispensing a prescription item Priorities prescriptions Determines the stock availability of prescribed medicines	6.2
		Accesses patient medicine records Verifies details of patient records with patients, their caregivers or other health professionals	6.4
		Obtains prescribed medicines Maintains a logical, safe and disciplined dispensing procedure	6.6
		Packages medicines into suitable containers Produces comprehensive and complete labels for medicines	6.7
		Ensures patient receives the correct medicine Ascertains patients' understanding of their medicines Demonstrates correct method of administering medicines	6.10
		Explains the principles of compounding Explains the principles of medicine stability	7.1
		Selects formulations Interprets formulations Modifies formulations within existing guidelines	7.3

Table 4.1 – Pharmacist competence cont'd

Competency	Description	Activity	Elements
		Prepares worksheet and calculations and labels Obtains stock and equipment and prepares work area Compounds pharmaceutical products applying suitable compounding techniques Examines final product for particulate contamination and homogeneity Packs and labels compounded products to optimise safety and compliance Ensures optimal storage of ingredients and compounded products Cleans and maintains compounding equipment Completes documentation and records	7.4
		Writes in clear English	7.5
Personal/ behavioural competence	The ability to adopt appropriate, observable behaviours in work-related situations. • social/vocational • intra-professional	Behaves in a professional manner Accepts responsibility for own tasks and performance Shares professional strengths with others	1.1
		Resolves conflicts	1.2
		Communicates effectively with others	1.6
		Communicates verbal and written information fit for receivers Communicates effectively with prescribers and other health professionals Communicates effectively with patients	2.6
		Refers patients and complies with professional, ethical and workplace conventions and legal requirements when referring patients	3.2
		Informs and advises patients about community health support agencies/organisations and pharmacy based primary health-care programme	3.5
		Informs and advises patients about preventing the spread of disease	3.7
		Establishes rapport with the patient	3.8
		Organises own work Takes responsibility for the work of non-pharmacist staff Supports the work of colleagues in the workplace	4.1
		Maintains effective working relationships with other staff Supports workplace-based training	4.2
		Compiles with agreed conditions of employment	4.4
		Communicates effectively with other personnel in the work place	4.5
		Finds information in reference sources	5.1
		Informs and advises about medicines Check patients' understanding of advice and counselling	6.10

Table 4.1 – Pharmacist competence cont'd

Competency	Description	Activity	Elements
		Communicates effectively with prescribers, health professional, care-givers and patients	7.5
Knowledge/ cognitive competence	The possession of appropriate work related knowledge and the ability to put this to effective use. • tacit/practical • technical/theoretical • procedural • contextual	Works to resolve workplace and professional practice problems	1.2
		Understands and is able to explain the application of the legislation and codes relating to pharmacy practice	1.5
		Identifies common medicines by their approved generic name, trade or common names Evaluates the available medicines, dose forms and methods of administration Interprets generic equivalence of medicines from different manufactures	2.2
		Interprets individual patient's medical history and medicine records Assess the effectiveness of the total medicine therapy Identify necessary changes to medicine therapy	2.3
		Identifies the immediate problem which the patient presents Interprets patient medicine records	3.1
		Evaluates patient's situation to determine whether to treat or refer	3.2
		Counsels patients about self-help measures to reduce current symptoms or discomfort	3.5
		Counsels patients about lifestyle changes, which may reduce illness	3.7
		Differentiates between information sources regarding their reliability Compares information from different sources Interprets information on behalf of other health professionals, patients and members of the public	5.2
		Explains the pharmacology and therapeutic use of common medicines Advises about the use of medicines Provides medicines and health-care information to individuals and groups	5.3
		Identifies prescribed medicines Explains the therapeutic use of prescribed medicines Interprets prescription instructions	6.3
		Detects medicine problems from individual patient's medicine history Identifies patient factors likely to affect the efficacy or safety of specified medicines	6.4
		Confirms that each selected medicine is suitable for the patient Addresses factors likely to affect patient compliance Applies all patient information to dispensing decisions	6.5
		On request informs and advises patients about their conditions and diseases	6.10
		Differentiates between prescriptions that require aseptic dispensing and those that do not Recognises extemporaneously prepared products that must be prepared under special conditions to minimise environmental risk	7.2
		Explains the purpose of ingredients within formulations	7.3

Table 4.1 – Pharmacist competence cont'd

Competency	Description	Activity	Elements
Values/ethical competence	The possession of appropriate personal and professional values and the ability to make sound judgments based on these in work related situations. • personal • professional	Demonstrates empathy and sensitivity to others' needs and values Complies with the intent of partnership as set out in the Treaty of Waitangi	1.4
		Complies with those parts of the legislation that apply to his/her pharmacy practice Complies with code of ethics for pharmacy practice	1.5
		Maintains privacy and security of patient information	2.5
		Complies with legal requirements and professional and ethical conventions regarding the supply of non-prescription medicines	3.3
		Refers first-aid emergencies to other health professionals	3.6
		Complies with legislation relating to occupational health, welfare and safety	4.3
		Contacts prescriber to recommend medicine, dose or dose form changes	6.5
		Fulfils the conditions and requirements specified in relevant legislation Provides emergency supplies of prescription medicines	6.6
		Fulfils legal requirements and professional conventions regarding maintenance of records	6.8
		Complies with current legislation, codes, standards and work practices for the compounding and preparation of pharmaceutical products	
Business competence	Ability to understand the wider business context within which the practitioner is practising and to manage client expectations in a proactive manner.	Records information and updates patient records Records clinical decisions and recommendations	2.5
		Contributes to the maintenance and development of workplace procedures and services Works with others to ensure adequate supplies of stock and equipment	4.4
		Communicates effectively with representatives from outside the workplace	4.5
		Annotates prescriptions Verifies prescriptions received by fax, telephone or e-mail	6.1
		Maintains patient records Maintains medicine records	6.8

4.4.1 Gaps in the standards

Conceptualising professional competence in this way enables a number of gaps in the standards to be identified in terms of the attributes associated with professional competence. These include:

- Integrating new knowledge and practices into practice
- Identifying opportunities to improve practice
- Engendering trust
- Personal competencies such as integrity, honesty, and trustworthiness.

In addition, it is likely that identifying how the pharmacy profession conceptualises "in a professional manner" will provide further insights to the construct of professional competence.

4.5 Approaches to developing competence models

There are a number of approaches that have been used to develop models of competence and the standards associated with them. Gonczi, Hager and Oliver (1990) list the main techniques used for this purpose as being:

- Interview methods, including unstructured or structured interviews, competencies interview and critical incident technique.
- Survey methods, including general surveys and DELPHI method.
- Convened group techniques, including nominal group technique, DACUM studies, and search conferences.
- Miscellaneous techniques, including functional analysis, CODAP, observation, and McBer[2].

Interview methods provide a means of obtaining both structured and unstructured information regarding the construct of professional competence and have been chosen in this thesis as the means of obtaining data from the profession. Interview methods

[2]DACUM (Developing a Curriculum), CODAP (Comprehensive Occupational Data Analysis) and McBer (designed by Hay McBer) are occupational analysis techniques that use one or more of panel discussions, customer interviews, one-on-one interviews, and behavioural event interviews to identify occupational roles, functions and competencies. The DELPHI method was developed by the RAND Corporation and is based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback.

provide a rich source of data and support the development of complex models of competence (Gonczi *et al.*, 1990).

4.6 Summary

In general, competence models and training for occupations or professions have been concerned with what can be observed and judged, and have therefore tended to focus on the observed functions of professional performance rather than on professional competence as a construct in its own right. Developing a complex model of professional competence has the potential to overcome many of the issues identified with existing functional approaches to conceptualising competence, including being able to identify those behaviours or attributes that differentiate performance.

Any model developed should describe how practitioners work, taking into account their context and culture, should recognise the impact of ethics and values, and should emphasise the involvement of the self through reflective practice. Any such model would need to be flexible, to recognise patterns of competence and the situational nature of professional practice.

Ideally, a complex, holistic model of competence should recognise that knowledge is not fixed, and that an individual's professional practice itself evolves, often becoming more specialised, differentiated and personalised. Experience leads to a deepening and enhancing of skills, especially clinical judgment reflected in expertise (Knapp, 1991). It could be said that competence itself is an individual expression of the integration, in practice, of knowledge skills and behaviour, and is applied in a given context.

Developing a complex, holistic model of professional competence for pharmacy is the aim of this research. Once developed, the model can be used as a blue-print to guide development of assessment tools, to assist in the development of professional development programmes, and to guide curriculum development.

Of the models investigated so far, the Cheetham and Chivers model (1998) together with modifications suggested by Kennie and Green (2001) look most promising for

application to the pharmacy profession. These models are used as the starting point for developing a model of professional competence for the pharmacy profession.

Part Two

Phase One – Constructing a Model of Professional Competence

The aim of this phase of the research is to develop an integrated, holistic model of professional competence for the pharmacy profession. In doing so, it seeks to answer the following research question:

1. What are the characteristics of competent and expert performance, and how do they differ from not-competent performance?

The research methodology uses qualitative research techniques, including a structured interview and questionnaire, to gather a range of information that is descriptive and rich in content.

The benefits of using qualitative approaches are that respondents are not restricted to fixed-response answers. Rather, they can provide information on the topic under investigation using their own words and constructs. While this provides a fruitful body of information, it can result in difficulties in analysis. Analysis of data from qualitative research typically uses analytical frameworks or matrices to group the information into themes or concepts. The model proposed by Cheetham and Chivers (1998) and adapted by Kennie and Green (2001) is used for this purpose in this research.

Chapter Five describes the methodology used to gather and analyse the data from which the model is developed.

Chapter Six describes the results obtained and how they have been interpreted.

Chapter Seven discusses the model of professional competence developed from the data, its core components and behavioural aspects. It compares that model with other

models previously discussed in Chapter Four. It also describes the results of the validation exercise.

Chapter Five
Methodology for model development

The aim of this phase of the research is to develop a holistic, integrated model of professional competence for pharmacy. An "open" systems approach is used to enable professional competence to be investigated as an integrated, whole construct, rather than focusing on its component parts.

Focusing on professional competence as a whole construct in its own right enables the interrelationships between knowledge, skills and attitudes to be explored, and their expression in competent and expert performance to be articulated. In this way it is hoped that those characteristics that differentiate competent from expert and not-competent performance can be isolated and identified.

5.1 Outline of the approach used

Four steps have been followed in undertaking the development of this model of professional competence.

In the first step, 20 pharmacists are interviewed and surveyed, using a follow-up questionnaire, to determine the behaviours and attributes characteristic of pharmacist professional competence.

In the second step, the data gathered from the first step are analysed, using the amended Cheetham and Chivers model as an analytical framework. This step leads to the third step in the research where a revised model of professional competence is conceptualised.

In the fourth and final step, workshops are held with expert pharmacists to validate the model. The steps in the research are shown in Figure 5.1.

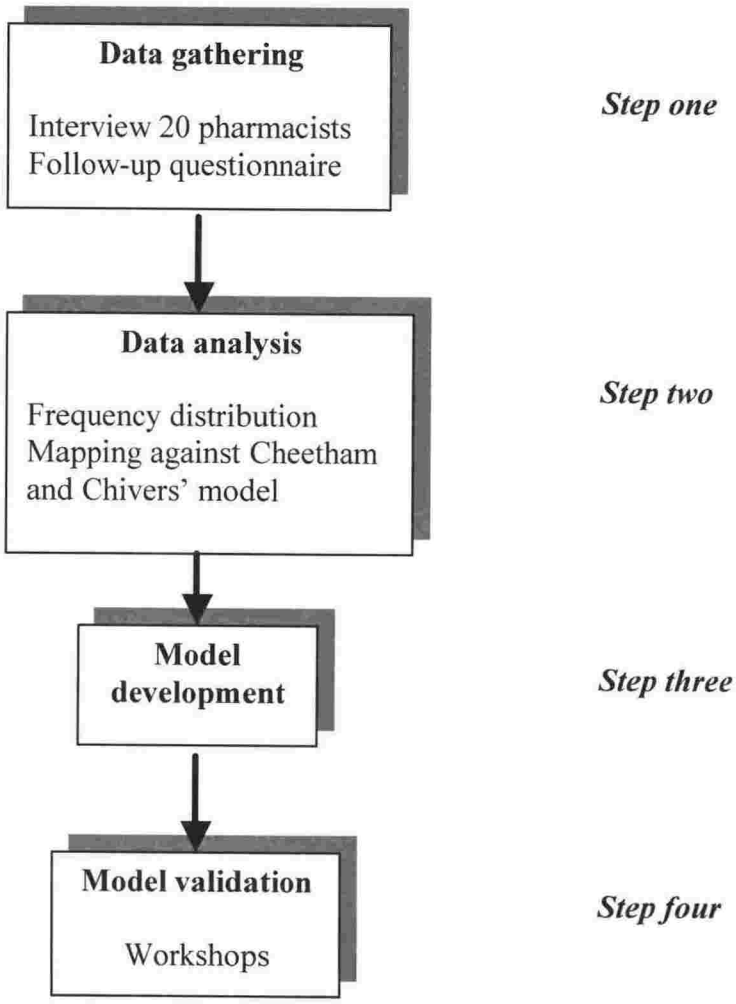

Figure 5.1 – Steps in research for phase one

The steps are described in detail in this chapter.

5.1.1 Rationale for approach used

The approach chosen investigates professional competence as a construct in its own right, rather than focusing only on what pharmacists do or know. This is because pharmacist competence from both functional/task-based and knowledge-based approaches has already been comprehensively analysed in the work done in developing the seven standards currently used by the profession—discussed in Chapter One—and in developing curricula for initial pharmacist training.

Rather than replicating this work, the intention in this study is to focus on those traits and processes a competent professional uses that differentiate the performance of

highly-skilled from less proficient practitioners. If the characteristics, traits and processes that underpin the development of professional capability and expertise can be identified, then these can be isolated. Developing a model that explains the role of professionalism in the ongoing maintenance of competence would enable the focus of assessment to shift from actual performance of tasks and functions to determining professional competence.

The aim of this research, then, is to identify those attributes of professional competence that make a difference in developing and/or maintaining ongoing professional practice. These, once identified, can be tested for and when combined with a practice audit could provide an assessment process that not only evaluates current competence, but also enables inferences of future competence to be made. In this way quality assurance processes for professional competence could be focused on the qualities that have the greatest impact on performance, rather than using quality assessment processes that look at everything. The process proposed is similar to those used for quality assurance and quality audit in tertiary education and discussed by a number of researchers, including: Beckford (1998), Brennan and Shah (2000), Crosby (1979), Deeming (1986), Harvey (1995), Lewis and Smith (1997), Meade (1980), and Sallis (1996).

In quality assessment, the quality of the product is measured against set standards at the end of production, which is analogous to the process used whereby novice pharmacists are assessed against all competence standards for registration. Quality assurance processes on the other hand, focus on ensuring the quality of the processes used to produce the end-product. The assumption is that if the processes are of high quality and are consistently used, then the quality of the end-product can be assured. However, the desired approach to quality assurance in tertiary education should perhaps reflect more the "principle of parsimony", focusing on the items that really matter. Random audit of the product—graduate outcomes evaluation—would provide the final quality check.

When applied to competence assurance practices, professional judgments can be made based on whether the practitioner exhibits the processes linked to the development and maintenance of competence and expertise. Typically, both self-audit and peer

assessment are used in such evaluations. A final independent assessment of the practitioner is used to maintain the integrity of the process.

Identifying those attributes that make a difference to competent performance and then modelling them is the aim of this phase of the research. It is facilitated by using interviews and open questions to gather data on the traits that characterise competent and expert performance. In the data gathering process, questions are designed to gather a wide range of data on the qualities that enable practitioners to maintain and enhance their competence through their practice lives.

Analysis of these data enables the traits and processes associated with professional competence to be extracted and modelled to develop a valid and reliable blueprint for the development of curriculum, continuing professional development initiatives, and quality assurance activities. The steps in this phase of the research, the methodologies used, and the analytical approaches adopted to develop and validate the model are summarised in Table 5.1.

Table 5.1 – Summary of steps in phase one of the research

Step	Method used	Approach adopted	Rationale
1	Interview with 20 experienced pharmacists and follow-up exploratory questionnaire	Interview and questionnaire based on quantitative research methods using a modified Kelly's Repertory Grid approach	Open questions within a structured framework enable pharmacists to describe the elements of their personal constructs of professional competence
2	Analysis of the qualitative data extracted from the interviews and questionnaires	Analytical approach uses a thematic review and synthesis of common characteristics	Approach enables data to be reduced to be manageable. Developing common themes enables these to be mapped to develop a model
3	Model development	Themes synthesised in step two are mapped against the amended Chivers and Cheetham framework	Using a framework developed from empirical research helps to ensure the analytical approach is valid and reliable
4	Model validation	Model is workshopped with 46 experienced pharmacists. Pharmacists are asked to determine whether the model makes sense and accounts for their professional practice	The feedback from experienced pharmacists enable the model to be amended if required. These pharmacists act as an "expert panel" in providing this feedback.

The steps are discussed in greater detail in sections 5.2, 5.3 and 5.4.

5.1.2 Participants

The participants employed in this phase of the research were all experienced pharmacists. Two separate groups were used.

The first group comprised 20 experienced pharmacists selected by the PSNZ as an expert group. This group was used to gather the data from which the model was developed. Initial contact with these pharmacists to determine their willingness to participate was made by the PSNZ as described in section 5.1.3. Details of their demography is given in section 5.2.2.

The second group of pharmacists used in this phase of the research were 46 experienced pharmacists who attended three workshops held in Wellington and Palmerston North to validate the professional competence model. Two of the three workshops were held as part of annual conferences and conference attendees were invited to attend. The third workshop was held as a meeting of the Wellington Branch of the Pharmaceutical Society and all Wellington branch members were invited to attend. Eighteen pharmacists attended the first workshop in Palmerston North, eight the second workshop, and 20 attended the third. No demographic data or names have been collected from this group of participants and in this way anonymity has been maintained. These workshops are discussed further in section 5.5.

The interview and questionnaire processes are covered in sections 5.2 and 5.3.

5.1.3 Approvals

The Pharmaceutical Society of New Zealand (PSNZ) was approached for its support in undertaking this research. It endorsed the aims of the research, the approach used, and identified 20 experienced pharmacists to participate in the first step of the study. PSNZ then approached and gained the support of these pharmacists to participate, and forwarded their names and contact details to the researcher.

The 20 pharmacists were then followed up by the researcher who sent a letter informing them of the process being used and requesting their informed consent to participate. A copy of the letter is attached as Appendix 3. All 20 pharmacists agreed to be part of this study and took part in the interview and follow-up questionnaire.

Ethical approval for the research was also obtained from the Ethics Committee of the Victoria University of Wellington, School of Education.

PSNZ was also supportive in enabling the three workshops to go ahead that were used to validate the model. These workshops are covered in section 5.5.

5.2 The explorative interview

In the first step of this phase of the research, a structured, face-to-face interview based on Kelly's repertory grid technique was used to gather data from the participating pharmacists. The repertory grid methodology is based on Kelly's (1955) work on personal construct theory, which is discussed further in section 5.2.1.

This method for data gathering was chosen because it permits an unconstrained and direct enquiry into the attributes associated with the construct of professional competence. During the interview, set questions were presented to participants using a structured format. The resulting data were analysed to obtain a comprehensive picture of the construct of professional competence.

While interviews are a good source of qualitative data, there are several difficulties associated with their use. In the face-to-face interview situation there is usually more pressure on the respondent to give socially acceptable responses, particularly those which the respondent thinks will please the interviewer, than is the case with an anonymous response to a questionnaire. This has been taken into consideration in the design of questions used in this interview by asking participants to think of people they have worked with rather than talking about themselves. In this way anonymity was retained.

Another problem with interviews is the reliable recording of interview data. In this study, interviews were taped and transcribed verbatim to ensure that an accurate record of the interview was created. Notes of key points were also taken during the interview.

The final major difficulty in using interviews is the difficulty in interpreting, synthesising and summarising a vast array of data into a single set of commonly occurring themes. In this study, this difficulty has been managed by extracting key themes, using a matrix for data analysis based on the amended professional competence model of Cheetham and Chivers (1998), as described in section 4.4.

This model has been used as a framework to group data from responses into themes and descriptive statements of performance that reflect the key attributes associated with professional competence. This enables the data to be analysed at a later point using a range of statistical techniques, including analysis of difference, correlation and discrimination to identify the underlying structure of construct of professional competence as is usual in the repertory grid technique. This quantitative data gathering and analysis is covered in Part Three of this thesis.

5.2.1 Kelly's repertory grid

The Kelly repertory grid technique is based on Kelly's personal construct theory. This theory proposes that people are actively engaged in making sense of their world and extending their experience by creating and using personal constructs. Kelly suggests that each person develops a set of representations or maps of the world through social experience. In his theory, personal constructs can be both commonly held with others and unique to the individual. In this, Kelly's personal constructs mirror Eraut's professional knowledge, which draws on both personal and collective components (see section 3.1).

As described by a number of researchers (see for example, Ryle, 1975; Bannister and Fransella, 1971; Bannister and Mair, 1968), an individual's personal construct system is built up of interrelated, separate constructs. Each distinct construct is concerned with discriminating between similar elements that can be compared or contrasted, for

example, people, and concepts. A construct can only be applied to elements within the same class, or in Kelly's terms, "range of convenience". Constructs, explicitly or implicitly are always expressed on a two-ended continuum, and are interrelated and organised in a structured system. The relationship between constructs is relatively constant and systematic.

The repertory grid technique is an analytical methodology based on these concepts of how people construct meaning for themselves. It provides the opportunity for participants to describe the characteristics of a construct, in this case professional competence, in their own words and is effective in uncovering the concepts that people use to structure and make sense of their environment (Kandola & Pearn, 1982). This is important because people do not necessarily have a common understanding of what is important in defining professional competence.

The repertory grid technique has been used in identifying a manager's cognitions (Fransella & Bannister, 1977; Stewart & Stewart, 1981), as well as for identifying competencies of managers in New Zealand (Rippin, 1995), and New Zealand manager's conceptions of integrity (Basill, 2001).

In carrying out the technique, the researcher asks participants to describe their concept of the "ideal" in relation to the construct under investigation, in this case professional competence. This is typically done by choosing a set of three elements—in this case expert, competent, and not-competent performers—and asking participants to describe all the ways that one of the elements in this triad resembles another and differs from the third. As the process is carried out, the researcher notes down all the descriptions of difference and similarity used by the subject. Successive triads of elements are used until no new constructs are being elicited. The use of three rather than two elements is based on Kelly's insistence of the two-ended nature of constructs and the fact that three elements are the minimum necessary to permit recognition of both similarities, and differences and to elicit the terms defining both poles of the construct. Participants then compare or rate all elements on the construct either by dichotomising them, by ranking them, or by rating them. Analysis of the resulting grid is concerned with identifying the relationships between constructs and typically uses principal component analysis.

There are three main advantages of the repertory grid technique. Firstly, the technique minimises the degree of influence the interviewer has on the participant's responses (Stewart & Stewart, 1981). The structured nature of the interview/questionnaire focuses the interviewer on eliciting the meanings of the constructs so they can be recorded and rated. This means the interviewer has less opportunity to share his or her own interpretation of the constructs with the participants. Asking the interviewee to describe an "ideal" person in relation to his or her concept of expert, competent and not-yet-competent performance enables the interviewee to express what may otherwise be socially unacceptable ideas if he or she were describing his or her own performance. In other words, this approach removes any chance of the interviewer making judgments regarding the participant and is likely thus to elicit a richer description of characteristics and attributes.

Secondly, the repertory grid technique does not ask participants how they cognitively organise their perceptions, since such questions tend to elicit descriptions of "espoused theories" rather than theories that actually govern behaviour (Ginsberg, 1989). It therefore helps capture the constructs people actually use in practice to make judgments of the competence of their colleagues and themselves.

Thirdly, the repertory grid technique can provide quantitative data that can be analysed statistically and provides results that can be replicated and validated (Dunn & Ginsberg, 1986). The quantitative data are collected when participants evaluate and compare the elements of the construct identified through the interview/questionnaire process.

In this phase of the research, the Kelly's repertory grid technique is used only to gather data to generate the construct of professional competence. Analysis of the qualitative data is then used to develop a model of professional competence, which is tested for validity and reliability with a wide range of "expert", experienced and novice pharmacists. This is covered in Part Three of the research.

5.2.2 Step one participants

Twenty experienced pharmacists were selected by PSNZ to participate in this step of the research. These 20 pharmacists formed an "expert" group, and were chosen from practitioners who have been actively engaged in self-audit in the ENHANCE programme[3]. Currently, this is a voluntary project and approximately a quarter—720—of the 2,825 New Zealand pharmacists on the active practice register participate in it.

The 20 pharmacists in this group were all actively practising pharmacists in New Zealand and were selected by PSNZ as a group of knowledgeable practitioners. Use of an "expert" group rather than a "representative" sample was chosen for this step in the research because using practitioners who had experience in engaging with the issues of professional competence would, hopefully, provide more valid and reliable data than using a randomly selected group.

Having said that, the pharmacists chosen are representative of pharmacists with respect to the range of practices that professionals are engaged in, namely:

- community practice
- hospital practice
- industry
- academia; and
- advisory/consulting positions.

In summary, the group comprised 15 females and 5 males. Three were aged between 20 and 30, sixteen between 40 and 50, and three were over fifty. Ten practised in community pharmacy, five in hospital, and the remaining five practised in a range of other contexts, including academia, industry and/or advisory positions.

All 20 pharmacists participating in this step of the research were given a unique identifying number, and this number was used in all records made of the interviews, and on the explorative questionnaire. This ensured the anonymity of the data obtained.

[3] For more information regarding ENHANCE, see section 1.2.

Survey data were collected from the 20 participants and the demographic data are shown in Table 5.2. The group had a good spread of ages, and while the majority of participants were female, this reflects the current situation where the majority of pharmacists participating in the ENHANCE programme are female.

The most common area of pharmacy practice was community pharmacy and this is reflected in the sample. There was, however, good representation of the other commonly encountered areas of practice.

The sample also reflected the commonly encountered initial qualifications for pharmacists, with most of the pharmacists who completed their training prior to the 1970s undertaking an apprenticeship, and most of those commencing their training in the 1970s obtaining a diploma. The Bachelor of Pharmacy is currently the only recognised initial professional qualification accepted for direct entry into the pre-registration training programme.

As the participants represented an "expert" or informed group, it is not surprising that 16 out of the 20 had some form of postgraduate qualification. These ranged from being an Associate (ANZCP), Member (MNZCP), or Fellow (FNZCP) of the New Zealand College of Pharmacists, to academic postgraduate qualifications such as postgraduate certificates and diplomas, Masters degrees and a PhD. Some non-formal qualifications were also listed. Some participants had more than one postgraduate qualification.

Table 5.2 – Demographic information of group one participants

		Number (n)	Frequency (%N, N=20)	
Age bracket	20 -30	3	15%	
	31 - 40	8	40%	
	41 - 50	6	30%	
	51+	3	15%	
Gender	Male	5	25%	
	Female	15	75%	
Area of practice	Community	10	50%	3 with specialisations
	Hospital	5	25%	All specialised in one or more areas
	Academia	1	5%	Also works in community
	Government/Policy	0	0	
	IPA/PHO	2	10%	Medicine review IPA
	Other	2	10%	1 consultant, 1 works in industry
Initial professional qualification	PSNZ Professional exam	2	10%	
	Diploma in Pharmacy	7	35%	
	B Pharm (NZ)	10	50%	3 have B Pharm (hons)
	Other	1	5%	B SC (Pharm) Brighton
Post Graduate qualifications	None	4	20%	
	MNZCP	4*	20%	*1 currently completing
	FNZCP	1	5%	
	Cert Clinical Pharm	2	10%	
	Dip Clinical Pharm	4*	20%	*1 currently completing
	Master Clinical Pharm	2	10%	
	Other (Formal)	3	15%	1 PhD, 1 MBA, 2 Postgrad Cert (UK)
	Other (Non-formal)	2	10%	Cert Diabetes (NZCP), Fellowship of American Society of Consultant Pharmacists

5.2.3 Interview questions

As stated above, the questions used in the interview were based on Kelly's Repertory grid technique and asked participants to make comparisons of the attributes they would expect to see in pharmacists who, they considered to be expert, competent or not-yet-competent performers. The interview was in three parts and an outline is attached as Appendix 4.

In the first part of the interview, participants were asked to consider the statement "practise pharmacy in a professional manner" and to think of three pharmacists they had worked or associated with at some point in their career who had demonstrated

behaviour they consider typified either expert, competent or not-competent performance in relation to this statement. The participants were then asked to describe the attributes of each of these individuals.

Firstly, they were asked to describe the attributes that typify the expert performer "practising pharmacy in a professional manner". This was pharmacist A. They were then asked to describe the attributes of the competent performer who performed at a level less than pharmacist A while "practising pharmacy in a professional manner". This was pharmacist B. They were then asked to describe the attributes of the not-yet-competent individual "practising pharmacy in a professional manner". This was pharmacist C.

In the second part of the interview, participants were asked to use a series of two or three word phrases to describe what differentiates pharmacist A from pharmacist B, pharmacist A from pharmacist C, and pharmacist B from pharmacist C. They were then were asked to identify which of the characteristics described they considered to be the most important in differentiating performance.

In the third part of the interview, they were asked how long, in their opinion, it took for a pharmacist to become an expert. Demographic data were collected and the interview concluded with participants being thanked and offered the opportunity to add further comments if they wished. At this point, participants were also asked if they were willing to respond to the follow-up explorative questionnaire. All participants agreed to do this.

Interviews were taped and transcribed, and the elements associated with the constructs extracted and pooled across participants. The analytical approach is discussed further in section 5.4.

5.3 The explorative questionnaire

Following the interview, participants were sent a follow-up explorative questionnaire, which aimed to gather further data on the construct of professional competence by

exploring the attributes that underpin competent performance of the four functional roles pharmacists commonly engage in, namely:

- dispense medicines
- prepare pharmaceutical products
- contribute to the rational use of medicines; and
- provide primary health-care.

Using a follow-up explorative questionnaire enabled participants time to reflect on the issues associated with competence and, by using the functional headings, provided an opportunity for these pharmacists to incorporate concepts arising from their reflection on the issues raised and their own engagement with the self-audit process of ENHANCE. In this way, it was hoped to isolate characteristics of functional competence that may be additional to, or implied by, the construct of professional competence. This also provided an opportunity to verify the information obtained from the interviews.

Questionnaires are commonly used to gather both qualitative and quantitative data. Open questions are typically used for qualitative data, while rating scales and fixed-response questions are commonly used for quantitative data gathering. To ensure validity and reliability, questionnaires must be well-designed and closely related to the purpose for which they are used. The main advantage of questionnaires is that they can be administered anonymously, are generally easier to interpret, and as long as they are well constructed, can lend themselves more easily to quantitative analysis than open interviews (Miles & Huberman, 1994).

5.3.1 Questionnaire questions

The aim of the explorative questionnaire was to gain further insights into the characteristics of competence by focusing on the functions that pharmacists perform. The questionnaire replicated the interview design and, again, was based on repertory grid techniques.

Participants were asked to consider each of the functional constructs—dispense medicines, prepare pharmaceutical products, contribute to the rational use of

medicines, and provide primary health-care—and to then think of three pharmacists they know or have worked with who typified: expert performance (pharmacist A); competent performance (pharmacist B); and not-yet-competent performance (pharmacist C) for each of these functions. Participants were told that they were able to choose a different "typical" expert, competent or not-competent pharmacist, for each of the functional roles if this was appropriate.

Participants were then asked to describe the attributes—knowledge, skills and attitudes—of pharmacists A, B and C. They were then asked to use a series of two or three word phrases to describe what differentiated pharmacist A from pharmacist B—expert from competent—for each of the functional roles; pharmacist A from pharmacist C—expert from not-yet-competent—for each of the functional roles; and pharmacist B from pharmacist C—competent from not-competent—for each of the functional roles.

Questionnaires were sent to all 20 participants via e-mail once they completed their interview. Participants were invited to send their response by e-mail or return mail and where necessary a stamped, return addressed envelope was supplied for this purpose. Non-respondents were followed up by both a phone call and e-mail.

Responses were received from 16 pharmacists of which 15 were able to be analysed—a final response rate of 75 percent. The data extracted from the questionnaires were pooled with the data from the interviews and analysed, as described in the following section.

A copy of the exploratory questionnaire is attached as Appendix 5.

5.4 Analytical approach for obtaining meaning from exploratory interviews and questionnaires

The aim of the analysis of the data obtained from the exploratory interviews and questionnaires was to identify the structure and meaning of the construct of professional competence and, if possible, to develop a model to explain the data.

5.4.1 Interview data

Taped interviews were transcribed verbatim, and data were extracted by interpreting participants' responses and isolating the elements used to describe the construct of professional competence as exhibited by expert, competent and not-competent performers. The extraction method used key words such as "communication", "problem-solving", "experience", and "knowledge" to isolate the elements.

These extracted elements were grouped together under common themes, for example, "ability to use knowledge", and the frequency with which the elements were mentioned in the interviews for each of the levels of performance was recorded. Recording the number of times an element was mentioned provided a measure of its importance in interpreting the construct of professional competence. This analysis resulted in the construction of a matrix of elements of professional competence, grouped in themes, as they relate to expert, competent and not-competent performance.

The matrix of elements was then analysed to determine which of the elements differentiated between levels of performance either through being exhibited at a different level or under different circumstances. For example, an expert using technical processes will adapt these and develop new procedures, a competent person would use the processes unsupervised, and the not-yet-competent practitioner would work under supervision. This analysis produced a simplified map of the elements and their interrelationships.

The elements that participants reported as being the most important in differentiating performance were also recorded, and the frequency with which they were mentioned was calculated. Determining the frequency that an element was identified as most important in differentiating performance, provided a measure of the overall weighting of the element. The most important element was awarded a weighting of ten, the next most important, a weighting of nine, and so on.

The average length of time in practice necessary to become an expert performer was also calculated from the interview data. Having a concept of the length of time required for a person to become an expert performer was considered useful for informing and interpreting the results in the second phase of the research, discussed in Part Three.

5.4.2 Questionnaire data

The data from the exploratory questionnaire were extracted in the same way. They were entered into a matrix made up of the four functional roles and the three levels of performance in order to identify the elements associated with each of the functional constructs.

5.4.3 Developing a single data map

The two matrices—the professional competence matrix and the functional competence matrix—were then combined into a single matrix and mapped against the template developed for the pharmacy professional, based on the modified Cheetham and Chivers model as discussed in section 4.4. The purpose of doing so was to develop a model of professional competence.

The theoretical framework based on the work of Cheetham and Chivers has been used in this analysis to provide a frame of reference for mapping professional competence. A map is a guide and, as such, is not a rigid conceptualisation. If, in using the map for interpretative purposes, the map was not found to be a good representation of the construct under investigation, this would indicate that a different map is needed. Fay (1996) describes it well in saying:

> In cartography there is no "One Best Map" of any particular terrain. For any terrain an indefinite number of useful maps is possible, each depending on the aspect of the terrain highlighted as an entity, the mode of its representation itself contingent on the uses to which the map will be put, and the perspective from which the map is drawn. (Fay, 1996, p. 210)

The analytical framework used to map the data for the model development is shown in Figure 5.1.

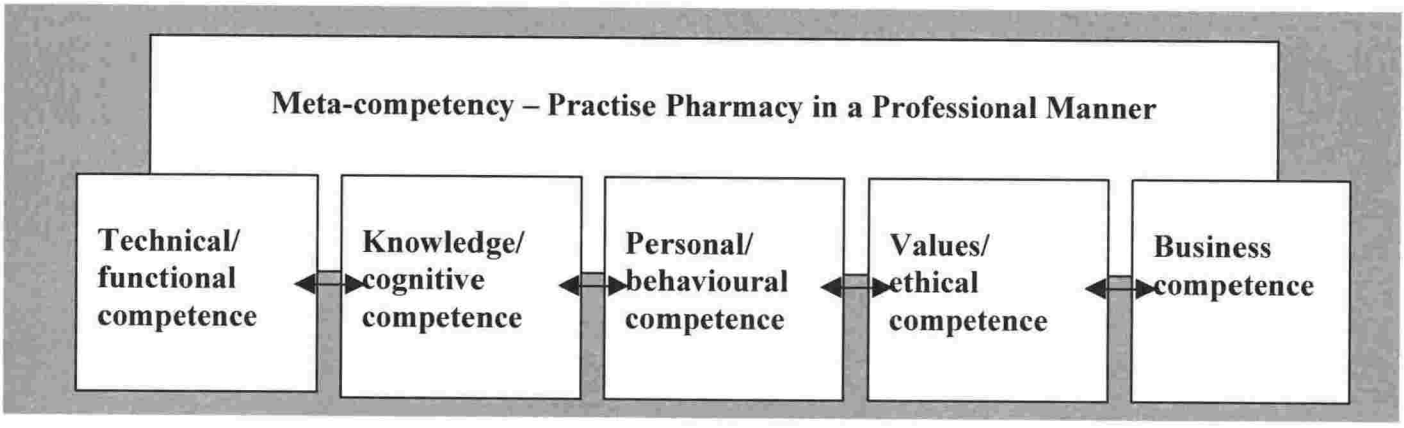

Figure 5.2 – Analytical framework

It was hoped that mapping the data in this way would enable a model of professional competence to be developed for pharmacy that differentiated performance of expert, competent and not-competent practitioners. The results of these analyses are described in the following chapter.

5.4.4 A word on data extraction and analysis

All data interpretation, extraction and analysis was undertaken solely by the researcher. While using only one person to undertake this task could lead to bias and a lack of objectivity, in fact the data from the interviews and questionnaires were remarkably consistent across all participants. This was probably the result of using an informed or "expert" survey sample.

Using people who were engaged in the discussion and debate about professional competence may have resulted in the data obtained reflecting the profession's overall view as well as that of the individual. This is one of the strengths of the Kelly approach in that personal constructs are always made up of both the individual's experience and his or her understanding, and the collective experience and understanding.

Further, it should be noted that in both this phase of the research and in later phases, the quantitative data extracted is ordinal (ratings etc) and such data *technically* does not fit the *interval level* criteria necessary for the use of parametric tests such as ANOVA, *t*-tests etc. In practise this does not matter too much; results are quite robust,

provided ordinal data distributions are not multi-modal or severely non-normal—for example, grossly skewed—and are reasonably "well behaved".

5.5 The workshops

The final step undertaken in this phase of the research was workshopping the model of professional competence developed from the mapping exercise with practising pharmacists, who in acting as an "expert panel" were asked to critique and validate the model.

Workshops were chosen for this validation exercise as they provided a structured format for the discussion of the model. Providing occasions for participants to share concepts and ideas offered an opportunity for the breadth and depth of thoughts and opinions to be communicated and debated by the group as a whole. In this way, agreement on the validity of the model became a group activity rather than having to solely rely on the objectivity of the researcher. This was felt to be important as the researcher had developed the model from the data in isolation and without the benefit of input from other experienced practitioners.

Three workshops were held—two as part of national conferences in order to attract experienced pharmacists from throughout New Zealand—and one as a meeting of the Wellington Branch of the Pharmaceutical Society of New Zealand.

5.5.1 Workshop participants

Forty-six experienced practicing pharmacists participated in the workshops. In the first of the workshops, a Special Interest Group (SIG) of hospital pharmacists attending their annual conference, 18 hospital pharmacists attended. In the second workshop, eight pharmacists working in community and/or policy roles had elected to attend a workshop at the annual conference of the Pharmaceutical Society of New Zealand. The third workshop had 20 pharmacists from a mixture of community, policy and academic practice who elected to attend a workshop advertised by the Wellington Branch of the Pharmaceutical Society. All participants were practising pharmacists and no demographic data were collected from them.

As mentioned previously, participants in this step of the research were asked to review the proposed model for validity and applicability to their practice, and to recommend amendments.

5.5.2 Workshop process

Workshop participants were asked to work in groups and to consider the proposed model, and to determine whether it made sense and described their practice. They were asked to consider:

1. Was the categorisation used in the model sensible?
2. Was there anything that a pharmacist does that did not fit into one or more of the domains of competence as described by the model?
3. Was there a better way of categorising the work?

A copy of the workshop exercise is contained in Appendix 6.

All participants in the workshops completed the exercise and provided positive feedback on the model. Results obtained from this step of the research are discussed in Chapter Six.

5.6 Ensuring validity and reliability in qualitative research

Validity in qualitative research is concerned primarily with ensuring credibility and authenticity of the data, its interpretations and the conclusions drawn from it. Reliability is concerned mainly with the dependability and auditability of the processes used. Ensuring objectivity is another aspect of reliability and relates to the extent to which the research is free from unacknowledged researcher biases that exist. Obviously, bias can also affect validity.

Validity in qualitative research is the extent to which the research investigates what it sets out to investigate, and whether its conclusions "make sense" or "ring true". Ensuring validity of both the research design and the data collected is important for ensuring the overall quality of the research. Measurement oriented aspects of

validity—face, content, construct and predictive validity—relate more to quantitative research and are dealt with in section 8.4.

Processes used in qualitative research to enhance validity include using context-rich descriptions, using triangulation or similar processes to generate converging conclusions, linking the processes and data to prior theories, using explicit rules to confirm propositions, and testing whether the conclusions were considered to be accurate by the original informants (Miles & Huberman, 1994).

Validity has been assured in this research by using open questions in both the interview and questionnaires. This enables the participants to express their own attitudes in their own words. It has also been assured by using a known technique for constructing and administering the interview and questionnaire, namely the Kelly Repertory grid technique, which is described in section 5.2. Validity has been further strengthened by taking as a starting point the Cheetham and Chivers 1998 model of professional competence that has been subject to validation. The model of professional competence developed from the research was workshopped with experienced pharmacists who included pharmacists used to generate the data that led to its development. This is covered further in section 6.5.

The underlying issues of reliability in qualitative research are whether the processes used are consistent, dependable, and reasonably stable over time and across the methods used. It is in effect concerned with "quality control" and the degree to which the processes used are auditable (Miles & Huberman, 1994). Reliability in qualitative research focuses on having clear description of the data gathering processes, and using established processes that are clearly described so that readers are able to audit the information for its dependability. Reliability in quantitative research is dealt with in section 8.4.

Reliability in the context of this study is dealt with by using established methods to generate the data, namely the Kelly's repertory grid approach, and ensuring the research data measure and record accurately the views of participants. This has been dealt with in this stage of the study by taping the interviews, transcribing them

verbatim and then combining these with the questionnaire responses prior to any analyses taking place.

Chapter Six
Phase one data analysis

6.0 Overview

All 20 pharmacists making up the expert group who participated in step one of the research completed the interviews, and 16 of the 20 responded to the follow-up exploratory questionnaire. Fifteen responses to the exploratory questionnaire were able to be analysed. The resulting data provided a rich description of the elements associated with expert, competent and not-competent performance in relation to both the construct of professional competence and each of the functional constructs. These data were then pooled into a single data set.

Synthesis of the elements into broad themes enabled a matrix to be constructed. This matrix was then used to compare and contrast the elements, and to isolate and identify those elements that differentiated performance. Analysis of the matrix showed that there was strong agreement among participants as to the elements associated with expert and competent performance. However, the elements associated with not-yet-competent performance showed greater variation.

This chapter describes the key elements identified in the matrix as typifying the three levels of professional competence—expert, competent and not-competent. This matrix was then mapped against the professional competence framework in order to construct a model of professional competence for pharmacists. The matrix and elements associated with it are described in Tables 6.4, 6.5 and 6.6. An alternative model of professional competence was developed and this is described in Chapter Seven.

6.1 Elements associated with professional competence

To extract the elements associated with professional competence from the pooled interview and questionnaire data, responses and comments that described the same

attribute were grouped together and a single behavioural description was synthesised to describe the resulting characteristic. For example, when describing an expert pharmacist the following statements were given:

> "The knowledge is vast and very deep"
> "...it's the knowledge of medicines used in that area, just the current knowledge of procedures and the conditions ..."
> "it's knowledge and how to apply that knowledge"
> "...his depth of knowledge is huge..."

These statements all reflect a common characteristic of expert pharmacists in that they have a deep and broad knowledge along with the ability to apply it to practice.

These characteristics were called elements and the frequency with which each of the elements was mentioned, when describing and differentiating expert, competent and not-competent performance, was recorded.

The major elements for expert, competent and not-competent pharmacists are described in the following sections.

6.1.1 Expert performers

The most important elements associated with expert performers are given in Table 6.1 and Figure 6.1 with the frequency that each element was indicated in the data. The key points indicate that expert performers have an extensive knowledge-base that covers clinical knowledge, knowledge about pharmacy practice and other things, as well. They are able to apply their knowledge in a wide range of situations, and to consider the wider picture. They are confident and happy in their role, and confident in their knowledge and ability to apply that knowledge. They are comfortable making decisions and will stand by the decisions they make, back them up with information if necessary and disagree with others. They are alert, self-aware, have self-respect, and are trusted and respected by others, including other health professionals, consultants and the public.

Experts have wide experience in both pharmacy and life, and are practical. They are able to adapt and apply information sourced from other situations to New Zealand and local situations. They generate new knowledge.

Experts learn from experience, and are open to feedback and to new ideas. They are reflective, and continually examine their performance. They are realistic, know their limitations, and they are prepared to say "that is outside my scope".

Experts are excellent communicators and counsel every time they give out medicines. They are good listeners, able to pitch information at the right level, and can tailor communication to their audience. They have good people skills and relate well to others. They show empathy and build relationships. They read body-language and adjust their approach in response to feedback. They are proactive and seek active engagement rather than merely responding to questions.

The interview questions used to obtain the data mean that an element may be mentioned more than once in any interview. For example, an element may be identified as one that is associated with both expert and competent performance, as well as being an element important in differentiating performance. Because of this the maximum number of times an element could be mentioned is 60.

Table 6.1 – Most commonly quoted elements of expert performance

Element	Frequency
Deep and broad knowledge-base	35
Take a wide/holistic approach	30
Are confident in themselves and their ability	28
Make decisions and stand by them	24
Self-aware/learns from experience	22
Inspires, teaches and mentors others	21
Good interpersonal skills	21
Excellent communication skills	20
Technically skilled	18
Wide experience	14
Trusted and respected	14
Open to feedback	11
Access and evaluate information	9

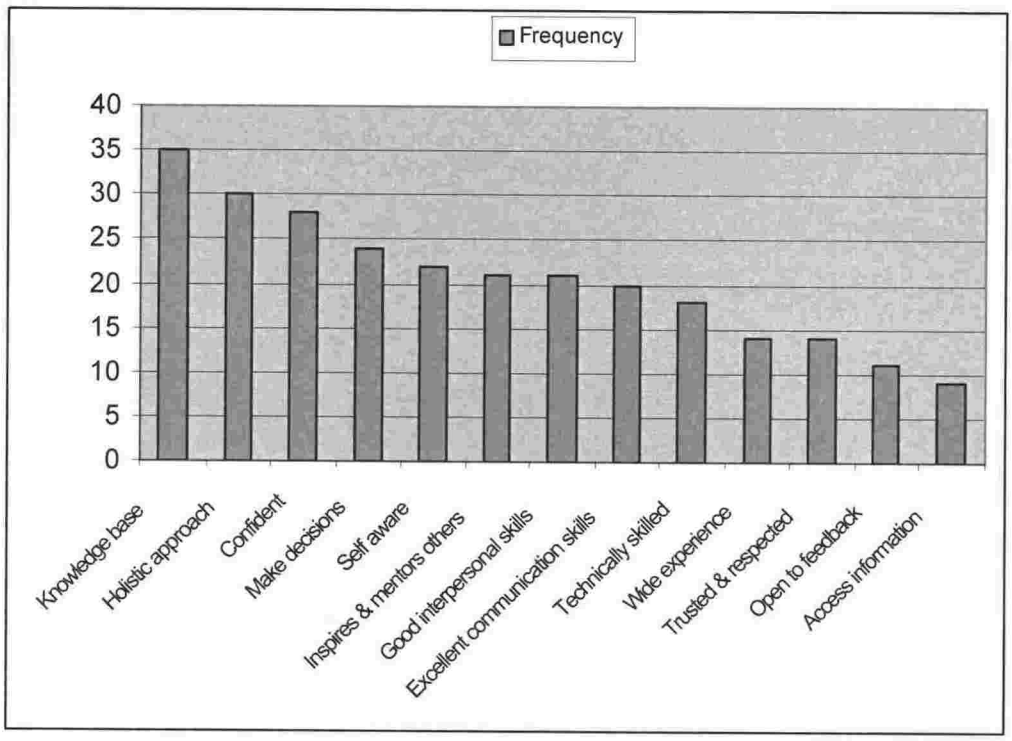

Figure 6.1 – Most commonly quoted elements of expert performance

6.1.2 Competent performers

The most important elements associated with competent performers are given in Table 6.2 and Figure 6.2 with the frequency that each element was indicated in the data. The key points indicate that competent performers have a good foundation knowledge-base, but do not have the depth of knowledge seen in expert performers. They are able to apply their knowledge to practical situations.

Competent performers are experienced, confident in their role, and know when they have done their job well. They may be less self-assured than an expert. They are able to access information from a range of sources, and are motivated to learn. They engage in continuing professional development (CPD) and actively build their knowledge and skills using their own and others' experiences. They evaluate their own performance.

Competent performers do their job well, but do not necessarily go the "extra mile". They are ethical and follow "the rules", known routines and procedures. They are logical, methodical, accurate and safe, do the job properly and check themselves.

Competent performers take responsibility for what they do. They will exhibit both personal and professional responsibility.

Competent performers are good communicators and are able to disseminate information in language understood by their audience. They are confident to talk to other health professionals, but may be subservient at times.

It is clear that there are common elements between competent and expert performance. These include knowledge, ability to access information, experience, good communication and interpersonal skills, confidence and self-awareness. Having said that, experts demonstrate these elements to a greater degree than competent practitioners. Descriptions of competent performers differ from those of expert performers by focusing on technical aspects of pharmacy practice, including being accurate, safe and ethical, while experts mentor others, are open to feedback, and are trusted.

Table 6.2 – Most commonly quoted elements of competent performance

Element	Frequency
Are methodical, accurate and safe	27
Motivated to learn	18
Evaluate own performance	16
Are confident in themselves and their ability	15
Good communication skills	14
Good knowledge-base	10
Check themselves	10
Take responsibility	9
Apply knowledge	8
Are ethical	8
Able to access information	6
Experienced	6
Good interpersonal skills	5

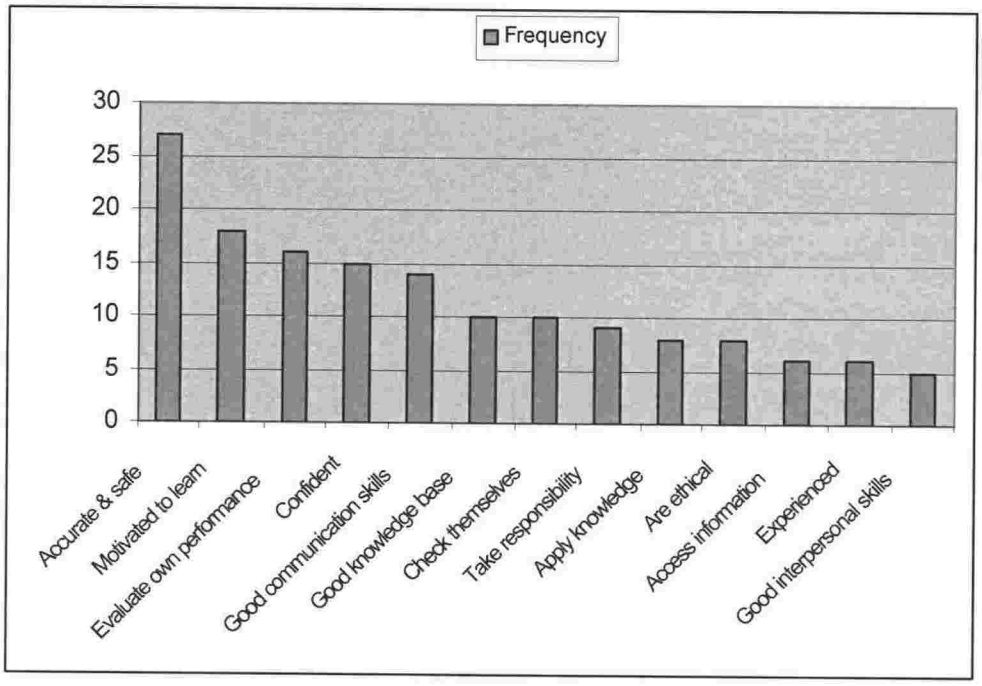

Figure 6.2 – Most commonly quoted elements of competent performance

6.1.3 Not-yet-competent performers

Table 6.3 and Figure 6.3 set out the information for not-yet-competent performers. These people, typically, are one of two types—interns under training or people who have let some aspect of their practice slip or become out-of-date.

Not-competent performers are most commonly reported as being hesitant, cautious, and lacking confidence. They are unsure of the job and their own abilities, and will seek direction and assurance. They worry about their ability, do not willingly take on new challenges, and instead, will rely on others.

Their performance is unreliable and they do not inspire trust. They make mistakes, are unreliable and require supervision. They may lack logical processes and be less organised in their thinking and approaches.

Not-competent performers often have a good clinical knowledge-base, but lack breadth of knowledge in all areas of practice. There may be gaps in their knowledge and they will not always see the links between apparently unrelated information. They often have less experience, and are not able to consistently apply their knowledge to practical situations. For example, they may not realise that it is a real person they are

talking about—as opposed to a textbook case—and are not able to make adjustments from theory to practice.

The interesting feature coming from the not-yet-competent performers is that there is a great deal of variation in the elements associated with this level of performance. For example, one pharmacist was considered to be not-competent because he/she could not speak English, another because he/she was not moral, and another because his/her knowledge was out-of-date.

Those elements commonly exhibited in not-competent performance are also reported as important for expert and competent performance. They are knowledge, communication skills and willingness to learn. While not-competent performers demonstrate these elements, their lack of confidence and experience do not enable them to display these reliably or consistently, and this contributes to the not-competent performance.

In addition, not-competent performance is distinguished from competent and expert performance in the following ways: not-competent performers lack confidence, are unsure of their own abilities, are unreliable in the performance they deliver, do not inspire trust, lack the experience to apply their knowledge, and are less organised and logical in their approach. While they often understand the importance of good communication, they may be unable to confidently tailor the information they provide or they way they deliver it to meet the needs of clients, particularly doctors or specialists.

In addition, not-competent practitioners may have unrealistic expectations of their abilities.

Table 6.3 – Most commonly quoted elements of not-competent performance

Element	Frequency
Hesitant, cautious and lacking confidence	29
Unreliable performance	17
Ability to apply knowledge to practice	14
Have adequate communication skills	13
Have adequate knowledge-base	13
Do not inspire trust	13
Unsure of own abilities, seek reassurance	12
Lack logical processes, less organised	7
Are willing to learn	6

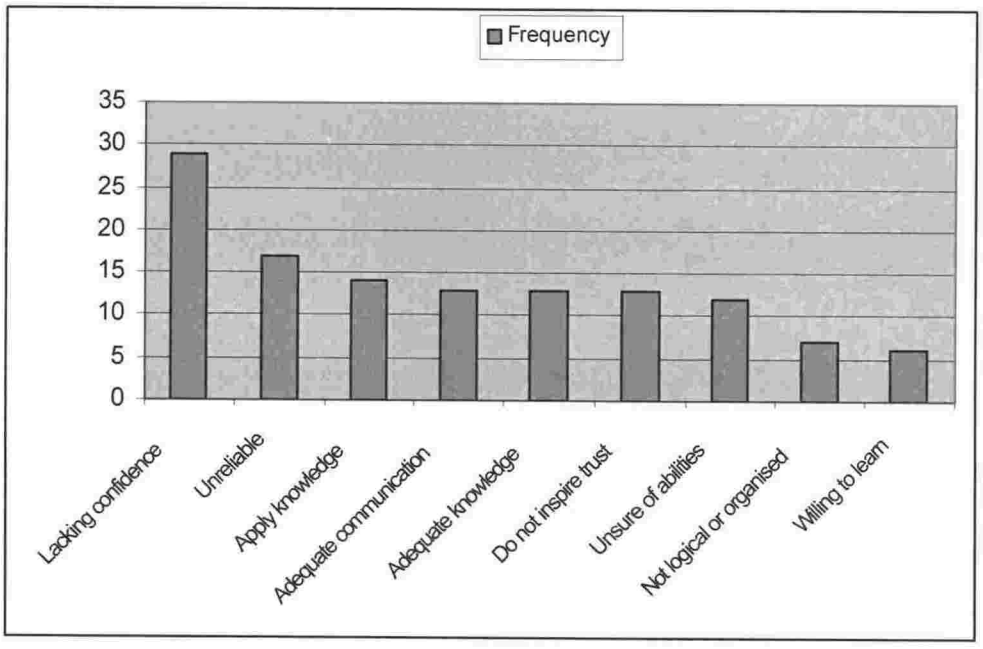

Figure 6.3 – Most commonly quoted factors of not-competent performance

6.1.4 Elements reported as important in differentiating performance

In both the interview and exploratory questionnaire, participants were asked to identify the factors that differentiate the performance of experts from competent practitioners, expert from not-competent practitioners, and competent from not-competent performers. Participants were also asked to state which elements they thought were the most important in differentiating performance.

The most commonly quoted elements that were seen to differentiate levels of performance and their importance are shown in Table 6.4. Weighting of the importance of the elements in differentiating levels of performance is determined

from the frequency with which participants identified the element as the most important factor in differentiating performance. The frequency scores were then translated to a weighting, scored out of ten.

The element most frequently cited as important was given a weighting score of 10, while the next most frequently cited for importance was given a weighting score of 9. Where different elements were cited as important an equal number of times, they were given the same weighting scores. For example, "having extensive knowledge" was the element most frequently cited as differentiating between expert and competent pharmacists so this was given a weighting score of 10. Being "experienced and able to integrate knowledge with practice" was cited an equal number of times so it was also given a weighting score of 10.

The elements and their weighting scores are shown in Table 6.4.

Table 6.4 – Elements associated with differences in performance

Factors	Differentiates	Importance weighting
Has an extensive knowledge and ability to apply knowledge	Differentiates expert and competent performers from not-competent performers	10=
Is experienced and able to integrate knowledge with practice	Differentiates expert and competent performers from not-competent performers	10=
Is confident	Differentiates experts and competent performers from not-competent performers	9
Has good communication and counselling skills	Differentiates expert and competent performers from not-competent performers	8=
Is able to make decisions	Differentiates competent performers from not-competent performers	7=
Knows limitations	Differentiates experts and competent performers from not-competent performers	7=
Considers "wider" picture	Differentiates expert performers from not-competent performers	7=
Is technically accurate and checks themselves	Differentiates competent performers from not-competent performers	6=
Has good people skills and is happy to communicate with other health practitioners	Differentiates competent performers from not-competent performers	6=
Applies theory to practice	Differentiates competent performers from not-competent performers	5=
Takes ultimate responsibility	Differentiates experts and competent performers from not-competent performers	5=
Works with others and recognises and values the knowledge of others	Differentiates expert performers from not-competent performers	5=

Factors	Differentiates	Importance weighting
Mentors others	Differentiates expert performers from not-competent performers	4
Recognises importance of apparently unconnected information	Differentiates expert performers from not-competent performers	3=
Is very patient-centred	Differentiates expert performers from not-competent performers	3=
Is honest and ethical	Differentiates expert and competent performers from not-competent performers	2
Is able to multi-task	Differentiates expert performers from not-competent performers	1
Deals with difficult customers	Differentiates expert performers from not-competent performers	1

From these data, the elements that appear to differentiate experts from competent performers are the depth and breadth of their knowledge and experience, and the ability of practitioners to apply that to their practice and to use it to support and develop others. They are able to see the relevance of apparently unconnected information.

Expert and competent practitioners are differentiated from not-competent performers by their superior communication and interpersonal skills, and they have a good understanding of people and can handle difficult situations. Experts differ from competent practitioners in their approach to patients. They take a wide view and look beyond the specific issue presented. They treat the whole person, not just the presenting disease or symptoms. Competent performers are ethical, accurate and check their work. They are able to make decisions and take responsibility for them. They are able to apply their knowledge to practice and are confident in their role.

The elements that differentiate competent performers from not-competent performers are in many cases the same as those that differentiate experts from competent performers. It appears, however, that it is the degree to which the practitioner demonstrates the element that determines whether he or she is considered to be expert or merely competent.

The most important elements for differentiating performance are knowledge, experience, confidence, and communications skills.

6.1.5 Years of practice to become expert

The interview step of the research asked participants to give their opinion on how many years of practice were required before a competent pharmacist would become an expert. While some of the participants (n=4) felt they could not answer this question, many participants believed that the length of time in practice required before a person could be considered to be expert varies depending on the person. Of the 16 participants who answered this question, the most commonly recorded length of time for the development of expertise was five years post-registration; that is, a practitioner needs to complete their internship year along with an additional five years in active practice. These results are summarised in Table 6.5 and Figure 6.4.

Table 6.5 – Years of practice to become an expert

		Number (n)	Frequency (%N, N=20)
Years of practice	3	5	25%
	4	3	15%
	5	7	35%
	8+	1	5%
	No response	4	20%

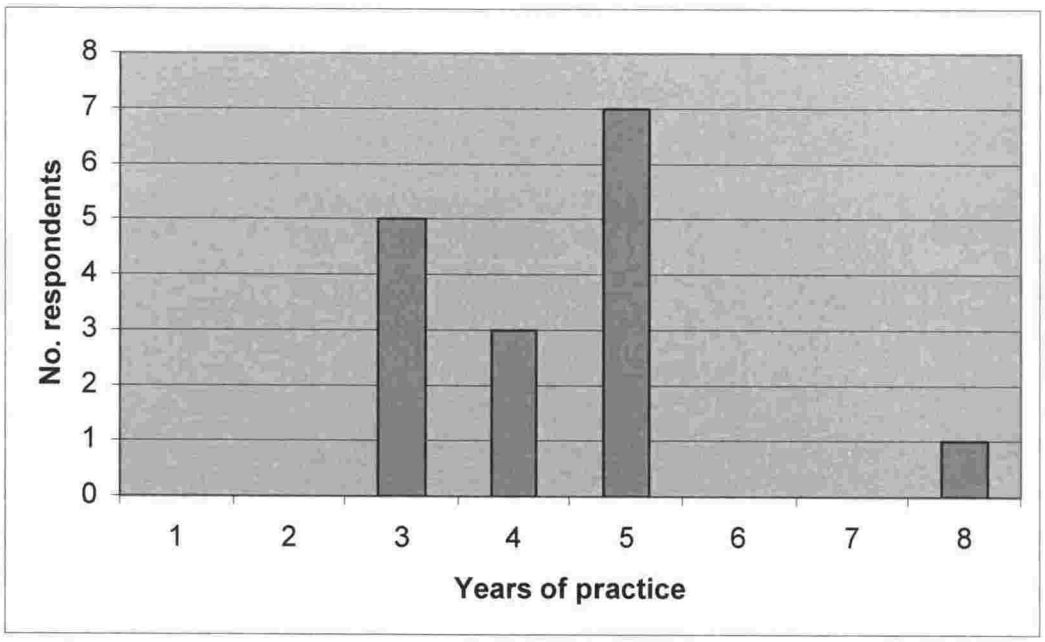

Figure 6.4 – Years of practice to become an expert performer

6.2 The matrix

All the elements extracted from the interviews and questionnaires were combined into a matrix that matched the attributes associated with expert, competent and not-competent performance against each of the constructs—professional competence, dispense medicines, prepare pharmaceutical products, provide primary health-care, and contribute to the rational use of medicines.

This matrix enabled elements to be compared and contrasted across each of these constructs and showed that most of the attributes identified as necessary to describe professional competence were also replicated in each of the functional competencies.

An example is the element "providing a "wider" service", described in the expert performance table of the matrix. Under the construct of "professional competence", an expert practitioner ...

> Is able to provide a "wider" service and has an holistic approach. They look after the whole person and provide holistic care. They are focused on the patient, provide extras, and anticipate and deal with potential problems. They look beyond the surface of things.

An expert in the functional construct "dispense medicines" ...

> Looks at the whole picture and does a really good patient history and clinical review by proactively and reactively questioning the patient. They think about the medication from the context of the patient. They apply knowledge to that particular person in a considered manner to get the best outcome for the patient, recognising that medicine is different for different people. They individualise treatment.

An expert in the construct "prepare pharmaceutical products" ...

> Critically appraises the appropriateness of the request for the product and how it relates to the patient. They confidently proactively or reactively question the patient to determine the need for the product and to ensure its appropriateness.

And so on. Where a cell in the matrix has been left blank, no factors from the pooled interview or questionnaire data have been matched within the data obtained for that construct.

The matrix is set out in the following three tables: Table 6.6 is the table of elements associated with expert performance; Table 6.7 is the table of elements for competent performance; and Table 6.8 is the table of elements for not-competent performance.

Table 6.6 – Matrix of elements associated with expert performance

Expert performance

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is able to provide a "wider" service and has an holistic approach—looks after the whole person—holistic care, focused on the patient, provides extras, anticipates and deals with potential problems. Looks beyond the surface of things.	Looks at the whole picture and does a really good patient history and clinical review by proactively and reactively questioning patient. Correctly thinks about medication from the context of the person—applies knowledge to that particular person in a considered manner to get best outcome for patient, recognises that medication is different for different people, individualises treatment.	Critically appraises the appropriateness of the request for the product and how it relates to the patient—confidently proactively or reactively questions patient to determine the need for product and to ensure appropriateness.	Critical appraisal of the need for a product and/or the appropriateness of a request for a product and how it relates to the patient—confidently proactively or reactively questions patient and listens to determine need for the product and to ensure appropriateness.	Critical appraisal of the appropriateness and effectiveness of a medicine in a given situation for a given patient or group of patients. Confidently proactively or reactively questions patient to determine their need for product and to ensure appropriateness—practises CPC and identifies possible problems/recommendations.
Is very patient centred, goes the extra mile/ has extra mile attitude—looks around to see if there's things around the task that need to be done.	Looks at "bigger picture" and sees past actual prescription (empathy). Critically appraises and checks prescription in a holistic manner for clinical appropriateness for patient before dispensing it.	Allocates some time to consider whether or not the product should be compounded at all. Asks questions such as is there a proprietary product available that is as good or better? If not, can we make this product to an acceptable standard in the given environment? If not, where should this request be referred to? Confidently advises patient and prescriber on changes or alternatives to the product based on personal knowledge and experience.	Looks at the whole picture and does a really good patient history and clinical review—correctly thinks about medication from the context of the person. Applies knowledge to that particular person in a considered manner to get best outcome for patient, recognises that medication is different for different people, individualises treatment.	Looks at the whole picture and does a really good patient history and clinical review—correctly thinks about medication from the context of the person. Applies knowledge to that particular person in a considered manner to get best outcome for patient, recognises that medication is different for different people, individualises treatment.
Manages patient expectations.				
Has a timely, logical and comprehensive approach to problems and processes—is methodical and thorough and takes time to do things properly and does not miss steps or take shortcuts.	Timely, organised and efficient—unhurried, good time-management.	Uses appropriate techniques and makes product quickly, neatly and efficiently to a high standard including rarer items such as suppositories, gels etc.—confident and methodical. Labels correctly.	Proactive in liaising with other health-care professionals to see how they can work with them to provide the best service for their patients and how they can provide the best information about services available in their area—provide feedback re problems identified.	
Does things swiftly and proficiently—prioritises tasks from patient point of view and gets the job done with a minimum of fuss, focused, not easily distracted from task at hand.	Prioritises work appropriately.		Very capable and skilled, thorough.	Very capable and skilled—handles everything that arises.
Is able to multi-task.				

Table 6.6 – Matrix of elements associated with expert performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Accurate and straight forward—works to the highest possible standards.	Technically excellent and thorough with close attention to detail—exhibits a consistently high standard for validating, interpreting, dispensing and checking processes. Checking process very methodical and accurate and covers legal and Healthpac requirements.	Can prepare a wide range of pharmaceutical products—may specialise in one area e.g. sterile, chemotherapy.	Confidently advises patient on most appropriate product based on personal knowledge and experience—chooses correct product/treatment to treat problem. Exhibits attention to detail.	Confidently discusses findings with prescriber or other health-care professionals and advises on most appropriate medicine based on personal knowledge and experience—can make evidence-based recommendations to improve therapy.
Is very careful—sets up systems to ensure everything is checked and double checked where necessary. Is alert to changes and will double check to ensure its okay.	When dispensing, completes comprehensive checks on all aspects of medication, dose, interactions, patient factors, medication history etc. Recognises when medicine is not appropriate and picks up any errors the doctor may have made in writing the prescription.		Proactive in getting involved in and setting up primary health-care initiatives—sets them up and coordinate from first principles e.g. screening, one-on-one consultations/education appointments with patients.	Aware of things a less experienced pharmacist would miss e.g. interactions.
	Has good documentation.	Documents batch numbers, expiry dates etc.—can do calculations.		Maintains good documentation.
Manages high pressure situations. Is relaxed and patient in the job, does not let things overwhelm them and can handle difficult situations—does not get wound up or lose their cool.	Unfazed by tricky situations, dubious customers, difficult patients—calm in stressful situations.		Handles everything that arises.	
Is proactive with recommendations and information.	Proactive in contacting prescriber in relation to anomalies and inaccuracies—Initiates change.	Automatically reviews procedures and initiates changes when errors or omissions identified.	Proactive in offering health-care advice in the pharmacy – takes an holistic view of the patient's health. Checks concurrent medicines—prescription and OTC. Sees bigger picture.	Proactive.
Follows through on everything including the difficult stuff—does not leave things for others.	Can always work independently without supervision.		Follows up with patient if appropriate.	
Is a good/expert communicator, listens and transfers information, pitched to the right level in both context and content—willing to talk, counsels every time gives prescription out. Leads interaction rather than merely responding.	Good communication skills—explains and advises both prescriber and patient comprehensively. Often consults with the patient when giving out their medications.	Counsels patient as needed.	Counsels patient on use of medicine and other treatments that may be appropriate—can provide patient with additional advice such as health promotion, lifestyle, dietary.	Excellent communicator—able to impart information so that it is understood by recipient—often thinks of ways to modify information delivery to suit the recipient.
Reads body-language and adjusts approach in response to feedback.				
Is able to deal with difficult customers.			Able to deal with difficult/dubious customers.	

Table 6.6 – Matrix of elements associated with expert performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Has good people skills and relates well to people—is able to build relationships and get alongside people. Has empathy and is able to judge when to be friendly and when to stand off a bit.	Friendly—is open and available for discussion.		Has empathy with end user—interested in patient. Respects patient's privacy. Exhibits confidentiality.	Maintains confidentiality.
Welcomes customer feedback.				
Is confident in dealing with other health professionals—is willing to talk, build relationships and have really good rapport.				Maintains good rapport with other health professionals—regularly interacts with health professionals in a collegial manner.
Is an effective team worker—works with others rather than for or against.	Works as part of a team.		Confidently refers to other specialised pharmacy staff or a prescriber if necessary.	
Has common sense along with experience in both pharmacy and life, and is able to integrate knowledge with practice—has maturity, and is practical and down to earth. Recognises constraints of system.				
Cares about people—wants to help and is involved in community—altruistic.			Member of groups external to pharmacy e.g. DHB, Asthma Society—community oriented.	Is proactive in taking the quality use of medicines information to the public and devising ways that such information can be made accessible and readable to the public.
Is able to remain human and be a nice person—not arrogant, non-threatening, approachable.				
Is transparent—does not try and cover up. Is honest, ethical, trusted and respected. Builds trust.				Is respected by colleagues and other health professionals.
Is interested in what they are doing and wants to do a good job and have best outcome for patient		Takes pride in finished product.	Makes a difference to patient's health-care.	Practises in a holistic manner.
Is able to give more than basic information—broader understanding, understand the questions raised.			Go through the information resources with the patient, explaining how they applied to them and checking that they understood the information—good communication skills, excellent patient counselling/OTC and POM advice.	Good understanding of basic principles.

Table 6.6 – Matrix of elements associated with expert performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Has an extensive clinical knowledge, vast and deep—has knowledge about medicines, diseases, practical aspects of pharmacy and other things such as procedures and conditions, up-to-date.	Knowledgeable—has and demonstrates a greater depth of up-to-date clinical knowledge, often personal in nature. Knows what they do not know and limits of their knowledge and personal professional limitations. Often consults textbooks or other sources for information they need to make sure what they are dispensing is safe, legal etc. Knowledgeable of Pharmacy Schedule/regulations/ loopholes.	Has more, broader experience and working knowledge e.g. ingredients, formulas, stabilities, incompatibilities, suitable bases, preservatives etc. Knows interactions that might be a problem – automatically thinks about interactions and stability when compounding—knowledge very broad.	Broad knowledge—knowledge of, and can demonstrate wide range of aids. Has a comprehensive knowledge of products available and their effectiveness for treating different conditions. Is aware of possible cautions for recommending certain medicines. Can identify a wide range of common ailments/complaints that patients present with and confidently provide treatment or refer when necessary.	Has extensive clinical knowledge—experienced.
Has specialised in a particular field of medicine—has a depth of knowledge in the specific area of specialisation.	Practices over a wide range of specialities and exhibits specialist knowledge of some—has a specialisation.	Able to recognise a potential incompatibility or potential compounding problem by looking at the formula—knows whether additional ingredients would be necessary e.g. suspending agents, preservatives.	Has a specialist area of expertise/area of interest.	Good research skills—retrieves and interprets data.
Has good information sourcing skills—knows where to go to find things out and is able to adapt information to NZ and local situations.				Is proactive in updating drug information on file so that provision of drug information is not always reactive.
Is able to work out these are the facts you need to know and work out where to go from there to complete the problem—know what it is and what to do about it. Integrate background knowledge and recognise importance of apparently unconnected information.				Can evaluate literature/clinical trial data—regularly collates information collected through their work and uses this in a manner to educate and inform outside the immediate sphere that it was originally accumulated—can assess evidence of efficacy and safety.
Recognises and values knowledge of others eg consultants.				
Interprets legislation.				
Is ambitious, dynamic, lively, energetic, has drive—is motivated to learn and achieve more, and to develop their skills.		Is honestly reflective about their own practice and initiates change based on the results of these reflections—adaptable.		
Is willing to take risks and to put themselves in situations that challenge them. They are challenged by their work.				Proactively takes part in peer review and shares with others to build resources and to ensure that they do not practise in a manner that isolates them—initiate peer review settings, encouraging others to share, to achieve and are generally motivating to others.

Table 6.6 – Matrix of elements associated with expert performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is alert, self-aware and self assured—continually self-examines performance, undertakes self audit—is realistic about their goals.				
Is confident and happy in their role, in their own knowledge and in their ability to apply knowledge. They will disagree with others.	Confident—comfortable with knowledge, manner, surroundings.		Shows confidence—experienced.	Comfortable with their ability to advise on quality medicines utilisation in their areas of expertise—good ability to sum up the situation.
Knows limitations prepared to say that's outside my scope.		Knows limits of knowledge of products and procedures and knows where to look to source the answers.	Knowledgeable of limits of knowledge of products though knowledge very broad (through experience)—can determine when necessary or desirable to refer to other health professionals – has knowledge of other agencies that may help patients.	Knowledgeable of limits of knowledge of medicine utilisation, though knowledge very broad or very detailed within a defined area (through experience) and knows when to seek further advice.
Accepts feedback, and is open to new ideas—is actively engaged in and undertakes CPD from interest	Honestly reflective about their professional practice—always wants to learn more.			Has a thirst for knowledge and able to bring knowledge up to speed very quickly—undertakes CPD at a level that extends their knowledge.
Learns from experience and generates new knowledge—is able to adapt to new situations.	Happy to extrapolate known information to an unknown situation to achieve results—can adapt to new situations readily.	Able to apply knowledge practically e. g. to prepare new products—investigates new formula where required.		Able to apply knowledge practically.
Acts as a resource for others—pharmacists and consultants.	Experienced—acts as a resource for others. Likely to be approached by patients, prescribers and colleagues for advice.	Used as a resource by others.	Can advise and teach others—acts as a resource for peers. Gives talks to community groups/GP.	Advises and tutors colleagues and other health professionals—involved in pharmacy and therapeutics committees. Gives talks to GPs and coordinates with IPA regarding prescribing of local GPs. Used as a resource by others In a senior role—advisory
Is able to approach problems from different perspectives—can identify comprehensive solutions and come up with more and unusual ways to deal with a problem. They recognise there's more than one solution.	Excellent problem-solving skills able to identify and solve problems independently.	Excellent ability to identify and promptly solve problems, mostly on their own.		Excellent ability to identify and solve problems mostly on their own.
Is able to think laterally, logically, in different ways.	Thinks outside the square			Sees shades of grey—can think laterally.
Uses a problem-solving rather than blaming approach—considers "wider" picture and is proactive in mitigating potential problems. Has a gut feeling for when things aren't right and acts on it.				

Table 6.6 – Matrix of elements associated with expert performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is confident in decision-making, is prepared to make hard decisions and stand by them—takes responsibility and accountability.	Able to make decisions/recommendations including in unusual circumstances—can make "hard" calls.			Is confident.
Is able to apply knowledge from a range of sources in decision-making and considers "wider" picture—undertakes decision-making from first principles, not making assumptions, practical.	Able to be proactive in decision-making and recommendations regarding patient care—offers a range of solutions.		Has deeper knowledge and can use it—articulate and sensitive.	
Is not pressured into making decisions—know the limitations of their knowledge, do homework to back decisions made, know when to refer or research further.				
Ensures the pharmacy able to operate—acts as a leader, motivates the team and initiates action and has solutions in place for themselves and others. Represents others.	Is involved in writing dispensing procedures and dispensing audits—recognises areas for continuous quality improvement.	Ensures compliance with GMP and audit requirements. Prepares SOPs and master batch sheets. Can maintain plant and equipment.		Develops and implements policies and/or prescribing guidelines/guidelines for medicine utilisation/formularies and audits medicine utilisation against these as part of multidisciplinary team (independence likely to be unsuccessful). Initiates new methods of information storage, retrieval and delivery – is proactive in devising operating systems to enable quick efficient retrieval of information.
Trains staff so can manage customers and difficult situations.	Able to lead/direct a team and train others.	Advises, trains and tutors colleagues.		
Is able to delegate and supervise others.			Supervises others.	
Is a good teacher, mentor and role model. Is able to inspire, mentor and teach others. Passes experiences on, and is not afraid to point out errors made as a learning tool for others. Acts as an educator—more so particularly with medical staff, leads CPD activities.	Teacher/role model.			Likely to be present at conferences or take workshops, member of College—has access to peer groups or equivalent.
Has a positive attitude—sees strengths in others, does not put them down. Provides opportunities for others to develop.				
Understands people and the limitations of others, is quick to help out and to give others a bit of latitude—creates an atmosphere that encourages others to learn from mistakes and share experiences.				
Believes that professional responsibility goes beyond work hours—that it is a vocation/calling not a job. They are passionate about pharmacy.				Likely to have higher qualification in pharmacy e.g. Masters.

Table 6.7 – Matrix of elements associated with competent performance

Competent performance

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is accurate and safe gives correct pills to correct person—can work unsupervised with very few mistakes does job properly, double checks themselves.	Technically very good and accurate—has a consistent standard for dispensing and checking. When dispensing, they check prescriptions for accuracy but often omit clinical checks such as reviewing PMH and patient factors such as renal failure etc. May need to refer to the Schedule when dispensing.	Makes product efficiently to satisfactory standard following standard operating procedures well and efficiently—can calculate formulas. Correctly labels.	Can appraise the appropriateness of a request for a product and how it relates to the patient—listens to patient and knows the right questions to ask patients to determine appropriate course of action and/or treatment—recommends correct OTC products when appropriate.	Able to appraise the appropriateness of a medicine in a given situation for a given patient or group of patients. Confidently reactively questions patient to determine their need for product and to ensure appropriateness. Recommends changes when necessary.
Logical approach, puts good systems in place—knows where mistakes could be made and takes actions to prevent them but may not always pick up usual signs or things going wrong.	Checks clinical appropriateness—patient focused, able to appraise the prescription and how it relates to the patient. Uses computer to check for clinically significant interactions.	Comfortable with their ability to prepare products and maintain plant and equipment. Aware of GMP. Accurately records manufacturing on batch sheets.	Has an holistic approach to the care of their patients and would suggest other health practitioners to customers. Knows limitations and when to refer/ ask another opinion—confidently refers patient to other pharmacy staff or prescriber if necessary. Wouldn't necessarily liaise personally with other health practitioners.	Is methodical and comprehensive in documentation, storage and retrieval.
	Reactively questions patient and prescriber to determine need for the product and to ensure appropriateness.	Appraises the appropriateness of the request for the product and how it relates to the patient—confidently reactively questions patient to determine the need for product and to ensure appropriateness.	Actively uses resources e.g. Self Care cards, available in the pharmacy for providing primary health-care advice to their patients. Re-orders resources when they are running low—searches out further information for patients on request—enthusiastic participant Wouldn't necessarily set up a primary health-care initiative.	Assists with guidelines implementation and audits medicine utilisation against these guidelines as part of a multi-disciplinary team.
Gets things done without too much fuss, stress or mistakes, fast and efficient—do not tend to get too ruffled, hard working, self directed.	Works well within given standard operating procedures—follows and interprets written instructions without assistance. Does what needs to be done and no more—stressed at times.	Can readily prepare a range of commonly prepared pharmaceutical products.		
Is able to prioritise, and manage their time.	Able to prioritise work and manage time—reasonably timely and efficient most of the time.	More task focused.		
Can multi-task—has an ear on what is going on in pharmacy			Capable.	Capable.

Table 6.7 – Matrix of elements associated with competent performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is able to take to ultimate responsibility for what they do—takes personal and professional responsibility.	Works independently for the majority of the time—discusses with other staff before deciding to dispense. Supervision or input from a more senior pharmacist may be required.	Can work independently—knows when to ask for advice.	Confidently advises patient on most appropriate product based on personal knowledge and experience or having obtained assistance from a colleague—can be trusted.	Confidently discusses findings with colleagues or other health-care professionals and suggests most appropriate medicine based on personal knowledge and experience or having obtained assistance from a colleague—able to present information to other health professionals. Endeavours to provide evidence based advice and recommendations.
Practises legally and ethically—complies with Code of Ethics.			Exhibits confidentiality and respects patient's privacy.	Maintains privacy of patient information.
Interacts well with others—patients, and health professionals, cares about people, has good people skills.	Regarded as a valuable resource by customers.		Happy to intervene and add value—interested in patients and has a positive expectation of role.	Respected by colleagues and other health professionals—works to maintain good rapport with other health professionals.
Is a good communicator, is able to disseminate information in language understood by the person communicating to—happy to communicate with other health practitioners.	Able to advise patient and prescriber on how to take their medicines and answer most questions patients may ask about their medicines—does not tend to communicate with the patient as often as an expert performer as they sometimes assume the doctor has given enough information to the patient. Will ring doctor if there are obvious inaccuracies.	Counsels patient—less attention to detail e.g. extra information.	Counsels patient and gives appropriate and accurate advice. Goes through information resources with the patient explaining how they applied to that patient and checking the patient understood the information—good communicator.	Good communicator—able to impart information so that it is understandable to the recipient. Is cognisant of the fact (and acts on this) that pharmacy information often needs to be reengineered to be readable and relevant to the recipient (especially when this is another health professional). Is concise in their communications and documentation.
Knows the questions to ask—understands why questions are asked and knows what sort of answers to expect.		Knows to check for interactions, stability.		
Deals effectively with interventions.	Not as proactive in contacting prescriber and in assessing and managing medication regime—won't necessarily ring doctor with a better alternative for a patient.	Confidently advises patient and prescriber on changes or alternatives to the product based on personal knowledge and experience or having obtained assistance from a colleague.	Can identify interactions/ADRs.	Happy to intervene and add value—picks up errors and corrects them.
Has both in pharmacy and life experience, does not have the same experience as expert.			Experienced in smaller range of various diagnostic and/or aids than expert.	Experienced—likely to have been working at least 2 years post registration
Can evaluate information, look up information from a range of sources and draw conclusions and apply it to situation, does not necessarily openly disagree.				Reasonable clinical knowledge so would pick up most ADRs/common interactions etc.—can provide answers from own knowledge but may not be able to adapt these to current situation without assistance.
Knows limitations of knowledge and when to ask for help—will use contacts.	Knows limits of knowledge.	Knows limits of knowledge of products and procedures—knowledge less broad. Knows where to find information.	Aware of own limitations—knows where to look for answers.	Knowledgeable of the limits of knowledge of medicine utilisation—knowledge less broad or detailed (through experience).

Table 6.7 – Matrix of elements associated with competent performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Knows where to look to find out what do not know—gathers available information together, does research.	Has more generalised knowledge—clinical knowledge often has gaps. Knows where to find information.		Less knowledgeable about other agencies that could help patient but can usually source information/refer on—will know at least two products for each condition that may be treated with pharmacy only or pharmacist only medicines.	Can access information easily and can interpret information from drug companies—knows where to look for information and is confident in this ability.
Able to apply theory to practice.	Able to apply clinical knowledge to practice – more infrequently use other sources to find information than the expert performer.		Has adequate knowledge and can use it—may need to research odd queries and areas of work. May need to ask for second opinion from more experienced pharmacist.	Understands basic principles.
Is able to use variety of problem-solving approaches—recognises when not going down right track and will try an alternative approach.		Able to identify and promptly solve problems on their own or with help from others—if presented with a challenge to make a new product would probably ask other pharmacists elsewhere if product was made there.	Can solve problems mostly on their own or with the help of others.	Able to identify and promptly solve problems, mostly on their own or with the help of others.
	May not always pick up alarm bells that normally an expert would pick up			
Is able to work problem out and to make decisions and defend them—able to make a sole decision, know why decision made. Decisions take into account legal and ethical issues.	Good ability to identify and promptly solve problems either on their own or with the help of others—reactive to problems e.g. identifies the problem but might not always have solutions to offer.			Comfortable in their ability to identify gaps in quality medicines utilisation and suggest remedies in many situations.
Is motivated and able to learn from experience, is actively trying to build skills and learn from experience and others—more confident in their own development, undertakes some CPD.	Is reflective about their professional practice—not as proactive in initiating change.	Is reflective of their own practice but is less proactive about changes that evolve from this.		Able to bring knowledge up to speed quickly—aware of new medicines and keeps up-to-date clinically with reading journals etc. May be studying for higher qualification or have a special interest.
	Is confident and comfortable with knowledge and known situations – may require help with new challenges.			
Has a high personal standards and standards of practice and assesses self against own standards.				Participates in peer review but does not necessarily initiate new types of peer review or collegiality.
Successful—both themselves and for others.	Can teach/guide others in general compounding skills.			
	Able to work as part of a team.			
Is empathetic.				Practises in a holistic manner.

Table 6.8 – Matrix of elements associated with not-competent performance

Not-yet-competent performance

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Does not take an holistic approach –does not take into account all aspects of a persons life that may be impacted on by their advice.		Is task focused—does not see compounded medication as part of overall medication picture. Not holistic in their approach.	Able to undertake basic transaction of a request for a product but not appraise how it relates to the patient—much less confidently reactively questions patient (if at all) to ensure appropriateness (though overconfidence might also be present). Asks minimum questions regarding the problem.	Unable to assess appropriateness of a medicine in any situation either for a given patient or group of patients—does not or ineffectively questions patient to ensure appropriateness.
Is not able to integrate information from range of sources—do not see big picture, all of background.		Able to appraise basic requirements of the request for the product but not how it relates to the patient.	Unable to interpret or gather patient information history.	
Not up-to-date with current processes.	Inexperienced.			
Relies heavily on textbook—does not apply to practical situation, or translate information into something useful.			No awareness of where to source information.	Has to look up answers to questions—may not know where to look to check. Knowledge of interpretation of clinical papers sketchy.
Lacks people skills—reluctant to deal with people, Not confident in dealing with other health professionals—do not build rapport/professional relationships.	At times can be a poor communicator not prepared to counsel patient.	Much less confidently reactively questions patient (if at all) to ensure appropriateness. Would rather someone else questions prescriber.	Hesitant with provision of information – may forget to check for patient understanding.	Poor communication—communications aren't always tailored to meet the needs of recipients.
Is unwilling to hear others point of view.	Not honestly reflective about their practice—does not identify areas they can improve upon.	Does not honestly reflect on their practice.		Is more a recipient of collegial sharing than a participant.
				Does not necessarily take a structured approach to CPD.
Does not have technical skills e.g. calculations.		Needs calculations checked.	Lack experience in diagnosing common complaints such as rashes—not always aware of warning signals and when to ask more questions Lack experience in diagnostic aids—needs to learn how to use them.	
Meets minimum legal requirements—practises at minimum standards or less.		Product may not be of highest possible quality.	May give answers without checking information.	Documentation lacking or inconsistent—can be a bit verbose and not as structured or logically laid out.
		Documents appropriately although batch records may be incomplete.		
		Labels product.		

Table 6.8 – Matrix of elements associated with not-competent performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Uses processes that do not always make sense and are not always logical. Has a particular approach to things—adopts a formulaic approach, works within set parameter.s	Able to appraise basic requirements of what's on the prescription but not how it relates to the patient. Needs to be reminded to check for interactions etc.	Can prepare a limited range of pharmaceutical products.		Advice not always evidence based—may be biased or based on personal opinion or hearsay.
Performance may be unreliable, sloppy, make mistakes, miss things out and not be safe, not doing right checks—not sure if making mistakes.	Processes and dispenses prescriptions adequate but technically variable—dispensing/checking process may not always be consistent/accurate. Checking technique poor and process often not thorough enough which therefore leads to dispensing errors—not trusted/respected. Probably requires constant reference to a prescribing guideline or Schedule as back-up and does not fully understand legal and Healthpac requirements. Not always methodical—do not always work to standard operating procedures.	May need help with preparation and method though knows most formulation techniques and use of common equipment, needs to refer to procedures often—not confident in their ability to prepare products or maintain or use plant and equipment, needs practice.	Wouldn't always think of preventative primary health-care advice that they could offer the patient. Let opportunities to educate patients slip by—inconsistently provides advice and information Either not comfortable or over-comfortable with or sure of their ability to advise on health and medicines in most situations.	May be less structured and organised in their information storage and retrieval.
May not ask all right questions – a bit slap-dash.				
Offers minimum information. Does not give comprehensive answers – may miss one or two points Lacks detail..		Counsels.	Can provide basic lifestyle advice—not always aware of other agencies that could help patient or where to source them.	Either does not or over confidently discusses any findings with colleagues or other health-care professionals and either makes no suggestions on the most appropriate medicine or recommends an inappropriate medicine based on personal knowledge and experience.
Is unwilling to take risks, do things not comfortable with.	Much less confidently reactively questions patient to ensure appropriateness—would rather someone else questions prescriber. Won't take risks or move beyond prescriber's instructions.		Not confident or over confident in dealing with people—not trusted.	
Is not responsive to the individual patient—does not have skills/experience to deal with range of people, multicultural, empathy.	Less patient focused, holistic—more task oriented.		Does not necessarily take an holistic view of the patient's health—focus solely on medications.	

Table 6.8 – Matrix of elements associated with not-competent performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is not able to consistently apply knowledge—less experience, less organised in thinking, do not always realise this is a real life person you're talking about or make adjustment from theory to practice.	Learning to apply theoretical knowledge to clinical practice—may have gaps in knowledge and try to cover these up. May not be overtly aware of interactions between medicines or contraindications.	Less able to apply knowledge practically eg. Recognising incompatibilities—might need to consult references to back up choices made. Not always sure where to find information such as formulas, ingredient information, solubilities, suitable expiry dates etc – may not be aware of appropriate bases for some products.	Either over or under confidently advises patient on product (but not alternatives) based on limited personal knowledge—poor knowledge of OTC products and referral options—not always aware of when to refer. May still be learning about products available for different conditions treated with pharmacy medicines.	Less able to apply knowledge practically—does not understand all factors involved in quality medicines utilisation.
	Less knowledgeable of limits of knowledge.	Less knowledgeable on limits of their knowledge.	Less knowledgeable of limits of knowledge and less able to apply knowledge practically.	Less knowledgeable of limits of knowledge of medicine utilisation.
Uses moral judgments to guide actions—rather than a patient focused approach.				
Lacks confidence in own application of knowledge and is not able to make final decision, take ultimate responsibility, or back their own judgement—needs to get second opinion and passes decision on to others or seeks validation.	Cannot make all decisions or recommendations—will need some supervision/direction from a more senior/experienced pharmacist. Often refers problems to a competent pharmacist—relies on others to identify and solve problems. Needs reassurance/assistance to complete task to acceptable level.	Poor knowledge of expiry dates, GMP.	Lacks confidence—unsure of advice to patients. May require a second opinion/back up to support ideas or suspected diagnosis. May often refer to other pharmacy staff or prescriber rather than undertaking themselves but may also undertake themselves when referral more appropriate.	Does not have the broad experience base to confidently make recommendations to other health professional—needs guidance to interpret evidence. Needs to consult with more experienced/qualified colleagues on procedures in certain situations—unsure of ability to answer questions from GP.
				Either not comfortable or over-comfortable with or sure of their ability to identify gaps in quality medicines utilisation and suggest remedies.
Does not take initiative. Is hesitant, tentative, cautious, unconfident, unsure of job and own abilities, seeks direction and assurance, asks lots of questions, lacks confidence—may say do not think they can do it, worried about ability, ask for help, rely on others – others not confident in them.	Unable to follow/interpret written instructions without assistance Not confident—often stressed.	Needs to discuss with colleague before making product—often needs to obtain assistance from a colleague.	Wouldn't be proactive about initiating the stocking of primary health-care resources and is unlikely to recommend resources outside those currently stocked in their place of work.	Relies on others to identify and solve problems, or identifies them via unfortunate experience.
Does not anticipate problems.		Not able to identify errors, omissions in procedures.	Reactive rather then proactive.	Not proactive—make no extra effort to ensure medicines are taken safely.
Can identify problem but does not look at and weigh up all alternatives—makes judgments without all the information.	Either over or under confidently advises patient and prescriber on appropriate medicines use based on limited personal knowledge.	Relies on others to identify and solve problems or identifies them through unfortunate experience.	Relies on others to identify and solve problems, or identifies them through unfortunate experience.	Still acquiring clinical knowledge—needs to check for ADRs, interactions.

Table 6.8 – Matrix of elements associated with not-competent performance (cont'd)

Professional competence	*Dispense medicines*	*Prepare pharmaceutical products*	*Provide primary health-care*	*Contribute to rational use of medicines*
Is not able to multi-task effectively, not able to use time effectively, lacks focus, dithers—takes longer to do things.	Take a long time to complete tasks—poor time management.	Methodical but slow—takes more time to prepare product.		
Is not able to work independently.	Requires supervision.	Needs reassurance and supervision.	Needs mentoring and support.	Needs mentoring and support—needs to be supervised.
	Able to work as part of a team.			
Is not good at prioritising.				
Can't take directions, instructions.				Is unaware of guidelines and does not work as part of a multi-disciplinary team.

6.3 Analysis of themes for professional competence

Once the matrix of elements matched against constructs was complete, the elements were then synthesised into single themes that represented the major attributes associated with the expert, competent and not-competent performance of pharmacists. These themes were fashioned to encompass the characteristics that were common across all the constructs—professional competence, dispensing, preparing pharmaceutical products, contributing to the rational use of medicines, and providing primary health-care—in order to synthesise a statement, or group of statements, that was generic, that is, not specifically related to a single function.

The representative themes were then mapped against the professional competence framework described in section 5.4. In undertaking this task, each thematic statement extracted from the matrix was assigned to one of the following categories:

- meta-competence
- technical/functional competence
- knowledge/cognitive competence
- personal/behavioural competence
- values/ethical competence
- business competence.

As with the extraction of elements from the transcribed interviews and questionnaires, this grouping against the analytical framework was undertaken only by the researcher. Relying on a single person's interpretation of the themes in determining how these should be allocated to framework components could introduce researcher bias into the process and impact on the objectivity of the process. This has been taken into account in the research design by asking an "expert panel" to validate the model developed, to explain the themes and by testing the model with a wide range of expert, experienced and novice pharmacists. This is discussed in Chapters 7, 8 and 9. Having said that, the data extracted from this phase of the research were remarkably consistent across all respondents and so a great deal of interpretation of participants' comments was not required.

The results of the mapping exercise are summarised in Table 6.9 and further discussion follows the table. Those themes identified as important in differentiating performance by the 20 participants in step one of the research are marked with an asterix *.

Table 6.8 – Map of the professional competence framework

Meta-competency—Practise Pharmacy in a Professional Manner elements

Expert	Competent	Not-yet-competent
Is proactive with recommendations and information	Able to make decisions and defend them, know why they have made that decision*—able to make a sole decision	Not able to make a final decision or sole decision—lack confidence in own application of knowledge and decision-making, need to get second opinion
Is prepared to make hard decisions and stand by them—take responsibility and accountability	Able to take ultimate responsibility for what they do*	Not able to take ultimate responsibility, or back own judgement – pass on to others or seek validation
Confident and happy in their role, in their own knowledge and their ability to apply their knowledge and in decision-making. Will disagree—alert, self-aware, self assured, trusted and respected—more so than others*	Able to take personal responsibility	See in black and white—do not see shades of grey, or value of others experiences. See only one way to sort problems out
Not pressured into making decisions – know limitations of knowledge, do homework to back decisions made, know when to refer or research further	Able to take professional responsibility*	Able and enthusiastic to learn—extend their knowledge, both general and practice (if not able to learn will never be competent). Have drive and passion
Willing to take risks—put themselves in situations that challenge them, challenged by work	Know limitations of knowledge and when to ask for help, will not necessarily openly disagree—will gather available information together, do research *	Hesitant, tentative, cautious, unconfident, unsure of job and own abilities, seeking direction and assurance, asking lots of questions, lack confidence – may say do not think they can do it, worried about ability, ask for help, rely on others—others not confident in them
Interested in what they are doing and motivated to achieve more and learn more/develop their skills—ambitious, dynamic, lively, energetic, has drive*	Able to work problems out but will get stumped earlier on in process than expert—refer to others	Not willing to sort problem out on their own—seek help
Learns from experience, accepts feedback, open to new ideas—continually self examines performance. Conducts self-audit, is self-aware, knows limitations, prepared to say that's outside my scope, realistic about their goals*	Motivated and able to learn from experience, evaluate own performance, actively trying to build skills and learn from experience and others. More confident in their own development, undertake some CPD, maybe erratic	Do not take initiative—won't ask for help
Professional responsibility goes beyond work hours—passionate about pharmacy and see it as a vocation rather than a job*	Happy to stay where they are—job is a job, not open to new endeavours, not as dedicated	False confidence, bravado—may try to hide things, do not recognise they are not-competent
Undertakes CPD from interest—actively engaged and spends more time on it	Confident but less assured than expert. Know they have done the job right. More subservient	Not able/willing to learn—think that what they know is all that is needed, does not learn from mistakes, ignorant, does not ask for help/advice
Able to approach problems from different perspectives—identify comprehensive solutions, come up with unusual ways to deal with a problem.* Have more solutions – recognise there is more than one solution	Keep up to date. Open to new ideas	Can identify problem but not solution
Looks after the whole person – holistic care, focused on patient not disease	Able to use a variety of problem-solving approaches – recognise when not going down the right track and try alternative approach	Overconfident, arrogant—think know everything, do not check themselves, may not recognise own limitations, reckless
Able to work out these are the facts you need to know and work out where to go from there to complete the problem—know what it is and what to do about it, integrate background knowledge, recognise the importance of apparently unconnected information*	Sees things as black and white—very absolute	Do not look at and weigh up all alternatives—make judgments without all the information
Looks beyond the surface of things	Identifies and deals with problems with known approaches and does not go further—may try to bluff	Unwilling to take risks or do things not comfortable with
Able to recognise that you're not always right/infallible and be able to live with that	Reactive	Not able to recognise that you're not always right and able to live with that

Table 6.8 – Map of the professional competence framework (cont'd)

Expert	Competent	Not-yet-competent
Make high level organisational decisions—responsible for protocol and policy development	Successful—both for themselves and others	Engages in sporadic training
Recognises that their advice is important and can make a difference to peoples lives and is responsible around that—cares about the consequences	Not as trusted as expert—do not generate same confidence in patients or other health professionals	Unhappy, unfulfilled
Able to do the job—is in control		Do not anticipate problems
Is respected*		Not able to work independently

Functional/technical competence elements

Expert	Competent	Not-yet-competent
Able to provide a "wider" service, holistic approach—provides extras, anticipates and deals with potential problems, and offers an enhanced service. Sees the "wider" picture	Able to apply theory the practice*. May have a perfunctory, formulaic approach and act like a super qualified technician. Can implement processes but does not derive processes and theories	Not able to apply theory to practice—lack detail
Logical and comprehensive approach to problems and processes—methodical and thorough, able to multi-task*	Provides a basic service, does what is in front of them—not as thorough or to the same extent as expert. May have to ask for help	Processes not always logical, particular approach to things—formulaic approach, work within set parameters
Timely approach—get the job done with a minimum of fuss, focused and less easily distracted from the task at hand	Logical approach, puts good systems in place—more so than not-yet-competent person. Knows where mistakes could be made and takes actions to prevent them	Processes used do not always make sense—sloppy, may miss things out
Do things swiftly and proficiently—accurate and straight forward, do not miss steps—manage high pressure situations	Do the job but do not go the extra mile—9 to 5 service and go home at end of day, bare bones but more comprehensive than not-yet-competent. Follows rules, routines and does not add extra dimension. May not pick up usual signs or things going wrong	Not up to date with current processes. May be a good source of knowledge about past practises
Very patient-centred, go the extra mile—have extra mile attitude, looks around to see if there are things around the task that need to be done*	Get things done without too much fuss, stress or mistakes, fast and efficient—do not tend to get too ruffled. Hard working and self directed*	May not be safe, not doing right checks—not sure if making mistakes
Considers "wider" picture and is proactive in mitigating potential problems—alert to changes and will double check to ensure its OK	Is accurate and safe, gives correct pills to the correct patient—does job properly, double checks themselves*	Unreliable performance, not able to be trusted—performance not able to be duplicated e.g. calculations. Require supervision, make mistakes, forgetful
Able to prioritise from the patient point of view	Technically accurate and can work unsupervised. Make very few mistakes*	Not able to keep up in the job—trying to do too much, need to focus on job more, not able to multi-task effectively, not able to use time effectively, lack focus, dither
Follows through on everything including difficult stuff—problem-solving rather than blaming approach, does not leave things	May not be able to multi-task – not as focused, more preoccupied	Do not have the technical skills e.g. calculations
Very careful—set systems up to ensure everything is checked and double checked where necessary	Not as patient-centred	Take longer to do things
Manage patient expectations	Can multi-task—have an ear for what is going on in the pharmacy	Not good at prioritising
Focused	Not as focused	Rushing through things—not making sure things are right

Table 6.8 – Map of the professional competence framework (cont'd)

Personal/behavioural competence

Expert	Competent	Not-yet-competent
Acts as an educator—more so particularly with medical staff, leads CPD activities	Knows the questions to ask—understands why questions are asked and knows what sort of answers to expect	Reasonable communicator, but less direct in what they are saying or advice they give—talk to rather than communicate with others. Less effective in communicating
Good/expert communicator, listens and transfers information, pitches to the right level—willing to talk, patient. Understands context and content. Better than competent or not-yet-competent. Counsels every time gives a prescription out*	Interacts well with others—patients and health professionals. Cares about people, good people skills*	Offers minimum
Asks other people for their opinion, welcomes peer support. Good team worker and works with others rather than for or against*	Time management—able to prioritise, manage time	May not ask the right questions—a bit slap dash
Able to inspire and teach others—good teachers and role models. Pass on experiences, not afraid to point out the errors they have made as a learning tool for others	Acts as an educator	May try to cover up what they do not know—B/Sing, put on a veneer of knowing things, bravado
Understands limitations of others, quick to help out and give others a bit of latitude	Supervises others	Can't take directions, instructions
Positive attitude—see strengths in others, do not put them down. Does not get wound up, relaxed in the job, do not let things overwhelm them. Create an atmosphere that encourages others to learn from mistakes and share experiences	Able to ask for help with decisions	Cope inside themselves –stay isolated, do not interact with others
Nice people, able to remain human – not arrogant, non-threatening, approachable, willing to share	Good communicator, able to disseminate information in language understood by who they are communicating with. Happy to communicate with other health professionals*	Unwilling to hear others points of view
Mentors—willing to help others who may be having problems, guide you to what you want to know, offer opportunities to learn/develop beyond competency*	More commonly ask question why?—some gaps in communication e.g. not always able to contextualise communication. May push point rather than listen	Formulaic approach, not as responsive to the individual patient e.g. multicultural, empathy—do not have skills/experience to deal with range of people
Welcome customer feedback	Not as much empathy	Lack communication skills (not-competent)—not listening, thinking so hard can't listen, talk over the top of people
Transparent—do not try to cover up	Able to manage stress levels	Lack people skills—reluctant to deal with people
Good people skills, relates well to people—able to build relationships and get alongside people and go the extra mile. Has empathy. Reads body-language and able to judge when to standoff a bit and adjust response in response to feedback. Able to deal with difficult customers. Put more into interaction and lead it rather than just responding*	Not as confident in dealing with others—particularly consultants or senior people	Nor confident in dealing with other health professionals—do not build rapport/professional relationships
Confident in their dealing with other health professionals—is willing to talk, build relationships and have really good rapport with other health professionals. Strong professional relationships	Not as aware of impact of self on others	Not independent in work—need help, require mentoring
Down to earth, practical have common sense	Not as confident/willing/effective in building relationships with specialists/consultants that work at a higher level	Poor English
Understands people	Able to mentor	Understanding of people not as good
Balances own needs with needs of the patient	Deal effectively with interventions	

Table 6.8 – Map of the professional competence framework (cont'd)

Expert	Competent	Not-yet-competent
Can handle difficult situations—do not lose their cool	Has basic counselling skills—gives basic information but does not go the extra mile to ensure the patient understands the background	
Able to adapt to new situations, has maturity, is practical and down to earth.		
Represents others—acts as a leader, motivates the team and initiates action		
Supervises others		
Able to delegate		

Knowledge/cognitive competence

Expert	Competent	Not-yet-competent
Extensive clinical knowledge, vast and deep—sound base. Has more knowledge about medicines, diseases and other things. Is up to date*	Fairly good basic knowledge, good foundations knowledge—not as much as expert but more and greater breadth than not-yet-competent. Knows enough to do the job but extra bit is missing*	Have base/good knowledge but not the breadth of knowledge to understand whole system—lack knowledge in some areas breadth/depth, large gaps in some areas
Able to apply knowledge from a range of sources inn decision-making and considers the "wider" picture—decision-making from first principles, not making assumptions. Practical, focused on the topic and able to apply information to NZ and local situations*	Know where to look to find out what do not know—will use contacts*	Do not recognise inter-relations in knowledge
Specialised in a particular field of medicine—have depth of knowledge in the specific area of specialisation	Can evaluate information, look up information from a range of sources and draw conclusions and apply it to a situation	Not able to consistently apply knowledge—less experience, less organised in their thinking and do not always realise that this is real person you are talking about and adjust theory to practise
Comprehensive knowledge of procedures and conditions—understands the issues and has common sense	Has more experience both in pharmacy and life but does not have the same experience as expert*	Learning where to look up information and how to evaluate it—have basic research/information access skills but less critical appraisal of information
Understands practical aspects of pharmacy e.g. making formulations suitable to a patient	Good understanding of pharmacy	Rely heavily on textbook—do not apply this to real situations or translate information into something useful
Experience both in pharmacy and life and balances the two. Learns from experience and generates new knowledge*	Does a basic clinical review—does not look at the whole picture, the big overview or to the same depth	Only accesses obvious information sources—if they are not there do not know where to go
Recognises and values the knowledge of others e.g. consultants*	Recognise that pharmacy is about real people ion real situations	Do not give comprehensive answers—may miss out one or two points
Able to give more than basic information—broader understanding, understands questions raised	Does not apply their knowledge/skills to every case	Not able to integrate information from a range of sources – do not see the big picture, all of the background
Able to think laterally, logically, in different ways, and extrapolate things to whatever is being done at the time	Not as confident in the use of their knowledge	Do not take a holistic approach—do not take into account all aspects of a person's life that may be impacted by their advice
Looks ate the whole picture and does a really good patient history and clinical review—correctly thinks about the medications from the context of the patient. Applies knowledge to that particular person in a considered manner to get the best outcome for the patient and recognises that medication is different for different people—individualises treatment*		
Acts as a resource for others—pharmacists and consultants		
Has a "wider" knowledge-base of pharmacy, the broader health environment and other things—able to integrate knowledge with practise*		
Has good information sourcing skills		
Recognises constraints of the system		

Table 6.8 – Map of the professional competence framework (cont'd)

Values/ethical competence

Expert	Competent	Not-yet-competent
Makes ethical decisions	High standards of practice	Practises at minimum standards or less
Extremely ethical—instinctively covers Code of Ethics	Practises legally and ethically—compiles with Code of Ethics	Meets minimum legal requirements
Takes time to do things right, done properly—do not take shortcuts	High personal standards	Bends the rules
Honest*	May not enjoy people as much	Not moral
Transparent in dealings with public and fellow professionals	Prefers a more background role	Uses moral judgments to guide actions—rather than a patient-focused approach
Cares about and is involved in the community	Assess self against own standards	
Cares about people and wants to help	Decisions take into account legal and ethical issues	
Professional in every respect		
Builds trust		
Wants to do a good job and get the best outcome for the patient—altruistic and works to the highest possible standards*		
Have a gut feeling for when things aren't right and act on it		
Interprets legislation		

Business competence

Expert	Competent	Not-yet-competent
Ensures the pharmacy is able to operate and puts solutions in place for themselves and others		
Trains staff so they can manage customers and difficult situations		
Represents pharmacy on lost of committees—is the face of the pharmacy		
Has a more varied role—trusted with a higher responsibility of activity		

* Those themes identified by participants as most important in differentiating performance

6.4 Limitations of the analytical approach

The result of this exercise was a comprehensive map of professional competence containing descriptive themes associated with different levels of performance across each of the competencies of the amended Cheetham and Chivers professional competence framework. A number of issues, however, arose in undertaking this exercise.

Firstly, in the mapping exercise, allocation of the thematic statements to one competency was an arbitrary exercise. While some themes mapped easily onto a single competency, many could easily have been assigned to more than one. For example, "follows through on everything including the difficult stuff—has a problem-solving rather than blaming approach, does not leave things" was allocated to technical competence but it could equally have been assigned to the meta-competency or personal/behavioural competence.

Secondly, very few of the themes characteristic of a level of performance contained only components of a single competence. Most contained aspects of more than one competency. For example, the statement "Is happy and confident in their role, confident in their knowledge and in their ability to apply that knowledge in making decisions" is made up of aspects of at least three of the competencies in the theoretical framework, namely cognitive competence, meta-competence, and behavioural competence. This suggests that competent performance requires the ability to integrate the separate competencies contained in the theoretical framework. Another example of this is the theme "knows the questions to ask, understands why questions are asked and knows what sort of answers to expect", which was allocated to the personal/behavioural competence group because it required communication skills. Competent performance also requires, however, cognitive skills and so the theme could equally have been allocated to the knowledge/cognitive competence group.

Thirdly, few of the elements extracted from pooled interview and questionnaire data or the themes synthesised from these, could be mapped against business competence. Themes such as "gets things done without too much fuss, stress or mistakes" and "is

able to prioritise", however, could be mapped against a component conceptualised as "organisational capability" that would encompass the concept of business competence, but also broaden the concept.

Fourthly, expert performance appears to be differentiated from competent performance not by taking on different roles or tasks, but rather by taking on roles and tasks at a deeper and more holistic or complex level. Expertise, for example, appears to be characterised by the ability to individualise treatment approach for each patient, taking into account their particular circumstances and making use of a wide range of knowledge and experience. This is consistent with theories of expertise, discussed in section 2.2.

Fifthly, the context in which a pharmacist practises, for example, community pharmacy or hospital pharmacy, has very little impact on the elements or themes identified as differentiating expert from competent performance. The elements reported by participants in both the interview and questionnaire were remarkably consistent and did not appear to be unduly influenced by the participant's practice context. While it can be expected that such contextual elements will impact on knowledge and its creation, as discussed in sections 3.2 and 3.3, the way these impact on behaviours appears not to be so marked.

Finally, specialist performance—while contributing to expert performance—is not the same thing as expert performance. Thus, a practitioner could be a specialist without necessarily being an expert when considered from the construct of professional competence.

While some difficulty was experienced in mapping the themes and elements onto the component competencies of the professional competence framework, they all could be accounted for and this suggests that the theoretical map of professional competence and the framework underpinning it that was used for the analysis has some validity.

Indeed, the results suggest that, in essence, professional competence arises from the ability to integrate technical and personal knowledge with technical and interpersonal skills, organisational ability, legal and ethical ways of working, and strong self-

awareness, confidence, and willingness to engage in ongoing learning. That is, competent performance appears to require a practitioner to use the competencies contained in the professional competence framework in an integrated, holistic, and complex manner rather than using them in isolation or in ways accounted for by theories of complicated ways of working.

These results suggest that a new model of professional competence is needed. The difficulties arising in the mapping exercise point to a fundamental flaw in compiling this map as a holistic representation of professional competence, which is based on the premise that professional competence is a complicated system. This suggests that complex thinking should be used and the integration of the competencies explored.

The complex model of professional competence developed from this complex approach is described in the next chapter.

Chapter Seven
A complex, holistic model of professional competence

When modelled, the data extracted from the exploratory interviews and questionnaires suggest that while the competence framework, and its underpinning amended Cheetham and Chivers model, have been useful for analytical purposes, they have not been able to provide an accurate model that explains pharmacist professional competence. Instead, the results suggest that a complex model of professional competence, focusing primarily on the traits of professionalism rather than the specific skills and knowledge associated with discrete tasks, could provide a more accurate conceptualisation of professional competence.

In this chapter, the attributes of such a model are explained along with the process used to determine its face validity

7.1 A complex model

In this complex model, the construct of professional competence cannot be understood or described merely by understanding the component parts. Instead professional competence is defined as a complex construct—an entity in its own right—which, while made up of component parts that describe functional performance, is more than the sum of these parts. The complex model of professional competence developed to explain the research data is constructed from five overlapping "holons"—complete entities embedded in other complete entities, which describe "domains of competence".

The core construct of this model is that professional competence and expertise are accounted for by the ability of the practitioner to integrate the knowledge, skills and attributes associated with these five "domains of competence": professional knowledge and cognitive skills, intra and interpersonal skills, technical skills, legal and ethical behaviour, and organisational skills.

This model is shown in Figure 7.1.

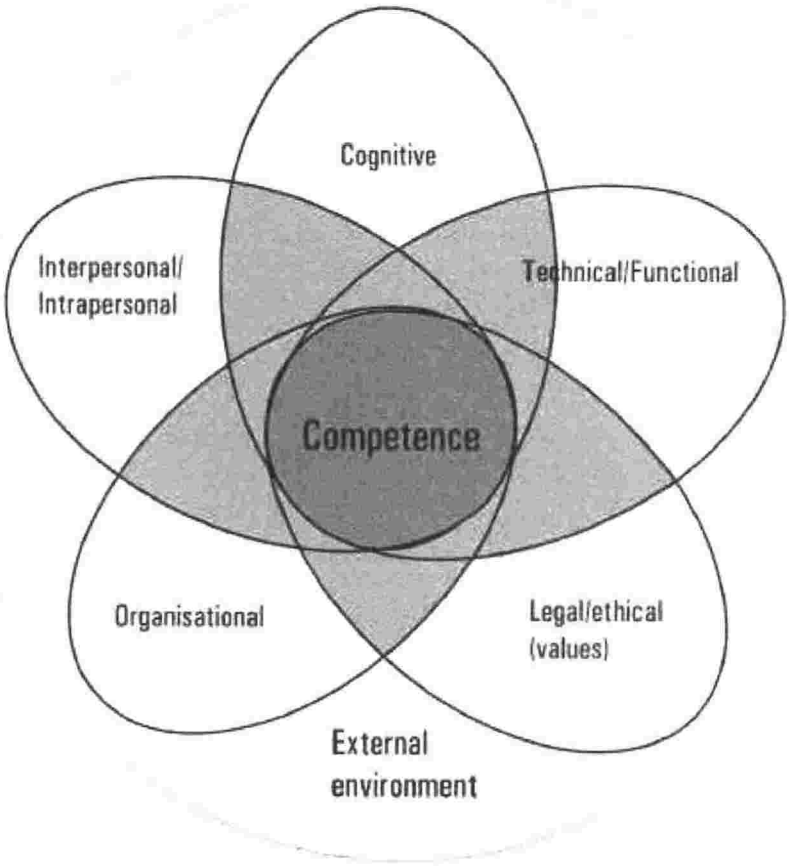

Figure 7.1 – Model of professional competence

7.1.1 The "holons"

The holons or "domains of competence" are the:

- cognitive domain,
- technical/ functional domain,
- intrapersonal/interpersonal domain,
- organisational domain; and
- legal and ethical domain.

Each of the five domains is whole and complete in itself and contains the knowledge, skills and attitudes needed to perform tasks and functions associated with that domain. For example, the cognitive domain contains the technical knowledge associated with pharmacy, such as knowledge of medicines and how they impact on the body. It also

includes personal knowledge and cognitive skills such as thinking, skills, evaluation skills and problem-solving.

The technical domain contains the psychomotor skills associated with dispensing medicines or preparing pharmaceutical products, and in the area of overlap with the cognitive domain, the cognitive, technical skills—among other things—to calculate dosages and quantities for the preparation of pharmaceutical products, to interpret prescriptions, and to develop formulations.

The legal/ethical domain contains, among other things, knowledge of laws that impact on pharmacy, the ability to work ethically by interpreting and applying the laws and the profession's code of ethics, and the ability to work in socially and culturally appropriate ways. In the area of overlap with the intra/interpersonal cognitive, and technical domains, the skills associated with this domain enable the pharmacist to communicate about medicines in culturally appropriate ways.

The organisational domain includes, for example, the ability to source information about medicines and to manage the conflicting tasks required in pharmacy practice. When integrated with the technical domain it enables the pharmacist to organise their work so that dispensing is orderly and mistakes are minimised, and when integrated with the cognitive domain, it enables the pharmacists to source and interpret new information about medicines.

The intra/interpersonal domain includes the ability to communicate with patients so as to understand their health needs and to ensure they understand how to take their medicines. It also includes the skills and attributes of knowing oneself, one's strengths, weaknesses and limitations. This domain accounts for the willingness of a competent professional to engage in reflective practice and continuing professional development (CPD).

When integrated with the other domains, the intra/interpersonal domain enables pharmacists to make decisions with confidence, to know their limitations, referring to others where necessary, and to work as part of a team. When integrated with the

technical domain, it enables a pharmacist to check their own work and to reflect on and improve the processes they use.

Each of the domains is expressed on a bipolar continuum that reflects the degree to which the skills, knowledge and attitudes associated with the domain are integrated with other domains. At one end of each domain continuum, the skills and knowledge associated with that domain are used by the practitioner in isolation from the skills and knowledge from the other domains. At the other end of the continuum, the skills and knowledge of the domain are fully integrated with those of all the other domains. A practitioner may operate anywhere along each of these continua, but it is only when they are able to integrate the skills, knowledge and attributes associated with the separate domains together that they can be considered professionally competent.

Thus, in this complex model, professional competence is defined by the overlap of the domains. For each practitioner the behaviours associated with professional competence will be exhibited within a social, cultural, and professional milieu that is the environment in which they practice; this is indicated in Figure 7.1 by the outer circle. As such, the way in which professional competence is exhibited will be situational; however, what differentiates the competent professional from the mere technician is the ability to bring all the domains together in a seamless manner.

7.1.2 Professional competence

The model determines that to be professionally competent, the practitioner must have the skills, knowledge and attitudes associated with each of the domains, and be competent in performing each of the requisite functions associated with the profession. They must also be able to integrate the domains and apply the integrated components in the situational and functional context in which they are working. For example, for a pharmacist to be professionally competent he or she must be able to use professional and personal knowledge to undertake the technical tasks associated with the role, to communicate with patients and other health professionals, to make decisions using such knowledge that are legal and ethical, and to ensure all of this is done effectively and efficiently with a minimum of stress.

Conceptualising competence in this way suggests that when not-competent performers first begin to practise, they use their skills and knowledge without fully integrating them with other domains. As they become more familiar with their role and more competent, they are able to integrate the skills associated with a particular domain with skills contained in other domains. In this way they progress from not-competent to competent performers. On the other hand, as competent performers develop into experts, their ability to integrate the domains becomes even more proficient. This thinking is consistent with the findings of other researchers exploring the nature of expert performance, which is covered in section 2.2.

In this model, professional competence is integrative and can be explained by behaviours that describe the outcomes observed when a practitioner demonstrates his or her ability to combine the domains of competence. These behaviours show three levels of competence.

7.2 Levels of professional competence

The research method used enabled three levels of professional competence to be defined. These are competent, not-competent and expert performance. The model also enables specialist performance to be differentiated from expert performance. These levels are discussed further in this section.

7.2.1 Competent performance

Mapping the behaviour statements associated with competent performers against the model showed that the majority of the themes extracted describe the integration of the five domains of competence defined by the complex model of professional pharmacist competence. For example, competent pharmacists will integrate the cognitive, interpersonal, technical and legal/ethical domains in order to:

> ... make decisions, know why the decision is made and defend them. They will gather available information and do the necessary research. They take responsibility for their decisions.

Competent practitioners will integrate the cognitive with the intra/interpersonal domains in order to demonstrate that:

> he/she knows the limitations of their knowledge and knows when to ask for help.

Competent practitioners will also integrate the cognitive, technical, organisational and inter/intra-personal domains to establish that:

> they are motivated and able to learn from experience, to evaluate their own performance and actively build their skills and learn from the experience of others. They are more confident in their own development and undertake some CPD.

Some of the themes extracted from the research, for example, "is proactive" were applicable across all domains and, as such, are examples of fully integrated behaviour. These sit firmly within the central area of overlap in the model as shown in Figure 7.1.

7.2.2 Not-competent performance

A review of the themes and behaviour statements that typified not-competent performance found that what sets not-competent performance apart from competent performance was the lack of ability to fully integrate the domains of competence. This is reflected in the professional competence model where not-competent performance is accounted for by a lack of full integration of the domains of competence.

To illustrate this further, the following statements extracted from the research show how lack of integration was an indicator of lack of competence. A not-competent performer lacks the ability to integrate the domains when they:

> do not take a holistic approach and do not take into account all aspects of a person's life that may be impacted by their advice. They do not see the big picture, or all of the background.

> are not able to consistently apply knowledge. They have less experience, are less organised in their thinking, and do not always realise that this is real person they are talking about and adjust theory to practice.

are not able to integrate information from a range of sources.

do not recognise interrelations in knowledge.

Not-competent practitioners may also show that they lack ability in one or more of the domains, for example when they:

do not give comprehensive answers—they may miss out one or two points.

only access obvious information sources. If they are not there do not know where to go.

rely heavily on textbooks—do not apply them to real situations or translate information into something useful.

are learning where to look up information and how to evaluate it. They have basic research/information access skills, but are less able to critically appraise the information.

have a good base knowledge, but not the breadth of knowledge to understand the whole system—lack knowledge in some areas, breadth/depth, and may have large gaps in some areas.

All these statements suggest that if practitioners are not able to fully integrate the domains, or if they lack the requisite skills, knowledge or attitudes in one of the domains they are not-competent. For example, if people cannot speak English, or do not have an in-depth knowledge of medicines, or are not up-to-date with legal requirements for the job, then they are not professionally competent—even if they can dispense medicines or prepare pharmaceutical products adequately. Thus, not-competent performance will be distinguished from competent performance by behaviour that demonstrates non-integration of the domains of competence, for example, exhibiting non-moral or illegal behaviour, inability to speak English, lack of up-to-date knowledge, or inability to perform calculations.

7.2.3 Expert performance

The statements that typified expert performance in phase one of the research indicated that expert performance was differentiated from competent performance by the ability of experts to:

> approach problems from different perspectives—identify comprehensive solutions, and come up with unusual ways to deal with a problem. They have more solutions and recognise there is more than one solution.

> work out these are the facts you need to know and work out where to go from there to complete the problem—know what it is and what to do about it, integrate background knowledge, and recognise the importance of apparently unconnected information.

> relate well to people and have good people skills—build relationships and get alongside people and go the extra mile. Have empathy. Read body-language and are able to judge when to stand off a bit, and to adjust response in response to feedback. Deal with difficult customers. Put more into interaction and lead it rather than just responding.

The research results showed that expert performers exhibited behaviours that showed they integrated the domains of competence more often in their practice and/or integrated them in a more comprehensive way, demonstrating a higher level of performance. Thus, expert performance was distinguished from competent performance by a higher level of integrating the knowledge, skills and attitudes contained in each of the domains.

Statements drawn from the research that describe the integrated nature of behaviours, typifying expert performance, include:

> They are able to provide a "wider" service and have an holistic approach. They provide an extra level of service, and anticipate and deal with potential problems. They look beyond the surface of things.

> They are able to apply knowledge from a range of sources in decision-making and consider the "wider" picture. They are practical and can undertake decision-making from

first principles without making assumptions. They are able to adapt information to New Zealand and local situations.

They are good/expert communicators, listen and transfer information, pitch to the right level—willing to talk, patient. Understands context and content. Better than competent or not-yet-competent. Counsel every time give a prescription out.

They are able to approach problems from different perspectives—identify comprehensive solutions, come up with unusual ways to deal with a problem. Have more solutions—recognise there is more than one solution.

They are able to work out these are the facts you need to know and work out where to go from there to complete the problem—know what it is and what to do about it, integrate background knowledge, recognise the importance of apparently unconnected information

In the model, expertise is accounted for by the degree of overlap between the domains of competence. In expert performance there is a larger and deeper degree of overlap in the domains than is seen with competent performance. In demonstrating this expertise, an expert performer is able to integrate across all the domains of competence at this higher, more comprehensive level.

This is illustrated in Figure 7.2.

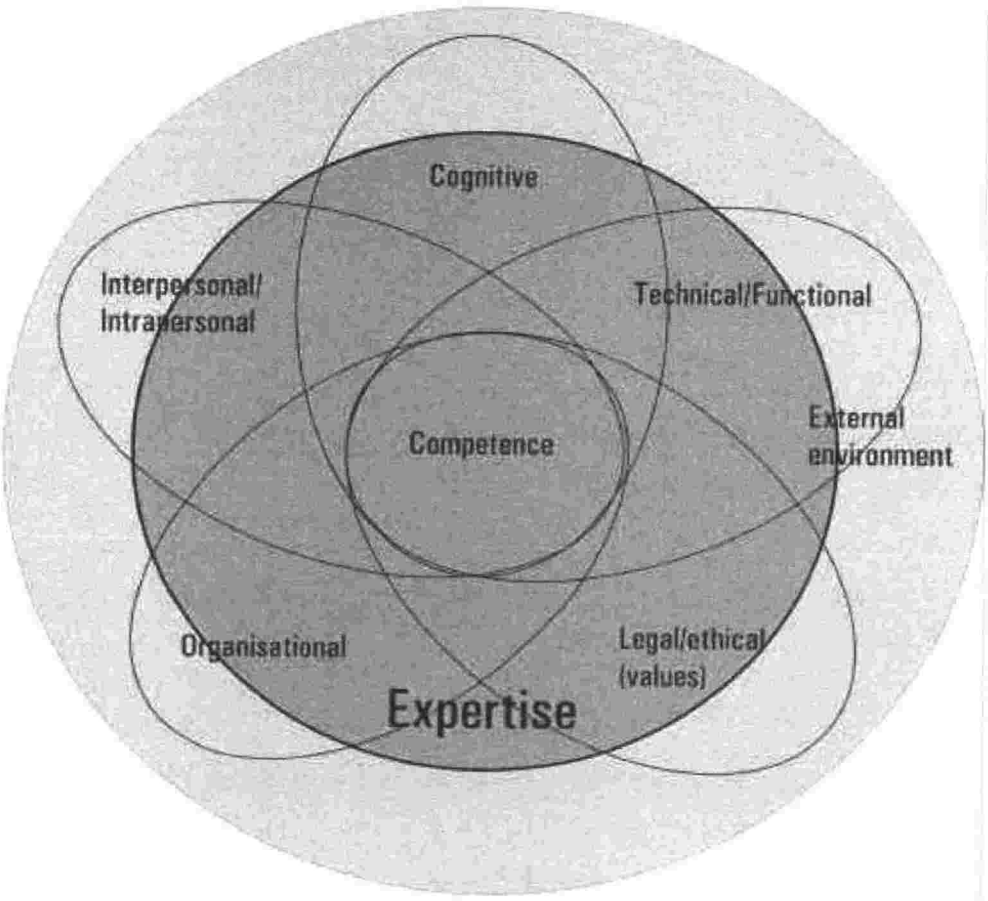

Figure 7.2 – Model showing expert performance

7.2.4 Specialist performance

Analysis of the research data collected from the interviews and questionnaires suggests that specialist performance is different from expert performance. While experts integrate all the domains of competence at a higher level, specialist performance is characterised by a high capability in only one or two of the domains. Typically quoted in the interviews was the statement that these people had specialised knowledge in an area and could apply that to their practice. For example:

> They have specialised in a particular field of medicine – have a depth of knowledge in a specific area of specialisation.

This suggests that if the overlap between the domains were mapped for a specialist performer, there would be a misalignment seen in the overlap of the domains. For example, a specialist may have a great deal of clinical knowledge, but may not

necessarily have the intra- or interpersonal skills to use it in a practice context. Such a practitioner would be a specialist in providing medicine information.

This is illustrated in Figure 7.3.

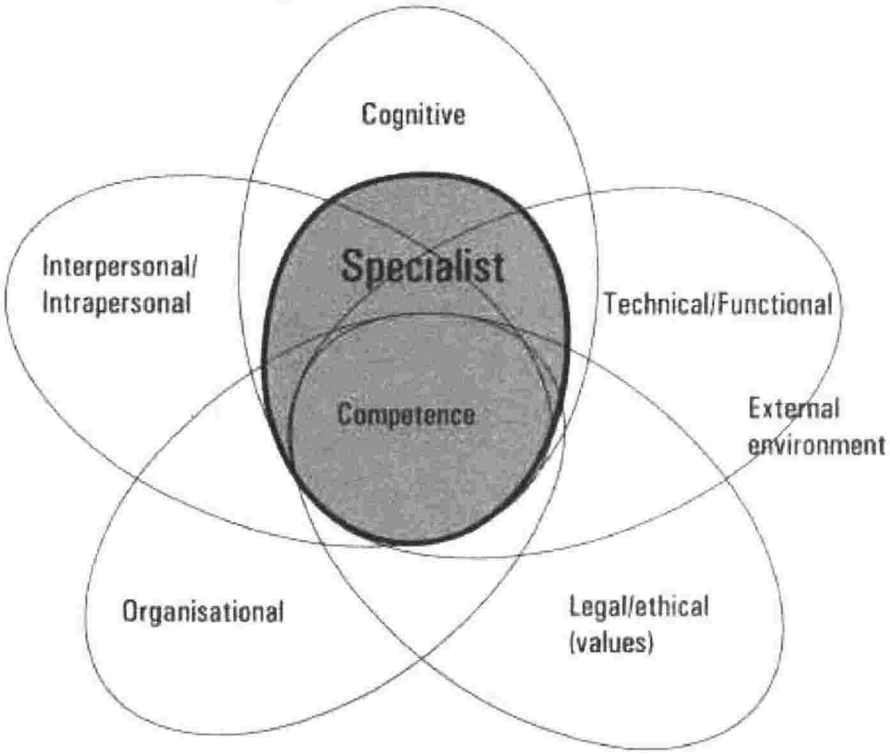

Figure 7.3 – Model showing specialist performance

Similarly, a pharmacist with a higher level of performance in the organisational domain would be a specialist manager. Specialisation is most likely to arise as a result of the practice context in which a pharmacist works. For example, a pharmacist who works in the manufacturing side of the pharmaceutical industry may well be required to have a strong focus on the technical/functional domain when performing their role.

7.2.5 The impact of function and situational context

Comparing the behavioural statements for different functional roles, as shown in Tables 6.6, 6.7 and 6.8, demonstrated that most of the behaviours that typified competent performance were equally applicable to all the functions pharmacists

commonly perform. For example, the following statements come from Table 6.7 and describe behaviours of a competent practitioner when he or she demonstrates practise pharmacy in a professional manner:

> He/she is able to provide a "wider" service and has an holistic approach. They look after the whole person and practise holistic care, focusing on the patient, providing extras. He/she anticipates and deals with potential problems and looks beyond the surface of things.

When he or she dispenses medicines:

> He/she looks at the whole picture and does a really good patient history and clinical review by proactively and reactively questioning patient. He/she correctly thinks about medication from the context of the person and applies knowledge of the medicine to that particular person in a considered manner to get best outcome for patient. He/she recognises that medication is different for different people, individualises treatment.

When he or she prepares pharmaceutical products:

> He/she critically appraises the appropriateness of the request for the product and how it relates to the patient. He/she confidently proactively or reactively questions patient to determine the need for product and to ensure appropriateness

When he or she provides primary health-care:

> He/she critically appraises the need for a product and/or the appropriateness of a request for a product and how it relates to the patient. He/she confidently proactively or reactively questions patient and listens to determine need for the product and to ensure appropriateness

And when he or she contributes to rational use of medicines:

> He/she critically appraises the appropriateness and effectiveness of a medicine in a given situation for a given patient or group of patients. He/she confidently proactively or reactively questions patient to determine his or her need for product and to ensure

appropriateness. He/she practises CPC and identifies possible problems/ recommendations

These statements provide a very similar view of what the competent professional does when performing each of these functions. This pattern was repeated across the majority of the statements in this table suggesting that professional competence was not solely defined by function performed.

Function, therefore, provides a context for viewing professional performance rather than being the means itself of determining professional competence. In this way, function can be used as a lens for viewing professional competence and a context for developing an assessment event or tool, or for developing learning activities. The design of the assessment task or curriculum component would focus on the elements of professional competence as they would be observed in performing one or more functions. Taking such an approach means that rather than focusing solely on the outcome of the performance, the processes used in achieving that outcome are of equal, if not greater, importance.

It is also important to note that none of the statements extracted from the exploratory interviews or questionnaires described a particular practice situation, for example, hospital practice. In fact the research data were remarkably uniform in describing components of competent and expert performance, regardless of whether they were describing hospital, community, specialist or other practice. This suggests that while these practice situations are important, the characteristics of competent professionals were applicable across all practice situations.

Where a difference was most likely to be observed was in the mix of functional competencies likely to be exhibited by an individual practitioner. For example, a hospital pharmacist was more likely to spend the majority of time contributing to the rational use of medicines, while a community pharmacist was most likely to spend the majority of his or her time dispensing medicines. This suggests that those characteristics associated with competent performance are always exhibited by the practitioner, regardless of the practice context in which they operate.

As with the functional context, a competent or an expert performer must demonstrate the behaviours associated with competent or expert performance in both the functional and situational context.

Considering competence in this way enabled professional competence to take into account practice context without being dependent on it. This gives the model three dimensions, which are shown in Figure 7.4.

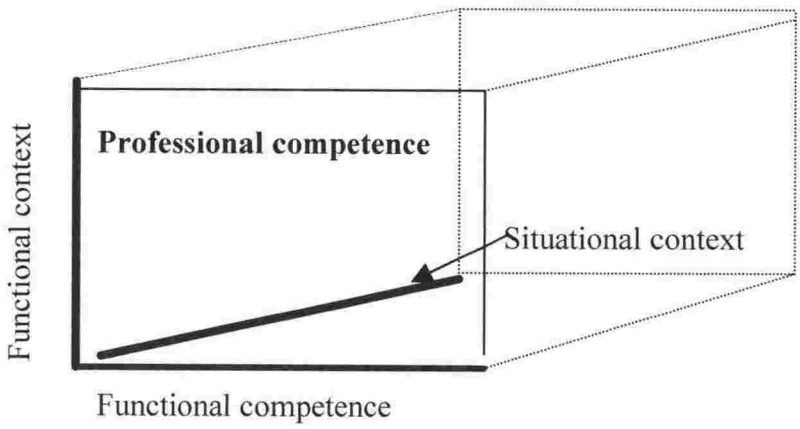

Figure 7.4 – The three dimensions of the model

The model components—the domains of competence, the three levels and the generic nature of the behavioural characteristics, and the situational and functional contexts in which pharmacists practise—describe the main features of the complex model of professional competence used to explain the data observed. These components and their links to the literature are discussed further in the next section.

7.3 Model components

The model of professional competence used to explain the research findings has four principal features. The first of these is that ***professional competence*** is defined as an entity in its own right.

Secondly, while ***functional competence*** is an important dimension of professional competence, it is not the sole defining attribute. Thus, a pharmacist must be able to demonstrate the required behaviours associated with professional competence while meeting the standards for dispensing medicines, preparing pharmaceutical products and so on, in order to be deemed fit for registration.

Thirdly, professional competence is demonstrated by the ability of pharmacists to integrate the skills and knowledge associated with the five functional ***domains of competence*** in their day-to-day practice.

And finally, professional competence is determined by judging the pattern of competence as exhibited in both the ***functional and situational contexts*** in which a pharmacist practises. That is, the determination of professional competence is situational and will be determined from the mix of behaviours exhibited by the practitioner in the performance of his or her principal role—for example dispensing, preparing products, contributing to the rational use of medicines, or providing primary care—practised within their situational context, of which the most commonly encountered will be community or hospital practice. Situational context, however, can also cover areas of specialist practice such as oncology, comprehensive pharmacy care, mental health and so on. Viewing competence in such a three dimensional way has also been proposed by Gonczi *et al.* (1990) in describing their integrated model of competence.

The resulting model is consistent with the literature as discussed in Chapters 2, 3 and 4.

7.3.1 The cognitive domain

In the model, a person operating at the independent end of the continuum within the cognitive domain would have some or all of the body of knowledge necessary to operate as a pharmacist, while a person operating at the integrated end of the continuum would be able to use that knowledge to solve practice problems. In solving such problems the practitioner integrates his or her knowledge with technical, legal and ethical, intra/interpersonal, and organisational skills in a wide range of contexts to meet the needs of clients, and to generate new knowledge and so on.

This is consistent with the Cheetham and Chivers (1998) model, where a competent professional with knowledge/cognitive competence has appropriate work-related knowledge and he or she is able to put this to effective use. As with Eraut's (1992) concept of process knowledge, to be effective knowledge must be integrated with practical skills and applied in situations encountered in day-to-day practice. Competent professionals must be able to integrate professional knowledge with process knowledge demonstrated in technical ability, the ability to organise work and information, and the ability to communicate knowledge and information both orally and in writing. This reflects the integrated end of the continuum in the domain. In line with Schön's (1983) concept of reflective practice and Dreyfus and Dreyfus' (1980) notion of expertise, the professional competence model also emphasises the importance of life experience in developing professional competence.

Boyatzis also recognised that knowledge is important for effective managers, but only important if it was used. He concluded that:

> specialised knowledge (useable facts and concepts) is a threshold competency for performance as a manager, where a threshold competency is one that is essential for performing a job but is not causally related to superior performance. (Boyatzis, 1982, p. 23)

The ability to continue to develop knowledge through reflection, accommodation, assimilation, perception, intuition and reasoning, and the knowledge that results from such an act or practice, are the processes associated with cognition and have been identified by many researchers, for example, Schön (1983), Eraut (1994), and Piaget (1969) as essential to professional competence.

Boyatzis (1982) also identified the integration of knowledge and cognition as important in differentiating performance. Three of the factors he identified are conceptualisation, perceptual objectivity and diagnostic use of concepts, which all require integration of knowledge, and cognition with skills found in other domains of the model. To provide an example of how the model of professional competence explains this, a pharmacist using conceptualisation will be able to recognise a

situation not encountered before and be able to question a patient to gather information and then use this to develop a concept of what is wrong. In acting this way he or she will integrate the ability to communicate, existing knowledge, the ability to learn and adapt, and the ability to develop new personal concepts and knowledge.

Application of this knowledge will be demonstrated in a number of ways in a pharmacy context, including determining whether the medicine is appropriate for the patient, by doing a really comprehensive patient history that considers the "wider" picture: identifying what is wrong with a patient and recommending an appropriate course of action; providing advice to patients and other health practitioners; interpreting new clinical data concerning a new medicine; developing a tailored medicine formulation, and so. In each of these situations, a pharmacist can only perform competently if he or she can integrate knowledge with other components, such as questioning, advising, psychomotor skills and activities, ability to source information, and interpersonal relating.

These activities are typical of "problem-solving" and Boyatzis' "diagnostic use of concepts" defined as

> a way of thinking in which a person identifies or recognises patterns from an assortment of information, by bringing a concept to the situation and attempting to interpret events through the concept. If these people do not have a concept that is relevant to a particular situation, they quickly attempt to find one by seeking source material to provide the concept. (Boyatzis, 1982, p. 79)

As exhibited in a pharmacy context, to be able to problem-solve, a pharmacist must be able to integrate knowledge with skills, behaviours and organisational ability. To be professionally competent, this problem-solving must also be, for example, legal and ethical.

7.3.2 Interpersonal/intra-personal domain

A person using the skills, knowledge and attitudes associated with this domain at the end of the continuum where they are used in isolation from the other domains would

be able to communicate and relate to others. A person operating at the integrated end of the continuum, however, would be able to elicit client needs, apply knowledge to meet the needs of individual patients, build rapport and trust, communicate complex ideas and information to another in a way that can be understood, as well as being self-aware and able to initiate actions to develop him-/herself and his or her practice. The person will be self-confident without being arrogant.

According to Cheetham and Chivers (1998), the personal or behavioural domain is dominated by the ability to demonstrate appropriate, observable behaviours, which in a pharmacy context include developing relationships with patients, customers, peers and health practitioners. Associated strongly with this domain are the underlying requirements for communication and interpersonal relating, the need for accepting responsibility for decisions and actions, and the need to be proactive in initiating measures to address issues arising. Practitioners must know themselves and the limitations of their abilities, and seek assistance or undertake further study where necessary.

Other researchers, as outlined in Chapters Two, Three and Four, have discussed these behaviours and the way they are exhibited in competent performance. Boyatzis (1982) is one of these. He identifies four factors of this domain as being important in differentiating levels of performance. The first of these is the ability of people to make effective verbal presentations. He identified that ability to express oneself verbally and to use symbolic, verbal and non-verbal behaviour to reinforce or interpret the content of the message, to ask questions to ensure that individuals understand, and to convince others to act, is closely related to competence as a manager.

The second factor is social-emotional maturity as it impacts on perceptual objectivity and enables people to be objective and not limited by personal biases, prejudices or perspectives. Boyatzis' concept of perceptual objectivity is an example of competent behaviours described by the overlap of two domains—in this case the cognitive and intra/interpersonal domains. The degree to which people are able to avoid the influences of personal involvement and personal position, when considering issues or actions to be taken, is a major factor in differentiating competent performance. McCoby (1976) calls this ability open-mindedness. Pharmacists using this ability will

be integrating attributes from the behavioural domain with those from the technical and ethical domains.

The third factor in Boyatzis' attributes that differentiate performance is self-confidence. This was also mentioned many times in the research data as differentiating performance. In Boyatzis' words:

> people with self-confidence feel they know what they are doing. They express little ambivalence about decisions they have made without being arrogant or defensive. They have a belief in the likelihood of their success. (Boyatzis, 1982, p.101)

The fourth factor differentiating performance in this domain is that of being able to undertake accurate self-assessment. People who are competent are able to accurately self assess, see their strengths and weaknesses and know their limitations—a characteristic that Bray, Campbell and Grant (1974) called self-objectivity. They are able to describe and evaluate the effectiveness of their performance in a particular situation, and seek help or activities to remedy their weaknesses—the concept of reflective practice (Boud, 1999; Schön, 1983).

7.3.3 Technical/functional domain

A person operating at the end of the continuum of this domain where the skills, knowledge and attitudes are used in isolation has the psychomotor and technical skills to prepare pharmaceutical products, and to count, pour and weigh preparations along with occupational skills such as the ability to dispense a prescription, or select an appropriate medicine to treat a medical condition. A person operating at the integrated end of the continuum can, in addition to these skills, use technical and cognitive skills along with knowledge to undertake such activities as identify errors and omissions on prescriptions, practise Comprehensive Pharmaceutical Care (CPC), develop new formulations, and communicate effectively with prescribers and/or patients.

The technical domain includes both psychomotor skills and technical cognitive skills, such as the ability to perform complex calculations. When integrated with knowledge from the cognitive domain, legal requirements from the ethical domain, and

communication from the behavioural domain, the resulting attributes mirror Eraut's process knowledge.

In the Cheetham and Chivers (1998) model of competence, the technical domain is called functional competence, which is the ability to perform a range of work-related tasks effectively to produce specific outcomes.

7.3.4 Organisational domain

The organisational domain is concerned with efficiently managing oneself and others to get things done. It includes such things as self-control, initiating actions, anticipation, managing, planning, delegating, managing time, ability to multi-task, task centredness, stamina and proactivity.

People operating at the end of the continuum where the skills knowledge and attitudes are used in isolation from the other domains are reactive to events, can plan and prioritise their work, and can manage their time to ensure work tasks are completed. At the integrated end of the continuum, competent professionals are proactive, develop and implement operational procedures, delegate, work effectively in teams, manage, develop and supervise the work of others, and source and evaluate information. In performing these tasks they integrate the technical, cognitive, behavioural, legal/ethical and organisational domains.

The behaviours demonstrated by practitioners performing at the integrated end of this domain resonate with Boyatzis' (1982) concepts of efficiency orientation. A person with efficiency orientation:

> sets goals or deadlines that are challenging but realistic, organises resources, identifies potential problems, and strives to do things efficiently and effectively. (p. 84)

When integrated with the behavioural domain, people operating in this domain are able to manage group processes which is defined by Boyatzis as:

> the ability to stimulate others to work together effectively in group settings. (p.129)

Boyatzis' concept of self-control is an example of a behaviour that describes the overlap in the intra/interpersonal, ethical and organisational domains as people who exhibit self-control inhibit their personal needs or desires in service of organisational needs.

> They consistently weigh the costs and benefits to themselves and to the social group, organisation, or other system in which they are a part before expressing or acting on personal needs or desires. They remain cool under stress (Boyatzis, 1982, p.161).

Further demonstrating the importance of the integration of domains, Boyatzis identifies stamina, including the physical stamina to sustain long hours and maintain high performance under consistently high stress, and adaptability to cope with change, as essential for competent performance (Boyatzis, 1982). Other researchers call these attributes "behavioural flexibility" (Bray *et al.*, 1974), tolerance of uncertainty (Bray *et al.*, 1974; Stogdill, 1964) and stamina and flexibility (Levinson, 1980).

Proactivity is an aspect of the organisational domain that deserves further discussion. It has been described by a number of authors as a person's "sense of efficacy" (Stewart & Winter, 1974; White, 1963; de Charms, 1968; Rotter, 1966; Boyatzis, 1969). A sense of efficacy is the disposition to see oneself as the originator of actions in one's life. In a professional role, a proactive person would be able to anticipate problems and use knowledge, technical skills, communication and ethical behaviours to ensure the best possible outcome for the patient. He or she takes the first step in a series of activities rather than waiting for a situation to develop.

> Whether solving a problem or merely investigating an issue, such people seek information from a wide variety of sources. Proactive people accept and readily admit their person responsibility for successes or failures in task accomplishment or problem-solving. (Boyatzis, 1982, p. 72)

7.3.5 Ethical domain

A person operating at the end of the continuum where the skills, knowledge and attitudes associated with this domain are used in isolation from the other domains is able to comply with legal requirements. At the integrated end of the continuum they

are able to apply legal and ethical frameworks to all decision-making and handle complex ethical situations in a respectful manner.

At the most simple level, for example, determining an appropriate course of action while operating within the law and other mandatory systems, there is little integration with other domains. However, in a situation where practitioners are required to manage difference that arises from conflicting values, there is a large degree of integration of these skills with the ethical and intra/interpersonal domains. All technical and professional tasks must also be undertaken within legal and ethical frameworks, such as those imposed by professional code of ethics. Pharmacy has such a Code.

In the Cheetham and Chivers framework, ethical competence encompasses personal and professional values and the ability to make sound judgments (Cheetham and Chivers, 1998). As Eraut *et al.* (1994) identify, ethical working requires practitioners to integrate legal values—such as operating within the law and other mandatory systems—with professional values, organisational values, and personal values including individual beliefs and behaviours. This implies that to be ethical in a professional setting a practitioner must use values that are consistent with standards set by that profession. For pharmacy these are defined in the 10 principles of the Pharmaceutical Society of New Zealand's Code of Ethics. These are:

Principle 1: Autonomy—The pharmacist shall promote patient self-determination, respecting the patient's right to understandable information, privacy, and confidentiality.

Principle 2: Beneficence—The pharmacist shall optimise medicines related health outcomes for the patient according to their concerns, needs, cultural values and beliefs.

Principle 3: Non-malfeasance—The pharmacist shall act to prevent harm to the patient and public.

Principle 4: Justice—The pharmacist shall practise fairly and justly and promote family, whanau, and community health.

Principle 5: Spirit of enquiry—The pharmacist shall actively seek and apply contemporary pharmacy knowledge and skills to ensure a high standard of professional competence.

Principle 6: Integrity—The pharmacist shall practise in a manner that does not compromise their own professional independence, judgement or integrity, or that of other pharmacists.

Principle 7: Trustworthiness—The pharmacist shall act in a manner that promotes public trust in the knowledge and ability of pharmacists and enhances that reputation of the profession.

Principle 8: Dignity—The pharmacist shall provide information about professional services, medicines and health-care products in a dignified manner without making exaggerated or unsubstantiated claims.

Principle 9: Co-operation—The pharmacist shall respect the skills and competence of other health-care providers and endeavour to work cooperatively with them to optimise the health outcomes of mutual patients and the public.

Principle 10: Compassion—The pharmacist shall demonstrate a caring and compassionate manner.
(Pharmaceutical Society of New Zealand, 2003, p.15-26)

Under the model of professional competence, a pharmacist is determined to be not professionally competent if they are unable to integrate these principles of ethical behaviour with knowledge, intra/interpersonal, organisational and technical skills and knowledge.

7.3.5 Expertise

Statements about behaviours typifying expert performance suggest that experts take a "wider" view and a more holistic approach to their work. The type of behavioural statements typifying expert performance suggest that rather than experts doing different things, they integrate the domains of competence at a deeper, more

comprehensive level and demonstrate this integrated, holistic performance across a wider range of work. Their performance is more fluid, complete and intuitive.

This finding resonates with the Dreyfus model of expertise (Dreyfus & Dreyfus, 1980) and that of Benner (1984). Benner reports an expert nurse's performance:

> When I say to a doctor, "the patient is psychotic", I do not always know how to legitimise that statement. But I am never wrong. Because I know psychosis from inside out. And I feel that, and I know it, and I trust it. (Benner, 1981, p. 32)

This extract demonstrates the confidence that characterises experts along with their willingness to back the decisions they make. Dreyfus and Dreyfus note:

> As long as a beginner pilot, language learner, chess player, or driver is following the rules, his performance is halting, rigid, and mediocre. But with mastery of the activity comes the transformation of the skill which is like the transformation that occurs when a blind person learns to use a cane. The beginner feels pressure in the palm of the hand which can be used to detect the presence of distant objects such as curbs. But with mastery the blind person no longer feels pressure in the palm of the hand but simply feels the curb. The cane becomes an extension of the body. (Dreyfus, 1977, p. 12)

Experts then, integrate all the domains of competence consistently in their performance. The integration of the intra/interpersonal domain with all other domains is particularly notable, demonstrated by behaviours such as:

> They learn from experience, accept feedback, and are open to new ideas. They continually self-examine their performance, undertake self-audit, are self-aware, and know their limitations. They are prepared to say that's outside my scope. They are realistic about their goals.

The model developed to describe the research data appears to be consistent with the research literature. The next step was to review the themes extracted from the research to determine whether a set of behaviours defining professional competence could be identified that could then be used to test the reliability and validity of the model. If

shown to be valid, such behavioural statements could be used to describe standards of performance.

7.4 Defining the characteristics associated with professional competence

The first step in defining a set of behavioural statements that reflect levels of competence described by the model of professional competence was to compare and contrast the different elements extracted from the pooled data for expert, competent and not-competent performance contained in Table 6.8. These comparisons enabled the core behavioural characteristics associated with the element to be synthesised. For example, in looking at statements about communication, an expert performer:

> Is a good/expert communicator, listens and transfers information, pitching it to the right level. He or she is patient and willing to talk and understand the importance of both context and content. He or she counsels every time a prescription is given out. He or she is better than competent or not-yet-competent.

A competent person:

> Knows the questions to ask – understands why questions are asked and knows what sort of answers to expect. Interacts well with others – patients and health professionals. Cares about people, and has good people skills.

While a not-competent person:

> Is a reasonable communicator, but less direct in what is said or advice given. He or she talks to rather than communicates with others. He or she is less effective in communicating than a competent or an expert performer.

The core behavioural characteristic synthesised from these different levels of performance is:

> A person who is professionally competent is a good communicator, is able to disseminate information in language understood by the person they are communicating to, and is happy to communicate with other health practitioners.

In another example, experts are able to:

> Apply knowledge from a range of sources in decision-making and consider the wider picture. They undertake decision-making from first principles, not making assumptions. They are practical, and able to adapt information to New Zealand and local situations.

Competent people:

> Can evaluate information, look up information from a range of sources and draw conclusions and apply it to the situation.

While not-competent practitioners:

> Are not able to integrate information from a range of sources. They do not see the big picture, or all of the background. They rely heavily on textbooks and do not always apply information to practical situations, or translate information into something useful.

This is synthesised to:

> A competent professional is able to integrate knowledge from a range of different sources and can recognise the importance of apparently unconnected information.

Using this process for all themes in Table 6.8 resulted in a list of 65 statements, or clusters of behaviour statements. These statements represent the behaviours associated with professional competence and are listed in Table 7.1.

Table 7.1 – Summary statements for professional competence

	Behavioural statement
A person who is professionally competent:	
1.	Is able to provide a "wider" service, looks after the whole person and has an holistic approach—considers the "wider" picture, provides extras.
2.	Anticipates and deals with potential problems. Looks beyond the surface of things. Has a gut feeling when things are not right and acts on it.
3.	Is focused on the patient and correctly thinks about the medication directly from the context of the person—applies knowledge to that particular person in a considered manner to get the best outcome for the patient, recognises that medication is different for different people and individualises treatment.
4.	Does a really good patient history and clinical review and is proactive in mitigating potential problems.
5.	Questions patient to determine need/appropriateness of product.
6.	Manages high pressure situations—does not get wound up, relaxed in the job, does not let the job overwhelm them.
7.	Has a timely, logical and comprehensive approach to problems and processes – is methodical and thorough, takes time to do things properly and does not miss steps.
8.	Does things swiftly and proficiently—prioritises from the patient point of view and gets the job done with a minimum of fuss, focused, not easily distracted from the task at hand.
9.	Asks other people for their opinion, welcomes peer support.
10.	Is accurate and straightforward, works to the highest possible standards.
11.	Is able to multi-task.
12.	Follows through on everything including the difficult stuff—does not leave things for others.
13.	Technically excellent, accurate and thorough with close attention to detail. Uses appropriate techniques.
14.	Is very careful—sets up systems to ensure everything is checked and double-checked where necessary.
15.	Has good documentation.
16.	Acts as a resource for others—pharmacists and consultants.
17.	Manages patient expectations.
18.	Is a good communicator and can listen and transfer information, and pitch it to the right level in both context and content—willing to talk.
19.	Counsels patients.
20.	Is patient, can handle difficult situations—does not lose his or her cool.
21.	Is able to inspire, mentor and teach others. Passes experiences on, and is not afraid to point out errors made as a learning tool for others.
22.	Provide opportunities for others to develop—creates an atmosphere that encourages others to learn from mistakes and share experiences.
23.	Understands people and the limitations of others, is quick to help out and to give others a bit of latitude.
24.	Is an effective team member.
25.	Welcomes customer feedback.
26.	Is transparent—does not try to cover up. Is honest and ethical.
27.	Has a positive attitude—sees strengths in others, does not put them down.
28.	Has good people skills and relates well to people—is able to build relationships and get alongside people. Has empathy and is able to judge when to be friendly and when to stand off a bit. Not arrogant, non-threatening, approachable.
29.	Reads body-language and adjusts approach in response to feedback.
30.	Is confident in dealing with other health professionals.
31.	Is down to earth, practical and has common sense.
32.	Balances own needs with needs of patient.
33.	Represents others—acts as a leader, motivates the team and initiates action.
34.	Supervises others.
35.	Is able to delegate.
36.	Is confident in decision-making, is prepared to make hard decisions and to stand by them—takes responsibility and accountability.
37.	Can work independently without supervision.

38.	Is confident, happy in his or her role, knowledge and ability to apply knowledge.
39.	Is trusted and respected. Builds trust.
40.	Is willing to take risks and to put his or herself in situations that are challenging to them.
41.	Is not pressured into making decisions—does homework to back decisions made, know when to research further.
42.	Is interested in what he or she does and motivated to learn more, and develop skills—ambitious, lively, energetic, have drive. Engaged in CPD.
43.	Knows limitations and is prepared to say that is outside my scope.
44.	Learns from experience, accepts feedback, is open to new ideas and adapts to new situations—continually self-examines performance, undertakes self-audit, and is realistic about goals. Self-aware and self-assured.
45.	Believes that professional responsibility goes beyond work hours—that it is a vocation/calling not a job. Passionate about pharmacy.
46.	Is able to approach problems from different perspectives—can identify comprehensive solutions and come up with more and unusual ways to deal with a problem. Recognises there is more than one solution.
47.	Is able to integrate background knowledge and recognise the importance of apparently unconnected information.
48.	Is proactive.
49.	Has extensive clinical knowledge—has up-to-date knowledge about medicines, diseases, practical aspects of pharmacy and other things such as procedures and conditions.
50.	Is able to apply knowledge from a range of sources in decision-making—undertakes decision-making from first principle, not making assumptions, able to adapt information to New Zealand and local situations.
51.	Can extrapolate known information to unknown situations to achieve results.
52.	Has specialised in a particular field of medicine—has depth of knowledge in the specific area of specialisation.
53.	Can access, retrieve and evaluate information/literature/clinical trail data. Can assess evidence of efficacy and safety.
54.	Has experience in both pharmacy and life, and is able to integrate knowledge with practise—has maturity, and is practical and down to earth. Recognises constraints of the system.
55.	Recognises and values knowledge of others e.g. consultants.
56.	Is able to think laterally, logically in different ways.
57.	Cares about people—wants to help and is involved in the community.
58.	Practises legally and ethically.
59.	Wants to do a good job and have the best outcome for the patient—altruistic.
60.	Ensures the pharmacy is able to operate—has solutions in place for him or herself and others.
61.	Represents pharmacy on lots of committees—is the face of the department.
62.	Trains staff so they can manage customers and difficult situations.
63.	Works independently.
64.	Participates in peer review.
65.	Has high personal standards and standards of practice.

Collectively, these behavioural statements describe the integration of the domains of competence and define the construct of professional competence. These behavioural statements were used to test the reliability and validity of the model. This is covered in Part Three of this thesis.

7.5 Model validation

The final step in this phase of the research was to take the model and ask experienced pharmacists to comment on its face validity and applicability to their practice. This was achieved by workshopping the model with three different groups of experienced pharmacists. This was described in Chapter Five, section 5.5.

Forty-six workshop participants completed the workshop exercise that asked them to work in groups to review the model of professional competence, and to provide a synthesis of their thinking.

Three workshops were held—two as part of national conferences and one as a regional workshop. The pharmacists at the workshops worked in small groups and considered the three questions:

1. Was the conceptualisation of professional competence and the categorisation of the five domains of competence used in the model sensible?
2. Was there anything that a pharmacist does that would not fit into one or more of the domains of competence as described by the model?
3. Was there a better way of categorising their work?

All responses were positive. The respondents were unanimous in their endorsement of the model. These results are shown in Table 7.2.

Table 7.2 – Workshop results

Research question	No. agree	% agree
The categorisation used in the model is sensible	46	100
All tasks that a pharmacist performs fits within one or more of the domains	46	100

	Yes	No
Is there a better way of categorising a pharmacist's work?		46

Comments recorded from the workshops included:

> "Everything I do could be accounted for with this model. This model could even be used to explain my competence as a mother."

> "A model of professional competence needs to be simple and uncomplicated, which it is."

> "The categorisation is sensible – the model needs to be flexible for a given person in a given situation. It needs to be 3D."

> "The categorisation is very broad and general and could be applied to many areas of practice."

> "Is the order of the domains significant? Consider reordering the domains of competence as this may make more sense to some people."

This feedback enabled the researcher to conclude that the model has face validity. As a result of this feedback no amendments were made to the model.

Part Three of this thesis describes the procedures used to further test the model for reliability, construct, content and predictive validity. Particularly, the research described in Part Three was used to verify the structure of the model, to identify the behavioural statements that map onto the levels of competence, and to determine the characteristics that discriminate between the levels.

7.6 Conclusion

The model of professional competence developed to explain the results of the research suggests that professional competence is a complex entity that is explained by the ability of a practitioner to integrate skills and knowledge across five domains—cognitive, technical/functional, intra-/interpersonal, organisational, and ethical—and to then apply these integrated attributes to his or her professional roles and functions in the specific practice situation in which he or she operates.

The model emphasises the important ability of a practitioner to integrate his or her skills and knowledge, and suggests that expert performance is associated with the ability to integrate skills and knowledge across a wider and deeper range of practice. Specialists, on the other hand, tend to demonstrate a greater depth and breadth of ability in only one or two domains.

The complex model of professional competence suggests that programmes aimed at developing a pharmacist's professional capability, and assessment activities aimed at assuring competence should focus on the practitioner's ability to integrate the domains of competence. Curriculum development and delivery should emphasise integrated skills and knowledge, and assessment tasks should be integrative rather than focusing on discreet tasks. This thinking is consistent with that of many researchers who have investigated the assessment of higher learning (see, for example, Masters and McCurry, 1990; Crooks, 1993; and Griffin, 1995). This will be discussed further in Part Four.

Part Three
Testing the Professional Competence Model

In this second phase of the research, the model of professional competence was subjected to quantitative analysis to determine its reliability, content, construct, concurrent and predictive validity in theory and in practice. Statistical techniques were used for this purpose, including analysis of variance—ANOVA and t-tests—principal component analysis, and discriminant analysis.

In testing the model, a number of research questions were investigated:

1. What specific attributes differentiate the performance of not-competent, competent and expert performers?

2. Do practitioners agree that these attributes are important?

3. Can a self-assessment instrument be developed from the model?

4. Does a self-assessment instrument created from these attributes enable practitioners to make a judgment of their own competence?

5. How reliable are such judgments?

Quantitative data for this analysis were gathered from samples taken from the population of practising pharmacists in New Zealand using fixed-response survey and questionnaire instruments. The first of these investigated the validity of the model of professional competence under ideal conditions, while the second looked at its validity when evaluated against pharmacist's perceptions of their own performance.

Quantitative research using fixed-response questionnaires produces data in a numerical format, which is easy to analyse using statistical analysis techniques. The major disadvantage is that respondents are restricted in the responses they can give.

This disadvantage can often be addressed by providing an opportunity for respondents to provide comments on their answers.

Part Three describes the methodology used to test the model, and the results obtained.

Chapter Eight describes the methods used in this phase of the research.

Chapter Nine describes the theoretical performance of the model as determined by an expert group.

Chapter Ten describes the actual performance of the model when tested widely with experienced and novice pharmacists (interns), and describes the performance of individual test items.

Chapter Eight
Methodology for evaluating the model of professional competence

As described in the previous section, the model of professional competence developed in the first phase of the research predicts that professional competence can be determined by observing whether pharmacists demonstrate the characteristic integrative behaviours in their professional practice. In addition to this, the model predicts that differences in levels of professional competence could be distinguished by the extent to which a pharmacist exhibits the integrated behaviours when performing their professional tasks. For example, an expert performer will use integrative behaviours more often when performing professional tasks than a competent or not-competent performer. The latter is more likely to rely on his or her technical ability, for example, used in isolation from the behaviours encompassed in the other domains of competence.

The model of professional competence has been shown, through the review by experienced pharmacists, to have face validity. The aim of this phase of the research is to provide further validation of the model by evaluating its performance in both theory and practice.

8.1 Outline of the approach used

This phase of the research has been conducted in two steps. In the first step, the model was evaluated by asking an expert "panel" of experienced pharmacists to rate the behavioural statements that the model defined as characteristic of the three levels of professional competence. Ratings focused on the applicability of the behavioural statements to the performance by "ideal" expert, competent and not-competent pharmacists. In addition, the "expert panel" pharmacists were asked to determine whether these statements required practitioners to integrate the domains of competence, and whether the statements were applicable to the key professional functions that pharmacists perform.

This step used a survey instrument that was developed containing the 65 behaviour statements synthesised in the first phase of the research (see section 7.4). The data obtained were analysed using item and test analysis statistical methods, including means and standard deviations for each of the classifications, analysis of variance, calculation of discrimination indices, and calculation of Cronbach's coefficient alpha.

Results from these analyses were used to develop a simplified self-assessment questionnaire containing 36 "test" items. This simplified self-assessment questionnaire was administered to a sample of novice and experienced pharmacists to determine how the model performed when used by practising pharmacists to evaluate their own performances. To do this, the questionnaire asked participants to rank themselves against each behavioural statement using a 5-point Likert scale, and to self-assess their overall level of competence. As a further evaluation measure, participants were also asked to rate each of the "test" items for importance.

Results obtained from administering the self-assessment questionnaire were analysed to determine the importance of each of the behavioural items in characterising professional competence. They were also used to identify the structure of the latent variables associated with the construct of professional competence, and which of the variables discriminated between the levels of performance. Statistical techniques used included analysis of variance—ANOVA and t-test—principal component analysis, factor and discriminant function analysis.

The steps in this phase of the research are shown in Figure 8.1.

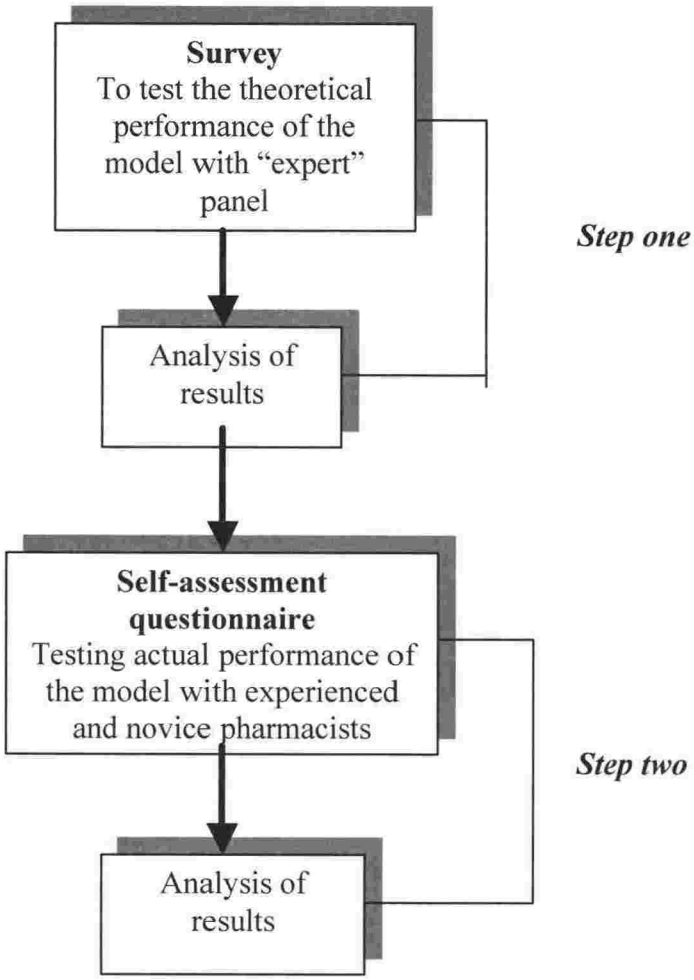

Figure 8.1 – Steps in research for phase 2

8.1.1 Rationale for the approach used

The approach adopted for this phase of the research is based on evaluation processes that make use of both qualitative and quantitative data and, where appropriate, follows standard psychometric methods used to determine valid and reliable measurement scales.

Evaluation methods were used as they enable measurement data from testing and non-measurement data, such as observations, to be used in making judgments about the model and the behaviours associated with it (Grönlund, 1985). Having said that, the approach used relies heavily on measurement data and standard psychometric

methods. The procedures used are guided by *Standards for educational and psychological testing* (1999)[4].

When psychometric methods are used to develop tests to measure performance, the standard approach used is to:

1. Ensure there is a clear purpose for the test.
2. Prepare a blueprint or test specification as a framework. The blueprint should cover the content areas to be covered by the test and the number of items relating to that content area.
3. Write/develop items for the test.
4. Pilot the test.
5. Analyse results.
6. Refine the test and, if necessary, conduct further trials.

(Rust & Golombok, 1989; Grönlund, 1985)

In this phase of the research, the survey instrument used in step one and the self-assessment questionnaire used in step two were employed to measure professional competence. The model of professional competence developed in phase one of this research formed the "blueprint" for development of these tests. This model was shown in phase one of the research to have face validity, and the individual test items were developed from a synthesis of the qualitative data used to develop the model.

This second phase of the research was the pilot phase and, as such, met the requirements for piloting and refining the test. Determining the ability of the behavioural test items to produce reliable and valid interpretations of professional competence was essential to the piloting steps. Validity and reliability in quantitative research and test design are discussed further in section 8.4.

The steps in this phase of the research, the methodologies used and the analytical approaches adopted to test the model of professional competence are shown in Table 8.1.

[4] These standards have been jointly developed by the American Education of Research Association, American Psychological Association and the National Council of Measurement in Education.

Table 8.1 – Summary of steps in this phase of the research

Step	Data gathering method used	Analytical approach adopted	Rationale
1	Expert panel of 12 pharmacists surveyed to: • Obtain rating scores for each of the 65 behavioural test items as they relate to an ideal expert, competent and not-competent pharmacist	Data gathered were entered into 3 Excel spreadsheets and means and standard deviations determined. Data were analysed to determine correlations between the items, their discriminating power and the Cronbach alpha of the items and the test as a whole.	This step and use of an expert panel enable the theoretical performance of the model to be determined and provide evidence of content and construct validity and reliability of the model.
	• Determine which of the 65 behavioural items are examples of integrative characteristics	Data from part two of the survey were analysed to determine their integrative power using an integrative index.	Determining whether the items extracted from phase one of the research are examples of integrative behaviours. Provides further evidence of construct and content validity of the model.
	• Determine whether the test items apply to all four of the professional roles that pharmacists perform	Data from part three of the survey were analysed to identify which of the behavioural items relate to all four of the key professional roles pharmacists perform.	Determining whether the items extracted from phase one of the research apply to all four key professional roles pharmacists perform. Provides further evidence of construct and content validity of the model.
	Simplified self-assessment questionnaire developed for use in step 2.	Information generated from the analysis of the survey data was used to create a self-assessment questionnaire. This contains the 36 test items that have been shown to be valid representations of the model and show potential to discriminate between levels of competence.	Self-assessment questionnaire contains items shown to be valid by the expert panel.

Step	Data gathering method used	Analytical approach adopted	Rationale
2	Self-assessment questionnaire administered to 132 novice and 276 experienced pharmacists to obtain: • Self-ratings against each of the 36 test items; and • An overall rating of their competence.	Self-assessment questionnaire administered to experienced and novice practitioners to determine their self-ratings on test items. Means and standard deviations of test items were determined and ANOVA and t-test used. Principal component analysis and discriminant functional analysis were also used.	ANOVA and t-test were used to determine whether there are significant differences between groups. Principal component analysis was used to determine the underpinning latent variables in the data, and discriminant function analysis was used to determine whether the latent variables were able to discriminate between groups. These analyses provided evidence of concurrent and construct validity and reliability of the model.
	• Ratings of importance for each of the test items.	Importance rating for each test item was obtained and correlations between the importance rating and mean self-rating score for each item were calculated.	Provides further evidence of content and construct validity and reliability of the model.

8.1.2 Participants

Three groups of participants were used to gather the data used in this phase of the research. Twelve experienced pharmacists participated in step one, forming an "expert" panel. These pharmacists evaluated the performance of the model by providing ratings for each of the behavioural characteristics associated with the model of professional competence as they applied to an ideal expert, competent and not-competent pharmacist. They also evaluated these characteristics in relation to the integrated and contextual aspects of the model as summarised in Table 8.1. This is discussed further in section 8.2.

Two groups participated in step two of this phase of the research. The first of these were 276 experienced pharmacists, while the second group were 132 novice practitioners, that is, practitioners in their internship year preparing to become registered pharmacists. These two groups of participants rated their own performances against each of the behavioural characteristics, and provided an assessment of their

level of competence. They also rated each of the items for importance to practice. These participants are discussed further in section 8.3.

8.1.3 Approvals

As with the first phase of the research, approvals for this phase of the research were obtained from the Pharmaceutical Society of New Zealand (PSNZ). The PSNZ supplied the names and addresses of all the pharmacists approached in step two of this phase of the research. They also provided assistance in contacting the novice practitioners approached to participate in this research.

In addition to gaining approval from the Pharmaceutical Society of New Zealand for this research, approval was also sought from the Pharmacy Guild of New Zealand. This was necessary because many of the participants approached for this research practised in community pharmacy settings. Approval and endorsement by the Pharmacy Guild was necessary for community pharmacists to participate in research projects.

8.2 Step one—Evaluating the model for "ideal" performance

In this step of the research, the perceptions of twelve experienced pharmacists, acting as an expert panel, were used to determine how the behaviours characterised the levels of professional competence under ideal circumstances. The data gathered from this step were analysed to provide further evidence of content and construct validity and reliability of the model.

The aim of this step was to elicit support from experienced pharmacists for the model. Invitations were sent to pharmacists who participated in phase one of this research. The hope was that at least 10 would volunteer for further involvement—17 in fact responded positively. As will be seen, the scope of this work was extensive.

This group was acting as an expert panel, effectively judging the model for validity. Experienced pharmacists were required for this step as they were being asked to critically review the model developed in phase one of the research in order to make

these judgments. The views of 10 pharmacists were considered to be sufficient for this purpose.

8.2.1 The expert panel participants

The 17 people participating in this step of the research were all experienced pharmacists from community, hospital, academic and policy roles, who had taken part in either the interview or validation workshops used in phase one of the research.

Experienced pharmacists were chosen for this step because they were being asked to judge the model developed to describe the data obtained from the first phase of the research. Experienced pharmacists were able to provide informed, expert views in relation to this task.

While 17 pharmacists agreed to participate in this step of the research, the responses from five of the participants were excluded from the analysis because the data obtained were in a different format to the analytical framework adopted, and converting the data into the analytical framework was not possible without compromising the data. This situation arose because these pharmacists had participated in the workshop exercise that used a different format for data collection.

The range of practice of the 12 participants whose responses were analysed is shown in Table 8.2. No further demographic data was obtained from these participants.

Table 8.2 – Participant data

Area of pharmacy practice	Number participating
Community	4
Hospital	2
Academia	2
Policy/specialist	4

8.2.2 Method

The method used in this step was to send a fixed-response survey instrument, containing the 65 items extracted from phase one of the research, to the 17 participants from phase one of the research who agreed to participate in this step.

Participants were asked to respond to the survey by rating the behaviours characteristic of professional competence on the three dimensions of the model—levels of competence, integration of behaviours, and applicability to practice context—and return it in a stamped, return-addressed envelope (see section 8.2.2 for further details).

The survey instrument was given to participants and they were asked to complete it in their own time and return it. Where required, the researcher worked with participants to provide further guidance to assist them to complete the instrument.

8.2.3 The survey instrument

The survey instrument used the 65 statements synthesised from the first phase of the research as representing behaviours characteristic of professional competence; the survey instrument was organised in three parts.

Each of the three parts sought to investigate different aspects of the model of professional competence:

- Part one of the survey investigated how the behaviour statements reflected the three levels of competence defined by the model—expert, competent and not-competent;
- Part two of the survey instrument investigated the degree to which the behavioural characteristics required the integration of the domains of competence; and
- Part three of the survey instrument investigated the degree to which the statements applied to the principal professional functions pharmacists perform.

The behavioural statements used in the survey instrument, along with an identifying number (ID), are listed in Table 8.3. This is a duplicate of the Table 7.1 and is included for the convenience of the reader.

Table 8.3 – Summary statements for professional competence

ID	Behavioural statement
1.	Is able to provide a "wider" service, looks after the whole person and has an holistic approach—considers the "wider" picture, provides extras.
2.	Anticipates and deals with potential problems. Looks beyond the surface of things. Has a gut feeling when things are not right and acts on it.
3.	Is focused on the patient and correctly thinks about the medication directly from the

	context of the person—applies knowledge to that particular person in a considered manner to get the best outcome for the patient, recognises that medication is different for different people and individualises treatment
4.	Does a really good patient history and clinical review and is proactive in mitigating potential problems.
5.	Questions patient to determine need/appropriateness of product
6.	Manages high-pressure situations—does not get wound up, relaxed in the job, does not let the job overwhelm them.
7.	Has a timely, logical and comprehensive approach to problems and processes – is methodical and thorough, takes time to do things properly and does not miss steps.
8.	Does things swiftly and proficiently—prioritises from the patient point of view and gets the job done with a minimum of fuss, focused, not easily distracted from the task at hand.
9.	Asks other people for their opinion, welcomes peer support.
10.	Is accurate and straightforward, works to the highest possible standards.
11.	Is able to multi-task.
12.	Follows through on everything including the difficult stuff—does not leave things for others.
13.	Technically excellent, accurate and thorough with close attention to detail. Uses appropriate techniques.
14.	Is very careful—sets up systems to ensure everything is checked and double-checked where necessary.
15.	Has good documentation.
16.	Acts as a resource for others—pharmacists and consultants.
17.	Manages patient expectations.
18.	Is a good communicator and can listen and transfer information, and pitches it to the right level in both context and content—willing to talk.
19.	Counsels patients.
20.	Is patient, can handle difficult situations—does not lose cool.
21.	Is able to inspire, mentor and teach others. Passes experiences on, and is not afraid to point out errors made as a learning tool for others.
22.	Provide opportunities for others to develop—creates an atmosphere that encourages others to learn from their mistakes and share experiences.
23.	Understands people and the limitations of others, is quick to help out and to give others a bit of latitude.
24.	Is an effective team member.
25.	Welcomes customer feedback.
26.	Is transparent—does not try to cover up. Is honest and ethical.
27.	Has a positive attitude—sees strengths in others, does not put them down.
28.	Has good people skills and relates well to people—is able to build relationships and get alongside people. Has empathy and is able to judge when to be friendly and when to stand off a bit. Not arrogant, non-threatening, approachable.
29.	Reads body-language and adjusts approach in response to feedback.
30.	Is confident in dealing with other health professionals.
31.	Is down to earth, practical and has common sense.
32.	Balances own needs with needs of patient.
33.	Represents others—acts as a leader, motivates the team and initiates action.
34.	Supervises others.
35.	Is able to delegate.
36.	Is confident in decision-making, is prepared to make hard decisions and stand by them—takes responsibility and accountability.
37.	Can work independently without supervision.
38.	Is confident, happy in role, in his or her knowledge and ability to apply knowledge.
39.	Is trusted and respected. Builds trust.
40.	Is willing to take risks and to put themselves in situations that challenge him or herself.
41.	Is not pressured into making decisions—do homework to back decisions made, know when to research further.
42.	Is interested in what and motivated to learn more and develop skills—ambitious, lively, energetic, have drive. Engaged in CPD.

43.	Knows limitations and is prepared to say that is outside my scope.
44.	Learns from experience, accepts feedback, is open to new ideas and adapts to new situations—continually self-examines performance, undertakes self-audit, and is realistic about their goals. Self-aware and self-assured.
45.	Believes that professional responsibility goes beyond work hours—that it is a vocation/calling not a job. Passionate about pharmacy.
46.	Is able to approach problems from different perspectives—can identify comprehensive solutions and come up with more and unusual ways to deal with a problem. They recognise there is more than one solution.
47.	Is able to integrate background knowledge and recognise the importance of apparently unconnected information.
48.	Is proactive.
49.	Has extensive clinical knowledge—has up-to-date knowledge about medicines, diseases, practical aspects of pharmacy and other things such as procedures and conditions.
50.	Is able to apply knowledge from a range of sources in decision-making—undertakes decision-making from first principles, not making assumptions, able to adapt information to NZ and local situations.
51.	Can extrapolate known information to unknown situations to achieve results.
52.	Has specialised in a particular field of medicine—has depth of knowledge in the specific area of specialisation.
53.	Can access, retrieve and evaluate information/literature/clinical trail data. Can assess evidence of efficacy and safety.
54.	Has experience in both pharmacy and life, and is able to integrate knowledge with practice—has maturity, and is practical and down to earth. Recognises constraints of the system.
55.	Recognises and values knowledge of others e.g. consultants.
56.	Is able to think laterally, logically in different ways.
57.	Cares about people—wants to help and is involved in the community.
58.	Practises legally and ethically.
59.	Wants to do a good job and have the best outcome for the patient—altruistic.
60.	Ensures the pharmacy is able to operate—has solutions in place for him or herself and others.
61.	Represents pharmacy on lots of committees—is the face of the department.
62.	Trains staff so they can manage customers and difficult situations.
63.	Works independently.
64.	Participates in peer review.
65.	Has high personal standards and standards of practice.

In part one of the survey instrument, participants were asked to rate each of the 65 behaviours listed in Table 8.1 on how often they would be exhibited by a "typical" expert, competent, and not-competent pharmacist using a 5-point Likert scale.

By asking participants to rank a "typical" performer rather than themselves, an ideal measure was obtained of how the behaviour statement applied to each of the levels of professional competence. This approach removed some of the concerns related to the use of self-rating scales—such as the tendency of participants to respond to a self-rating questionnaire in a socially acceptable manner—and improved the validity of the resulting test.

The Likert scale used for this exercise employed a scale ranging from 1—meaning that the "ideal" practitioner never exhibited the behaviour—through 3 where they exhibited it half the time—to 5 where the "ideal" pharmacist exhibited the behaviour all of the time. It was recognised that this scale was not the best measure for rating all the statements and may have lead to some ambiguity—for example, it is unlikely that anyone would participate in peer review "all the time". The single scale was, however, retained to make the survey instrument instructions easier to follow.

In part two of the survey instrument, participants were asked to determine whether the behaviour—when exhibited by a competent performer—required integration of two or more of the five domains of competence—cognitive, technical/functional, legal/ethical, organisational and intra/interpersonal as defined by the model of professional competence.

In part three of the survey instrument, participants were asked to indicate whether the behaviour would be exhibited by a competent pharmacist if they were dispensing medicines, preparing pharmaceutical products, contributing to the rational use of medicines, and providing primary health-care.

A copy of the survey instrument is attached as Appendix 7.

8.2.4 Analytical approach

Raw rating scores obtained from the responses to part one of the survey instrument were entered into three Excel spreadsheets—one for expert scores, one for competent scores, and one for not-competent scores. Means and standard deviations were calculated for each of the three classifications, and analysis of difference techniques were used to determine whether the total scores showed significant differences between the three classifications. In addition to this, discrimination indices were calculated to determine which items were able to discriminate between the classifications.

Data from part two of the survey instrument were used to calculate an Integration Index for each item. The Integration Index reflected the degree to which each item combined the domains of competence.

Cronbach's coefficient alpha was used to calculate the reliability of the classifications.

Data from part three of the survey instrument were entered into an Excel spreadsheet and then subjected to frequency analysis to determine which behavioural items applied to the four main professional functions that pharmacists perform—dispense medicines, prepare pharmaceutical products, contribute to the rational use of medicines, and provide primary health-care.

Data from these analyses were used to select test items to be used in the self-assessment questionnaire used in step two of this phase of the research.

8.2.5 Calculating discrimination indices

The discrimination index is the power of an item to discriminate between groups. In this step of the research, items were tested for their power in discriminating in two ways. Firstly a Pearson's correlation provides a measure of the power of items to discriminate across all three levels of competence. Secondly, to explore the utility of test items to discriminate between competent and not-competent practitioners a modified discrimination index was also calculated.

To do this the individual polyotomous scores were converted to dichotomous scores by converting "positive" scores (5, 4, or 3) to 1 and "negative" scores (2 or 1) to 0. This was done in order to simplify the data and to make a clearer distinction between competent and not-competent performance. At the same time, expert and competent ratings were combined into a single classification. It should be noted that the decision to include "3" as a positive score was not entirely arbitrary. Firstly, the researcher did not want to delete data by eliminating rating scores of "3". Secondly, the view was taken that, in a forced choice situation, a score of "3" would probably be more indicative of competent than not-competent.

Item discrimination power was then calculated by subtracting the proportion of not-competent pharmacists who scored 1 (R_L) from the proportion of the combined expert and competent group who scored 1 (R_U). In formula form, item discrimination power can be summarised as:

$$\text{Item discriminating power (D)} = (R_U) - (R_L)$$

An item with maximum positive discriminating power is one in which all respondents in the upper group get the item right (a competent rating) and all respondents in the lower group get it wrong (a not-competent rating). This results in an index of 1.00.

8.3 Step two—Testing for reliability and validity in practice

In this step of the research, the content, construct and concurrent validity of the model were tested in practice by inviting a sample of novice and experienced pharmacists to complete a simplified self-assessment questionnaire that asked them to:

1. rate their own performance on each of the behavioural characteristics;
2. rate their overall level of performance; and
3. rate the behaviours associated with professional competence for importance.

8.3.1 Step two participants

The sample of pharmacists used for this step of the research comprised a mix of experienced and novice practitioners. The experienced pharmacists approached to participate in this step of the research were the pharmacists who had participated in the ENHANCE project in 2004 and returned their self-assessments to the Pharmaceutical Society of New Zealand for review (see section 1.2.2 for an explanation of ENHANCE). All the pharmacists from this group who were in New Zealand at the time of the research—719 in all—were approached to participate. Using this group ensured that these participants were experienced in self-assessment and familiar with the concepts associated with professional competence. It was particularly important in this step of the research to include pharmacists who had been

practising for more than five years post-registration as earlier research had suggested that these pharmacists are likely to have developed into expert or specialist practitioners. Including them provided an opportunity to test this hypothesis.

The 132 novice pharmacists responding to the questionnaire represented the majority of the144 intern pharmacists undertaking their pre-registration training programme in 2004. Interns in their final year of training were chosen for this research because it was believed that by not being registered pharmacists, they would exhibit a wide range of capability that might not be found in the group of experienced registered pharmacists, all of whom are assumed to be competent. At the time of the research, the majority of the interns were in their ninth month of training, and the questionnaire was administered to them at their final training workshop prior to their last assessment.

Interns are either graduates of a Bachelor of Pharmacy, participating in the competency-based pre-registration training programme operated by the Pharmaceutical Society of New Zealand in preparation for assessment for registration (n=130), or overseas-trained pharmacists seeking registration in New Zealand (n=2).

As described in section 1.2.3, the competency-based pre-registration training programme is a work-based programme supported by training workshops, workplace assessments, and assignments. For most trainees it is 52 weeks in duration. At the end of the training programme, trainees undergo an assessment event comprising workplace evaluation, skills assessment using simulated practical assessment, and an interview.

Consideration was also given to involving students in their fourth year of Bachelor of Pharmacy in this step of the research, as it was felt that including participants who had not completed their initial qualification or undertaken any professional training would provide some useful data on the characteristics of not-yet-competent performers. Students at Auckland University's School of Pharmacy were approached to participate; however, only five responses were received. Otago University's School of Pharmacy year four students were also approached and no responses were received.

The experienced and novice pharmacists approached to participate in this step of the research were chosen in consultation with the Pharmaceutical Society of New Zealand, who supplied names and contact addresses of experienced pharmacists and facilitated contact with novice pharmacists.

Analysis of the data from the five responses that were received showed a great deal of variability and inconsistency in the ratings. This is probably not surprising as the ability to reflect honestly and accurately on your own performance, along with self-confidence and self-awareness are behaviours the literature associates with professional competence. Not being practising professionals, it is unlikely that the students would have developed these skills within a professional framework to any great degree. Consequently, it was decided not to include this group in the research.

The demographic data of the 360 respondents participating in this step of the research is shown in Table 8.4.

Table 8.4 – Demographic information of participants

		Number (n)	Frequency (%N, N=360)
Type	Pharmacists	228	63.3%
	Interns	132	36.7%
Age bracket	20 –30	163	45%
	31 - 40	60	17%
	41 - 50	70	19%
	51+	65	18%
	Unknown	2	0.6%
Gender	Male	122	34%
	Female	234	65%
	Unknown	2	0.6%
Area of practice	Community	272	76%
	Hospital	54	15%
	Academia	2	0.6%
	Government/policy	8	2.2%
	Other	1	0.3%
	Combination	17	4.7%
	Unknown	6	1.7%
Principal function	Dispensing	219	61%
	Prepare pharmaceutical products	5	1.4%
	Contribute to the rational use of medicines	52	14%
	Providing primary care	30	8%
	Other	41	11.4%

	Unknown	13	3.6%
Initial professional qualification	PSNZ Professional exam	22	6%
	Diploma in Pharmacy	96	27%
	B Pharm (NZ)	220	61%
	Other	14	4%
	Unknown	3	0.8%
Postgraduate qualifications	None	230	64%
	Post grad qualification	127	35%
	Unknown	3	0.8%

Just over one-third of the sample were novice pharmacists and this is a much higher percentage than would be found in the general pharmacist population. This high proportion of novice practitioners is also reflected in the age demographics seen in the sample with 45 percent in the age group 20 – 30.

In line with the majority of practitioners working in a community setting, the primary role that 61 percent of participants engaged in was dispensing; however, a further 14 percent stated that their role was contributing to the rational use of medicines, a role that would be performed in community, hospital and advisory settings.

Sixty-one percent of the sample stated that their initial professional qualification was a BPharm, which reflected the majority of participants being in the 20 to 30 age group. The BPharm is currently the only initial pharmacy qualification accepted for entry into the profession. Twenty-five years ago, it was possible to gain entry to the profession with either a Diploma in Pharmacy or a Bachelors degree, and prior to that, entry was via an apprenticeship.

Nearly two-thirds of the sample—64 percent—had not engaged in any post-graduate study.

8.3.2 Research method

The method used in this step of the research was to approach a sample of experienced pharmacists and novice pharmacists, requesting they complete a self-assessment questionnaire containing 36 behavioural items (for details of participants, see section 8.3.1). Participants were sent or given a letter seeking their informed consent to participate. They were also sent a copy of the self-assessment questionnaire and a

return-addressed, stamped envelope. For those consenting to participate, the letter was returned with the completed questionnaire.

Two methods were used for administering the self-assessment questionnaire.

1. For novice pharmacists, the questionnaire was given to them at their final training day for the year. For most interns, this fell approximately nine months into their final year of training. At this point, most interns could be considered to be competent. Interns were asked to complete the questionnaire overnight and return it the next day. 144 novice pharmacists received the questionnaire and 132 responses were received, a response rate of 92 percent.

2. For pharmacists, the self-assessment questionnaire was sent out by mail with a stamped, return-addressed envelope. All non-respondents were followed-up after approximately three weeks with a phone call. This provided an opportunity to answer any questions or address any concerns raised by the participant. 719 questionnaires were sent out and completed questionnaires were received from 276 pharmacists, a response rate of 38 percent. Six questionnaires were received after the cut-off date for inclusion in the analysis.

If the two groups were combined, the overall response rate was 47 percent.

8.3.3 Self-assessment questionnaire

The self-assessment questionnaire used for this research contained two parts. In Part A, participants were asked to review 36 behavioural statements—selected from the 65 used in the first step (see later)—and to determine, using a five-point Likert scale:

1. The importance of the statement: participants were asked to rank each statement for their importance, with 1 being unimportant for competent performance and 5 being vitally important.

2. Their self-rating for each statement, with 1 being "never do it" to 5 being "always do it".

Participants were then asked to state whether they considered themselves to be expert, competent, or not-competent.

The 36 behavioural statements used in this self-assessment questionnaire were selected from the 65 used in step one of this research. The items selected were those that: correlated well with the construct of professional competence ($r > 0.4$); were examples of behaviour requiring the integration of the domains of competence as judged by the expert pharmacists; had the ability to differentiate performance as determined by the discrimination index; and were exhibited by pharmacists in more than one of their professional roles. The process used to select these items and the behavioural items themselves is covered in section 8.4.

In Part B of the self-assessment questionnaire, participants were asked to consider how their practice had changed over the last five years and to provide basic demographic data.

The self-assessment questionnaire is attached as Appendix 8.

8.3.4 Analytical approach

Data from the self-assessment questionnaire were entered into three Excel spreadsheets, one for importance, one for self-ratings, and one for the demographic data. Means and standard deviations were calculated for importance and self-rating scores along with frequency distributions.

Importance rating data were then entered into the Statistical Package for Social Sciences (SPSS) for analysis, and a correlation analysis was carried out to identify those items that correlated strongly with the self-rating scores and to identify which items were correlated for importance. This enabled those items that did not fit the model of professional competence to be identified. It also provided mean-rating scores for importance for each of the behavioural items that could be compared with the self-rating scores.

Data for self-rating scores were also entered into SPSS and a range of statistical techniques undertaken. These techniques included principal component analysis, discriminant function analysis, and analysis of variance. Internal consistency reliability of the data was calculated using Cronbach's coefficient alpha.
The mean self-rating scores on each behavioural item were compared for novice and experienced practitioners, and expert, competent and not-competent performers to determine if there appeared to be a difference in the scores for these classifications.

ANOVA was then used to identify the significant differences between these groupings in relation to the total scores on the test.

8.3.5 Principal component analysis

Principal component analysis is used to gain evidence of construct validity by identifying structure within a data set, that is, by uncovering the latent variables that make up the construct under investigation so they can be investigated further. It may also be used to reduce a number of variables to a smaller set, or to describe concisely the pattern of interrelationships between observed variables. It can also be used to assist in the development of a reliable, sensitive measuring instrument by finding a dimension—the first principal component, or set of dimensions, a set of principal components—along which subjects are maximally different (Tabachnick & Fidell, 1983).

Once principal components have been extracted and interpreted, "factor scores" were calculated for each component using regression techniques. Factor scores represent the estimated score that subjects would receive on each of the latent variables if they had been measured directly. These are useful for constructing measurement scales and tests.

Factor scores were then used to determine the discrimination power of the self-assessment using discriminant function analysis.

8.3.6 Discriminant function analysis

Discriminant function analysis (DFA) was used to determine the dimensions on which group members differ; in other words, whether items were able to predict group membership, for example, competent and not-competent groups. This is done by determining the best combination of predictor variables (items) that maximise difference among groups. Where group members have not been classified, DFA provides the means to classify those members by determining the group they most closely resemble with respect to their performance on the predictor variables (Klecka, 1980).

DFA includes several statistical activities aimed at interpreting group differences and classifying people into groups. In undertaking the analysis, the first discriminant function is always the most powerful. Significance tests indicate which dimensions discriminate reliably among groups and which provide no additional information (Tabachnick & Fidell, 1983).

8.3.7 Item selection

Results of the analyses were used to determine which items would be most useful in constructing:

- an assessment of competence to be used to determine fitness for registration as a pharmacist; and
- an evaluation instrument to be used for competence assurance.

A potential evaluation instrument was developed.

8.4 Validity and reliability

The ***reliability*** of a test or evaluation instrument is an estimate of its accuracy or consistency in producing results. A perfectly reliable test is one where there are no errors attributable the test itself or to extraneous examinee factors such as health, anxiety or fatigue. In addition, in a perfectly reliable test no errors are caused by mistakes, biases or lucky guesses. Such reliability is never able to be achieved in

practice, but the aim of any test writer is to develop a test that reduces error caused by these effects.

Reliability is usually measured using techniques that require comparing the performance on two assessments—such as test-retest, or equivalent forms—or techniques comparing the performance of the group on split-halves of the test. Measures of reliability used to determine the internal consistency reliability of a test administered to only one group include Kuder-Richardson Formula 20 (KR-20) and Cronbach's coefficient alpha. KR-20 is used for items scored 1 or 0 (dichotomous scores), whereas coefficient alpha is used to calculate the reliability of a test for items scored polyotomously. As stated in Zumbo and Rupp:

> Cronbach alpha can be computed from data on a single administration of a test and does not require parallel forms, a test-retest scenario, or multiple judges for which an intra-class correlation coefficient can be used (Zumbo & Rupp, 2004, p. 79).

A perfectly reliable test will have an alpha score of 1.0; however, this is not achievable in practice. Instead, a test producing an alpha score greater than 0.9 is considered to be a reliable test, that is, one that measures with a good degree of precision (Ebel & Frisbie, 1986).

Reliability can be influenced by a number of factors such as:

- defects in the test, such as poorly designed or ambiguous items, omissions, or poor instructions;
- poorly developed criteria for interpreting results, which lead to inconsistent judgments being made;
- different interpretations of responses by different assessors; and
- instability in participant performance due to factors such as health, stress, lack of opportunity for practice, or other variables that interfere with normal achievement.

(Rust & Golombok, 1989; Grönland, 1985; Ebel & Frisbie, 1986).

Reliability measures for a test, however, are not enough on their own. A test can measure the wrong thing or a trivial matter with great precision, but that does not make it a good test. A test also needs to be valid. The validity of a test is the extent to

which it measures what it is intended to measure, that is, its "fitness for purpose". While reliability is a necessary condition for validity (Ebel & Frisbie, 1986), there are a number of other categories for describing the evidence of validity.

Face validity is the extent to which the test looks to participants as if it is sensible and likely to produce the results it is aiming to produce. If a test does not have face validity, participants may not take it seriously. ***Content validity*** is the fit between the sample tasks contained in a test and the construct being tested for. Content validation requires a judgment that the domain being tested for is clearly specified, and that the tasks selected for use in testing are representative of the domain (Grönlund, 1985). Because the test items have been extracted from interview data obtained from experienced pharmacists they will have content validity. Obtaining further evidence was achieved in both step one—by asking the panel to determine the score achieved by the ideal performer—and step two of this phase of the research—by asking pharmacists to rank the test items for importance.

Criterion-related evidence of validity is needed if a test is to be used to estimate a person's current performance against a measure—***concurrent validity***—or his or her future performance—***predictive validity***. Criterion-related evidence of validity is obtained by calculating the correlation between the score obtained and a "criterion". The self-assessment questionnaire used in the second step of this phase of the research is used to gather evidence of concurrent validity of the model.

Construct validity is the ability of a test to support inferences of a person's ability in relation to some construct—for example, professional competence—using construct related evidence. When test scores are used to provide a measure of a particular construct, the implication is that there is such a construct, that it differs from other constructs, and that the test scores provide a measure of the construct that is little influenced by extraneous factors. Verifying such implications is the task of construct validation (Gronland, 1985; Ebel & Frisbie, 1986).

As stated by Zumbo and Rupp (2004):

> Construct validity refers to the degree to which inferences can be made legitimately from the observed scores to the theoretical constructs about which these observations are supposed to contain information. In short, construct validity involves generalising from our behaviour or social observations to the concept of our behavioural or social observations. (p. 84)

Construct validation involves identifying the meaning of the construct being measured, determining the theoretical performance of the construct, and then verifying that performance by empirical means. A variety of evidence may be used for construct validation, including evidence of content and criterion-related validity, along with correlation and other analysis. The strongest case for validity can be made when evidence from all of the categories is present (Grönlund, 1985).

Evaluating the reliability and validity of the construct of professional competence as defined by the theoretical model was the aim of this phase of the research.

Chapter Nine
Evaluating theoretical performance of the model

In this chapter, the data obtained in step one of phase two of the research are analysed. This step of the research used a survey instrument that asked twelve "expert" pharmacists to undertake three tasks.

In the first task, the twelve participants were asked to rate the performance of an "ideal" expert, competent, and not-competent pharmacist on the 65 behavioural statements used as test items. The research questions used a Likert rating scale that ranged from 1 to 5 and asked participants to rate the behaviours for how often each of the "ideal" pharmacists would demonstrate them. A score of 1 meant the pharmacist did not demonstrate that behaviour, while a score of 5 meant they demonstrated it "all of the time".

In the second part of the survey, the "experts" were asked to determine which test items required a competent pharmacist to integrate the domains of competence—cognitive, technical, legal/ethical, organisational, and intra/interpersonal.

The third part of the survey asked the "experts" to determine which of the test items were linked to the primary professional functions of pharmacists—dispense medicines, prepare pharmaceutical products, contribute to the rational use of medicines, and provide primary health-care.

9.1 Analysis of data from part one of the survey

The data obtained from part one of the survey instrument resulted in twelve sets of 65 scores, ranging from 1 to 5, for each of the three classifications—expert, competent and not-competent. The data were entered into three separate Excel spreadsheets—one each for expert, competent and not-competent scores. Where an item was not scored by one of the panel, the field in the spreadsheet was left blank.

9.1.1 Comparison of means

Following data entry, the mean score and standard deviation for each of the test items was calculated for each of the classifications. These are shown in Table 9.1.

Table 9.1 – Means and standard deviations of "idealised" ratings

ID	Test item	Mean score expert	SD	Mean score competent	SD	Mean score not-competent	SD
1.	Has a holistic approach	4.93	0.27	3.33	0.65	1.67	0.49
2.	Has a big picture focus	4.93	0.27	3.58	1.08	2.08	0.90
3.	Has a patient focus	4.86	0.36	3.92	0.67	2.17	0.84
4.	Takes a complete patient history	4.92	0.28	3.67	0.98	1.42	0.67
5.	Questions the patient fully	5.00	0.00	4.36	0.81	2.64	0.92
6.	Manages pressure situations	4.43	0.51	3.50	0.67	1.75	0.62
7.	Uses a logical approach	4.77	0.44	4.00	0.74	1.83	0.58
8.	Is proficient	4.42	0.52	3.60	0.67	1.70	0.51
9.	Welcomes peer support	4.21	0.80	3.25	0.96	2.83	1.53
10.	Is accurate	4.62	0.51	4.17	0.83	1.92	0.90
11.	Can multi-task	4.23	0.72	3.58	0.79	1.83	0.58
12.	Follows through on everything	4.62	0.51	4.00	0.74	1.46	0.66
13.	Is technically excellent	4.92	0.28	4.25	0.75	1.82	0.58
14.	Is careful and checks him or herself	4.61	0.51	4.08	0.79	2.00	1.13
15.	Has good documentation	4.31	0.75	3.92	0.79	1.92	0.67
16.	Acts as a resource for others	4.71	0.47	3.38	0.77	1.25	0.45
17.	Manages patient expectations	4.50	0.76	3.67	0.49	1.58	0.67
18.	Is an excellent communicator	4.29	0.83	4.08	0.67	1.83	0.72
19.	Counsels patients	4.08	1.04	4.17	0.84	2.25	0.75
20.	Is patient	4.14	0.77	3.67	0.65	2.00	0.74
21.	Mentors others	4.50	0.76	3.25	0.87	1.08	0.29
22.	Provides opportunities for others to develop	4.36	0.63	3.25	0.75	1.67	0.39
23.	Understands people	4.21	0.80	3.33	0.65	1.71	0.62
24.	Is an effective team member	4.43	1.09	3.75	0.87	1.67	0.65
25.	Welcomes feedback	4.31	0.63	3.83	0.72	2.00	0.74
26.	Is transparent	4.57	0.76	4.25	0.87	1.79	0.72
27.	Has a positive attitude	4.07	1.07	3.58	0.99	1.75	0.62
28.	Has good people skills	4.00	1.04	3.67	0.89	1.92	0.67
29.	Can read body-language and adapt response	4.07	1.07	3.67	0.49	1.71	0.45
30.	Is confident dealing with other health professionals	4.79	0.43	3.92	0.79	1.33	0.49
31.	Practises legally	3.86	1.03	3.67	0.78	1.79	0.58

ID	Test item	Mean score expert	SD	Mean score competent	SD	Mean score not-competent	SD
32.	Balances work and life	4.07	0.62	3.58	0.52	1.71	0.62
33.	Acts as a leader	4.57	0.76	3.17	0.72	1.08	0.29
34.	Supervises others	3.92	1.11	3.33	1.07	1.25	0.45
35.	Delegates	4.14	0.95	3.50	0.91	2.00	1.21
36.	Is confident making decisions and stands by them	4.79	0.43	4.08	0.52	1.50	0.52
37.	Works independently	5.00	0.00	4.58	0.79	1.58	0.79
38.	Is self-confident	4.85	0.38	4.00	0.74	1.88	0.80
39.	Is trusted	4.64	0.75	4.17	0.72	1.58	0.90
40.	Is willing to challenge him or herself and take risks	4.00	1.04	3.17	0.58	1.75	0.75
41.	Is not pressured into making decisions	4.71	0.47	4.08	0.67	1.54	0.50
42.	Is motivated	4.71	0.47	3.75	0.97	2.25	0.75
43.	Knows limits and will say that's outside my scope	5.00	0.00	4.75	0.45	2.46	1.27
44.	Learns from experience	4.64	0.745	3.92	0.67	1.75	0.62
45.	Sees pharmacy as a vocation	4.23	0.85	3.50	0.67	1.92	0.67
46.	Uses a range of problem-solving approaches	4.57	0.76	3.50	0.67	1.67	0.65
47.	Integrates knowledge	4.50	0.76	3.75	0.62	1.50	0.67
48.	Is proactive	4.57	0.76	3.42	0.67	1.92	0.67
49.	Has a broad knowledge-base	4.79	0.43	3.71	0.45	1.54	0.66
50.	Applies knowledge from a range of sources	4.64	0.50	3.92	0.52	1.67	0.78
51.	Extrapolates known information to unknown settings	4.71	0.47	3.42	0.52	1.46	0.50
52.	Has an area of specialisation	4.43	0.65	2.67	0.78	1.33	0.65
53.	Can access, interpret and evaluate information	4.71	0.61	3.58	0.79	1.67	0.65
54.	Has experience in life and pharmacy	4.50	0.52	3.33	0.65	1.75	0.62
55.	Values others	4.86	0.36	4.25	0.45	2.42	0.79
56.	Can think laterally	4.50	0.52	3.58	0.67	1.63	0.48
57.	Cares about people	4.07	0.83	3.83	0.94	2.67	0.89
58.	Is ethical and legal	4.79	0.43	4.75	0.45	2.33	0.89
59.	Is altruistic	4.71	0.47	4.42	0.67	2.42	1.08
60.	Ensures the pharmacy is able to operate	4.71	0.61	3.92	0.52	1.83	0.72
61.	Represents the pharmacy	4.00	0.88	3.00	0.60	1.16	0.58
62.	Trains others	4.21	0.80	3.33	0.78	1.42	0.79
63.	Can work independently	4.79	0.43	4.42	0.79	1.63	0.77
64.	Participates in peer review	4.43	0.76	3.50	0.80	1.92	0.90
65.	Has high standards	4.86	0.36	4.58	0.52	1.92	0.79

Mean scores for the expert classification ranged from 3.86 for "practises legally" to 5.00 for "knows limits and will say that is outside my scope". Standard deviations ranged from 0.00 to 1.11. Mean scores for the competent classification ranged from 2.67 for "has an area of specialisation" to 4.75 for "is legal and ethical". Standard deviations ranged from 0.45 to 1.08.

Means scores and standard deviations for the not-competent classification showed much greater variability. The mean scores ranged from 1.08 for "looks at the bigger picture" and "mentors others" to 2.83 for "welcomes peer support". Standard deviations ranged from 0.29 to 1.53.

The mean item scores for each classification were graphed and this is shown in Figure 9.1. The graph shows that, based on the rating scores for "ideal" performers, 63 of the 65 behavioural statements differentiate between the performance of expert and competent pharmacists, and all 65 statements differentiate competent from not-competent practitioners. The two statements that do not differentiate expert and competent performance are:

"Counsels patients"

and

"Practises legally and ethically".

.

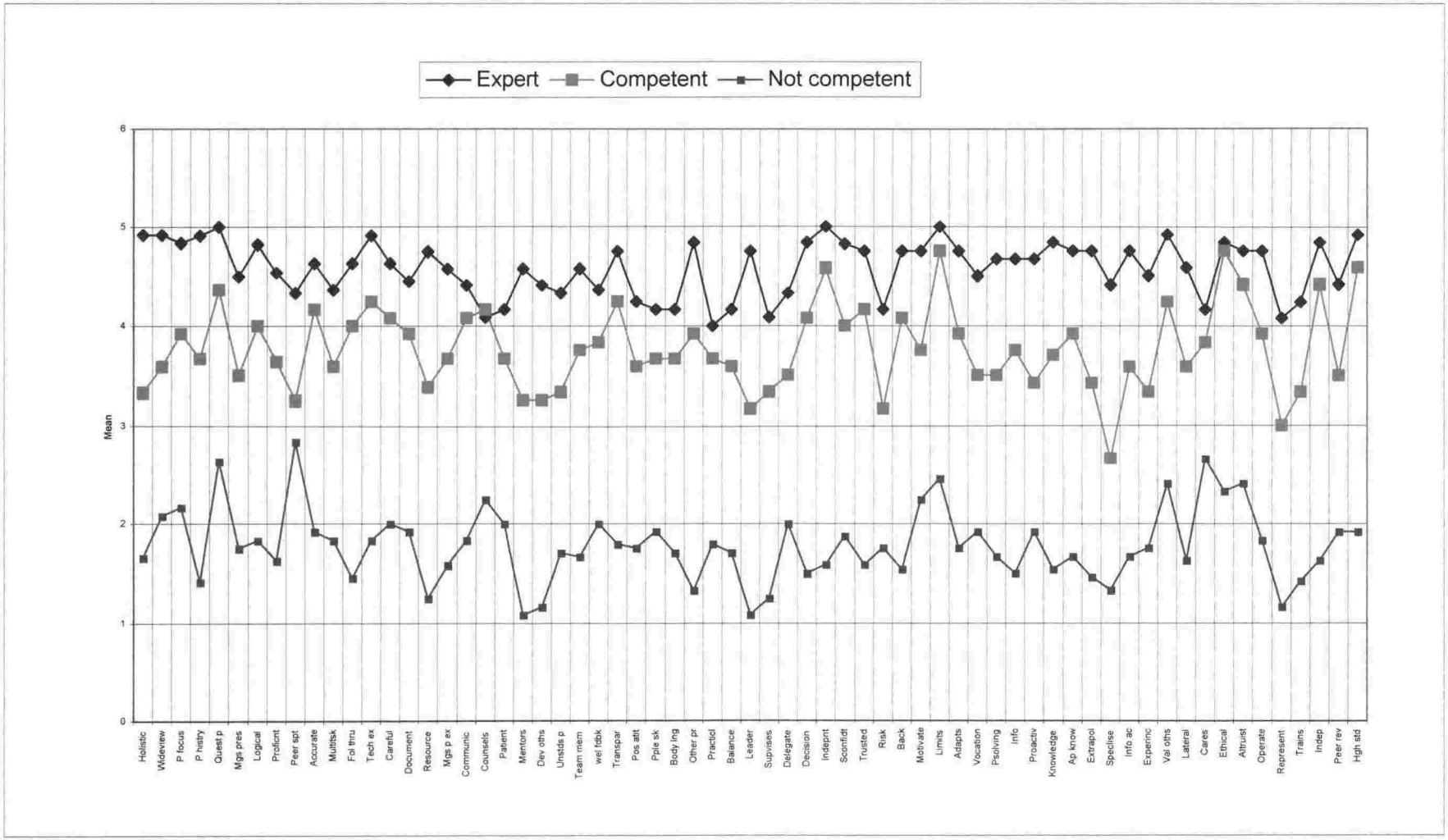

Figure 9.1 – Comparison of means for rating scores

9.1.2 Analysis of variance

Analysis of variance of the sum of the mean scores was undertaken using ANOVA analysis. ANOVA analysis was used to test the significance of the difference between the summed mean scores for the three classifications, and provided a measure of the ability of the overall test to differentiate between these classes. ANOVA analysis was used for this process because it enabled the scores for the three classifications to be compared simultaneously. The other main test of difference between groups—the t-test—can only be used to compare two groups at the same time.

The box plot for the ANOVA analysis depicting the 95 percent confidence level for the means, is shown in Figure 9.2. It illustrates that the sum of the mean scores of the three classifications—expert, competent and not-competent—were significantly different.

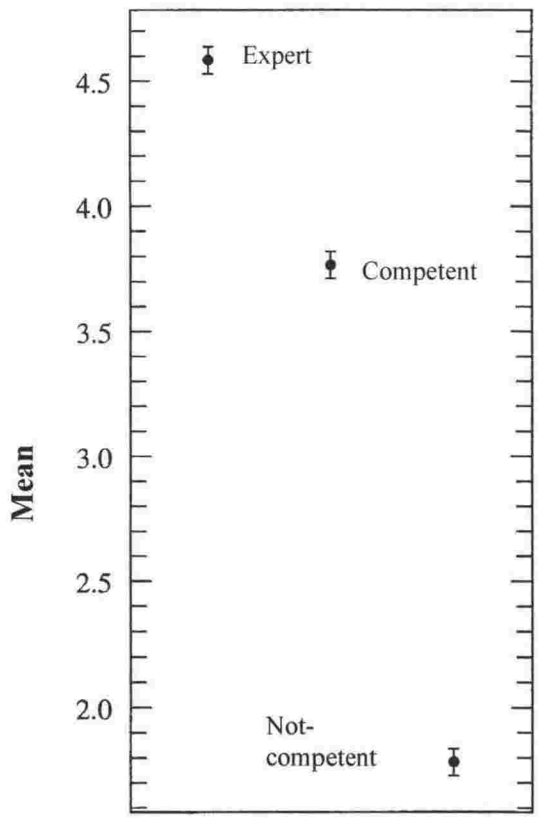

Figure 9.2 – ANOVA plot showing difference between groups

From the perspective of validity, these results show that in an "idealised" situation the items selected collectively for analysis are able to separate out clearly expert,

competent, and not-competent classifications. This provides further evidence of content validity, as well as potential evidence of criterion-related validity. The latter is examined further later.

9.1.3 Analysis of correlation and internal consistency reliability

Correlation analysis enables the relationships between items to be identified and quantified. The degree of correlation is designated by the correlation coefficient—symbol *r*—when calculated using Pearson's Product-Moment Correlation Coefficient. A coefficient of +1.0 indicates a perfect positive correlation, –1.0 indicates a perfect negative correlation, while 0.0 indicates no correlation between items.

Correlation analysis can also be used to identify test items that are closely correlated and therefore testing a similar trait. Where overlap in questions is identified, duplicated or unnecessary, items can be removed. This was important in this instance, as 65 test items was a large test and administering it could lead to difficulties, for example, people are unlikely to complete the test if it takes too long to answer. Also, if more than one of the items appears to be asking the same thing, then this could detract from the face validity of the test. In addition, a larger test is generally more expensive to administer and mark. For these reasons it is useful to reduce the test items to a manageable number.

The data were entered in the Statistical Package of Social Sciences (SPSS) in order to calculate correlation coefficients—Pearson Product-Moment Correlation—and Cronbach's coefficient alpha scores for the 65 test items.

Pearson correlations (*r*) and alpha estimates for the individual test items are given in Table 9.2.

Table 9.2 – Alpha scores for individual items

Item	Item Total correlation (*r*)	Alpha if item deleted
Has a holistic approach	0.86	0.996
Has a big picture focus	0.76	0.996
Has a patient focus	0.90	0.996
Takes a complete patient history	0.92	0.996
Questions the patient fully	0.81	0.996
Manages pressure situations	0.90	0.996
Uses a logical approach	0.94	0.996
Is proficient	0.95	0.996
Welcomes peer support	0.51	0.996
Is accurate	0.92	0.996
Can multi-task	0.87	0.996
Follows through on everything	0.92	0.996
Is technically excellent	0.94	0.996
Is careful and checks him or herself	0.81	0.996
Has good documentation	0.88	0.996
Acts as a resource for others	0.93	0.996
Manages patient expectations	0.95	0.996
Is an excellent communicator	0.89	0.996
Counsels patients	0.75	0.996
Is patient	0.88	0.996
Mentors others	0.94	0.996
Provides opportunities for others to develop	0.93	0.996
Understands people	0.91	0.996
Is an effective team member	0.93	0.996
Welcomes feedback	0.92	0.996
Is transparent	0.93	0.996
Has a positive attitude	0.90	0.996
Has good people skills	0.87	0.996
Can read body-language and adapt response	0.90	0.996
Is confident dealing with other health professionals	0.96	0.996
Practises legally	0.86	0.996
Balances work and life	0.96	0.996
Acts as a leader	0.94	0.996
Supervises others	0.86	0.996
Delegates	0.72	0.996
Is confident making decisions and stands by them	0.95	0.996
Works independently	0.92	0.996
Is self-confident	0.92	0.996
Is trusted	0.93	0.996
Is willing to challenge his or herself and take risks	0.88	0.996
Is not pressured into making decisions	0.96	0.996
Is motivated	0.85	0.996
Knows limits and will say that's outside my scope	0.75	0.996
Learns from experience	0.93	0.996

Item	Item Total correlation (*r*)	Alpha if item deleted
Sees pharmacy as a vocation	0.89	0.996
Uses a range of problem-solving approaches	0.90	0.996
Integrates knowledge	0.93	0.996
Is proactive	0.91	0.996
Has a broad knowledge-base	0.95	0.996
Applies knowledge from a range of sources	0.93	0.996
Extrapolates known information to unknown settings	0.94	0.996
Has an area of specialisation	0.81	0.996
Can access, interpret and evaluate information	0.92	0.996
Has experience in life and pharmacy	0.90	0.996
Values others	0.88	0.996
Can think laterally	0.94	0.996
Cares about people	0.74	0.996
Is ethical and legal	0.84	0.996
Is altruistic	0.83	0.996
Ensures the pharmacy is able to operate	0.89	0.996
Represents the pharmacy	0.86	0.996
Trains others	0.85	0.996
Can work independently	0.93	0.996
Participates in peer review	0.85	0.996
Has high standards	0.93	0.996

All but one item—"welcomes peer support"—showed a very high total correlation ($r > 0.7$) and therefore an ability to discriminate performance. Thirty-eight of the 65 items had a total correlation of $r > 0.9$. These results show a strong correlation between nearly all items in the test and the test itself. They did suggest, however, that the validity of including the item "welcomes peer support" in a test of professional competence was questionable.

Cronbach alpha values remain high in the "idealised" situation irrespective of which item is deleted and demonstrate an extremely high internal consistency reliability—alpha > 0.99—and, when combined with the item-total correlation coefficients, indicate that the test items form a single measurement scale.

The survey instrument as a whole achieved a Cronbach alpha score of 0.996. Clearly this very high value is due to the method used to gather the data, that is, asking participants to rate an "ideal" expert, competent and not-competent performer. Using the scores of hypothetical "ideal" practitioners in constructing a theoretical

measurement scale, however, was useful in helping to validate the model blueprint (content validity).

Further evidence of validity was gathered through evaluation of the performance of individual test items.

9.2 Analysis of item data

The next stage in testing validity and reliability was to test individual items to determine their ability to differentiate between the classifications—expert, competent and not-competent. Analysis of variance and discrimination analysis were used for this purpose.

Data from part two and three of the survey instrument were also analysed to determine the integration index of each item, and the strength of its application to each of the four main professional functions that pharmacists perform.

9.2.1 Analysis of variance on individual items

Firstly, ANOVA analysis was used to determine whether the mean scores for each test item were significantly different across the classifications.

Results from this analysis showed that there is a significant difference in the scores across the classifications—< 0.01 in all cases—and t-tests were then used to determine which items were able to differentiate between expert and competent, and competent and not-competent classes. The significance level of less than or equal 0.001 was chosen for this cut-off, in recognition of the increased error resulting from multiple testing of population means in both t-tests and ANOVA. Results from both analyses are given in Table 9.3.

Table 9.3 – Table of analysis of difference between classifications using ANOVA and t-tests

Item	ANOVA		t–test for difference expert/ competent		t–test for difference competent/ not-competent	
	F	Sig.	t	Sig. (2 tailed)	t	Sig. (2 tailed)
Has a holistic approach	145.76	<0.001	8.40	<0.001	7.07	<0.001
Has a big picture focus	40.22	<0.001	4.50	<0.001	3.69	0.001
Has a patient focus	58.16	<0.001	4.55	<0.001	5.67	<0.001
Takes a complete patient history	80.53	<0.001	4.42	<0.001	6.55	<0.001
Questions the patient fully	36.89	<0.001	2.85	0.009	4.66	<0.001
Manages pressure situations	65.06	<0.001	3.98	0.001	6.61	<0.001
Uses a logical approach	81.07	<0.001	3.20	0.004	8.01	<0.001
Is proficient	76.30	<0.001	3.39	0.003	7.88	<0.001
Welcomes peer support	5.22	0.010	2.78	0.010	0.80	0.433
Is accurate	44.32	<0.001	1.64	0.115	6.35	<0.001
Can multi-task	38.16	<0.001	2.13	0.044	6.18	<0.001
Follows through on everything	84.67	<0.001	2.45	0.022	8.92	<0.001
Is technically excellent	101.77	<0.001	3.01	0.006	8.82	<0.001
Is careful and checks him or herself	33.25	<0.001	2.02	0.056	5.23	<0.001
Has good documentation	36.84	<0.001	1.27	0.218	6.68	<0.001
Acts as a resource for others	117.12	<0.001	5.43	<0.001	8.22	<0.001
Manages patient expectations	66.28	<0.001	3.26	0.003	8.69	<0.001
Is an excellent communicator	41.37	<0.001	0.68	0.504	7.95	<0.001
Counsels patients	17.99	<0.001	-0.28	0.815	5.90	<0.001
Is patient	30.30	<0.001	1.68	0.105	5.86	<0.001
Mentors others	80.12	<0.001	3.92	0.001	8.22	<0.001
Provides opportunities for others to develop	89.12	<0.001	4.07	0.001	8.51	<0.001
Understands people	41.79	<0.001	3.04	0.006	6.26	<0.001
Is an effective team member	32.23	<0.001	1.74	0.095	6.66	<0.001
Welcomes feedback	37.73	<0.001	1.76	0.092	6.17	<0.001
Is transparent	47.02	<0.001	1.01	0.322	7.55	<0.001
Has a positive attitude	21.87	<0.001	1.20	0.244	5.41	<0.001
Has good people skills	19.85	<0.001	0.87	0.39	5.45	<0.001
Can read body-language and adapt response	35.26	<0.001	1.20	0.241	10.17	<0.001
Is confident dealing with other health professionals	119.19	<0.001	3.55	0.002	9.59	<0.001
Practises legally	23.48	<0.001	0.52	0.604	6.68	<0.001
Balances work and life	56.62	<0.001	2.17	0.040	8.06	<0.001
Acts as a leader	98.62	<0.001	4.83	<0.001	9.33	<0.001
Supervises others	27.62	<0.001	1.35	0.192	6.20	<0.001
Delegates	14.61	<0.001	1.76	0.091	3.45	0.002
Is confident making decisions and stands by them	159.06	<0.001	3.81	0.001	12.20	<0.001
Works independently	104.43	<0.001	1.90	0.070	9.27	<0.001
Is self-confident	55.61	<0.001	3.66	0.001	6.75	<0.001
Is trusted	54.33	<0.001	1.65	0.112	7.77	<0.001

Item	ANOVA		t–test for difference expert/ competent		t–test for difference competent/ not-competent	
	F	Sig.	t	Sig. (2 tailed)	t	Sig. (2 tailed)
Is willing to challenge him or herself and take risks	24.19	<0.001	2.47	0.021	5.17	<0.001
Is not pressured into making decisions	117.87	<0.001	2.82	0.010	10.56	<0.001
Is motivated	35.70	<0.001	3.32	0.003	4.24	<0.001
Knows limits and will say that's outside my scope	42.69	<0.001	2.07	0.049	5.89	<0.001
Learns from experience	61.02	<0.001	2.60	0.016	8.22	<0.001
Sees pharmacy as a vocation	37.28	<0.001	3.04	0.006	5.77	<0.001
Uses a range of problem-solving approaches	56.42	<0.001	3.79	0.001	6.78	<0.001
Integrates knowledge	64.21	<0.001	2.72	0.012	8.50	<0.001
Is proactive	46.21	<0.001	4.09	<0.001	5.50	<0.001
Has a broad knowledge-base	130.46	<0.001	6.27	<0.001	9.44	<0.001
Applies knowledge from a range of sources	82.97	<0.001	3.65	0.001	8.35	<0.001
Extrapolates known information to unknown settings	141.69	<0.001	6.73	<0.001	9.47	<0.001
Has an area of specialisation	65.58	<0.001	6.31	<0.001	4.55	<0.001
Can access, interpret and evaluate information	64.55	<0.001	4.10	<0.001	6.47	<0.001
Has experience in life and pharmacy	68.99	<0.001	5.08	<0.001	6.09	<0.001
Values others	65.46	<0.001	3.80	0.001	6.96	<0.001
Can think laterally	87.33	<0.001	3.94	0.001	8.23	<0.001
Cares about people	9.07	<0.001	0.69	0.498	3.13	0.005
Is ethical and legal	64.24	<0.001	0.21	0.84	8.40	<0.001
Is altruistic	32.89	<0.001	1.33	0.196	5.44	<0.001
Ensures the pharmacy is able to operate	72.85	<0.001	3.56	0.002	8.17	<0.001
Represents the pharmacy	52.15	<0.001	3.33	0.003	7.61	<0.001
Trains others	41.44	<0.001	2.83	0.009	5.97	<0.001
Can work independently	82.11	<0.001	1.51	0.144	8.74	<0.001
Participates in peer review	30.89	<0.001	3.04	0.006	4.56	<0.001
Has high standards	99.27	<0.001	1.58	0.126	9.77	<0.001

The results of this analysis showed that all items had the power to discriminate among groups when the test as a whole was taken into account (ANOVA). Twenty items showed a significant difference in the mean scores between expert and competent classifications, and 62 showed significant difference between mean scores for competent and not-competent performers.

While this provides further evidence of content and construct validity of the model when used as test items to predict competence, it is the ability of the items to [illegible]

[illegible]

Item	Item discrimination index
Is an excellent communicator	0.83
Counsels patients	0.58
Is patient	0.75
Mentors others	0.96
Provides opportunities for others to develop	0.96
Understands people	0.92
Is an effective team member	0.80
Welcomes feedback	0.75
Is transparent	0.83
Has a positive attitude	0.80
Has good people skills	0.72
Can read body-language and adapt response	0.92
Is confident dealing with other health professionals	1.00
Practises legally	0.80
Balances work and life	0.92
Acts as a leader	0.96
Supervises others	0.84
Delegates	0.71
Is confident making decisions and stands by them	1.00
Works independently	0.83
Is self-confident	0.75
Is trusted	0.75
Is willing to challenge him or herself and take risks	0.76
Is not pressured into making decisions	1.00
Is motivated	0.55
Knows limits and will say that's outside my scope	0.50
Learns from experience	0.92
Sees pharmacy as a vocation	0.83
Uses a range of problem-solving approaches	0.92
Integrates knowledge	0.92
Is proactive	0.83
Has a broad knowledge-base	0.92
Applies knowledge from a range of sources	0.83
Extrapolates known information to unknown settings	1.00
Has an area of specialisation	0.76
Can access, interpret and evaluate information	0.88
Has experience in life and pharmacy	0.88
Values others	0.58
Can think laterally	0.96
Cares about people	0.21
Is ethical and legal	0.58
Is altruistic	0.58
Ensures the pharmacy is able to operate	0.83
Represents the pharmacy	0.92
Trains others	0.79
Can work independently	0.83
Participates in peer review	0.63
Has high standards	0.75

Ten items have a discrimination index 0.6 or less. These are:

- Questions the patient fully
- Welcomes peer support
- Counsels the patient every time
- Is motivated
- Know limits and will say "that's outside my scope"
- Values others
- Cares about people
- Is legal and ethical
- Is altruistic
- Participates in peer review.

The results suggest that these ten items do not provide strong evidence of concurrent or predictive validity and therefore could be excluded from a shortened test designed to determine professional competence.

Analysis of data from part two and part three of the survey provided further information in relation to each of the test items. Data from part two of the survey enabled an *Integration Index* to be calculated, providing a measure of the degree to which the items spanned the five domains of competence in their coverage. This is considered to be an important property, given the "integrated" model of professional competence developed from the analysis in phase one of this research.

Data from part three of the survey provided a measure of the degree to which each of the test items are required by pharmacists when they perform each of the four key professional functions—dispense medicine, prepare pharmaceutical products, contribute to the rational use of medicines, and provide primary health-care.

9.2.3 Strength of integration

As mentioned, the model of professional competence proposes that the construct of professional competence is defined by the ability to integrate the domains of competence. In this step of the research, the test items were analysed to determine

which of the test items were considered by the "expert" panel to require the integration of domains of competence for proficient performance.

An *Integration Index* was calculated for each item to obtain a measure of the strength of integration as follows:

- Each item response was given a score for integration by summing the number of domains the respondent ticked for that item—X. Given that there were five domains, the maximum X for any item was therefore 5.
- The item scores were summed for all respondents ΣX. As n =12, the maximum score for ΣX on any item = 60.
- The *Integration Index* (I) was calculated using the following formula:

$$I = \frac{\Sigma X - 12}{48}$$

A perfectly integrated item would have an Integration Index of 1.0, while an item that does not integrate at all will have an integration index of 0.0. The integration indices for each item are given in Table 9.5.

Table 9.5 – Table of integration indices

Questionnaire item	Integration index
Has a holistic approach	0.59
Has a big picture focus	0.63
Has a patient focus	0.56
Takes a complete patient history	0.50
Questions the patient fully	0.46
Manages pressure situations	0.38
Uses a logical approach	0.46
Is proficient	0.41
Welcomes peer support	0.46
Is accurate	0.75
Can multi-task	0.31
Follows through on everything	0.56
Is technically excellent	0.31
Is careful and checks him or herself	0.44
Has good documentation	0.41
Acts as a resource for others	0.59
Manages patient expectations	0.75
Is an excellent communicator	0.35
Counsels patients	0.34
Is patient	0.38

Questionnaire item	Integration index
Mentors others	0.60
Provides opportunities for others to develop	0.40
Understands people	0.25
Is an effective team member	0.28
Welcomes feedback	0.25
Is transparent	0.29
Has a positive attitude	0.16
Has good people skills	0.16
Can read body-language and adapt response	0.13
Is confident dealing with other health professionals	0.44
Practises legally	0.28
Balances work and life	0.21
Acts as a leader	0.75
Supervises others	0.46
Delegates	0.38
Is confident making decisions and stands by them	0.56
Works independently	0.50
Is self-confident	0.31
Is trusted	0.31
Is willing to challenge him or herself and take risks	0.28
Is not pressured into making decisions	0.44
Is motivated	0.31
Knows limits and will say that's outside my scope	0.35
Learns from experience	0.54
Sees pharmacy as a vocation	0.25
Uses a range of problem-solving approaches	0.34
Integrates knowledge	0.19
Is proactive	0.21
Has a broad knowledge-base	0.44
Applies knowledge from a range of sources	0.41
Extrapolates known information to unknown settings	0.29
Has an area of specialisation	0.22
Can access, interpret and evaluate information	0.34
Has experience in life and pharmacy	0.44
Values others	0.34
Can think laterally	0.21
Cares about people	0.16
Is ethical and legal	0.16
Is altruistic	0.28
Ensures the pharmacy is able to operate	0.31
Represents the pharmacy	0.34
Trains others	0.35
Can work independently	0.31
Participates in peer review	0.35
Has high standards	0.44

These results showed that in the perception of the expert panel, all items required a competent pharmacist to integrate the domains of competence to some degree. The thirteen items with the strongest integration—I > 0.5—include: taking a holistic approach and looking at the "wider" picture, having a patient focus, taking a complete

patient history and managing patient expectations, all of which focus on interactions with patients and clearly require a high degree of integration. Another group that includes acting as a resource for others, mentoring others, acting as a leader and learning from experience, relate to the role of pharmacists in the health-care team. The third set of items includes accuracy, the ability to follow through on everything, to work independently and to make decisions confidently and stand by them, and represents the integrated nature of technical tasks.

Nineteen items show a low strength of integration—$I < 0.3$. Many of these are domain specific. For example, understanding people, welcoming feedback, having good people skills, reading body-language, and being an effective team member, are interpersonal skills. Being transparent, and practising legally and ethically fit in the legal/ethical domain, while balancing work and life, having a positive attitude, and being willing to challenge oneself fit in the intra-personal part of the intra/interpersonal domain. Integrates knowledge, extrapolates known information to unknown settings, and has an area of specialisation, are examples of the cognitive domain that have some integration with other domains.

Integration of the domains of competence is clearly regarded by the expert panel as important for professional competence. This provides further data for refining items from 65 to a more manageable number.

9.2.4 Analysis of functional application

The final part of the survey instrument was used to gather data on whether the "expert" panel could perceive that competent pharmacists used the behaviours—as expressed in the test items—when performing their key professional functions. This question was included in the questionnaire to identify those test items that were applicable to all the functional roles and were therefore related to the construct of professional competence broadly, rather than functional competence in only one or two domains. Such data, if conclusive, would be useful as evidence of the professional competence being a construct in its own right—separate from functional competence.

Unfortunately, only five responses to this question were received from the expert panel, which meant that insufficient data were obtained to support the drawing of any definitive conclusion. Pharmacists had difficulty with this part of the survey as many of them interpreted the question from the point of view that the functional roles were specialist ones, rather than being roles they routinely engaged in. The data obtained did, however, provide an indication of which test items were strongly associated with all the professional functions and which were functionally specific.

The question in part 3 of the survey instrument asked participants to determine, in their opinion, which of the test items would be used by a competent pharmacist when they:

- performed all their professional roles (A)
- dispensed medicines (D)
- prepared pharmaceutical products (P)
- contributed to the rational use of medicines (R)
- provided primary health-care (H).

The frequency with which the respondents recorded that an item was used in one or more of the functions were recorded and summed. Frequency counts for each item and function are given in Table 9.6.

Table 9.6 – Frequency count of functional application

Item	All (A)	Dispensing (D)	Prepare products (P)	Rational use of medicines (R)	Primary health-care (H)
Has a holistic approach	3	3	1	2	3
Has a big picture focus	4	2	2	1	3
Has a patient focus	2	2	0	4	4
Takes a complete patient history	0	2	0	5	5
Questions the patient fully	1	1	0	3	3
Manages pressure situations	4	2	0	1	2
Uses a logical approach	5	-	-	-	-
Is proficient	5	-	-	-	-
Welcomes peer support	5	-	-	-	-
Is accurate	4	2	2	0	0
Can multi-task	4	1	0	1	1
Follows through on everything	4	3	2	2	1
Is technically excellent	4	2	2	1	1
Is careful and checks him or herself	4	2	2	0	0

Item	All (A)	Dispensing (D)	Prepare products (P)	Rational use of medicines (R)	Primary health-care (H)
Has good documentation	4	2	2	2	1
Acts as a resource for others	5	-	-	-	-
Manages patient expectations	0	3	1	3	5
Is an excellent communicator	4	2	1	1	1
Counsels patients	1	3	1	4	5
Is patient	5	-	-	-	-
Mentors others	5	-	-	-	-
Provides opportunities for others to develop	4	1	1	1	2
Understands people	4	1	1	0	0
Is an effective team member	4	1	0	0	0
Welcomes feedback	1	1	2	2	4
Is transparent	5	-	-	-	-
Has a positive attitude	5	-	-	-	-
Has good people skills	4	0	0	1	1
Can read body-language and adapt response	2	2	0	1	2
Is confident dealing with other health professionals	4	1	1	1	2
Practises legally	5	-	-	-	-
Balances work and life	1	2	2	1	4
Acts as a leader	3	1	0	1	1
Supervises others	3	1	0	1	1
Delegates	4	1	0	0	0
Is confident making decisions and stands by them	5	-	-	-	-
Works independently	3	5	5	1	2
Is self-confident	5	-	-	-	-
Is trusted	5	-	-	-	-
Is willing to challenge him or herself and take risks	3	0	0	0	1
Is not pressured into making decisions	5	-	-	-	-
Is motivated	4	1	1	1	2
Knows limits and will say that's outside my scope	4	2	2	2	1
Learns from experience	5	-	-	-	-
Sees pharmacy as a vocation	3	1	1	2	1
Uses a range of problem-solving approaches	4	2	2	2	1
Integrates knowledge	3	3	1	2	2
Is proactive	3	0	0	0	1
Has a broad knowledge-base	1	1	1	4	4
Applies knowledge from a range of sources	4	2	2	2	2
Extrapolates known information to unknown settings	5	-	-	-	-
Has an area of specialisation	1	0	1	3	4
Can access, interpret and evaluate	2	0	0	5	5

Item	All (A)	Dispensing (D)	Prepare products (P)	Rational use of medicines (R)	Primary health-care (H)
information					
Has experience in life and pharmacy	4	1	0	1	0
Values others	2	1	0	3	1
Can think laterally	5	-	-	-	-
Cares about people	1	2	0	1	2
Is ethical and legal	5	-	-	-	-
Is altruistic	4	1	1	2	2
Ensures the pharmacy is able to operate	3	1	0	0	1
Represents the pharmacy	3	1	0	1	0
Trains others	3	1	0	0	1
Can work independently	4	1	1	1	1
Participates in peer review	3	1	1	3	2
Has high standards	3	2	2	1	1

Although the number of participants answering this question was small, the results indicate that all but two items are considered to apply to all functions that pharmacists perform. Thirteen of the items were rated by all respondents as behaviours that were demonstrated by competent pharmacists when performing all their professional functions. While interesting, insufficient data was obtained to draw definitive conclusions.

The data obtained from evaluating the theoretical performance of the test items was used to identify items to be used in the second step of this phase of the research—namely piloting the test as a self-assessment with practising pharmacists.

9.3 Selecting test items for step two

The data obtained from the perceptions of the expert panel of pharmacists provided a great deal of evidence in support of the internal reliability consistency of the model of professional competence and the test items drawn from it. The data also provided support for content and construct validity.

In the next step of the research, further evidential data were sought as to how the model and test performed when used by practising novice and experienced

pharmacists to self-assess their competence. A shortened test was required for this purpose and the item analysis results were used to identify items for use in the test.

9.3.1 Item selection criteria

Collectively, all items used in the survey instrument formed a unitary measurement scale with very high internal consistency reliability—alpha greater than 0.99. All items, except for "welcomes peer support" also correlated strongly with professional competence and showed a potential difference in rating scores across the three performance classifications—expert, competent and not-competent. This suggested that any of the items trialled in this step could be used in the shortened test except, perhaps, "welcomes peer support".

The criteria used to select items for the self-assessment were that:

1. Items should potentially differentiate between the three competence levels, that is, there should be a clear indication that different levels of performance would be expected to be seen for not-competent, competent and expert pharmacists.
2. Items should demonstrate that they require integration with the domains of competence as these are considered good examples of behaviours that reflect professional competence as proposed by the model.
3. Items should not be highly functionally specific, that is, they should be applicable to all or most of the professional functions that pharmacists perform. Using items that are not highly functionally specific means that the test developed is more likely to have face validity.

Items considered for inclusion in the shortened self-assessment test included the eleven items that differentiated between classifications at a significance level of 0.001 or less, and the fifty-four items with a discrimination index 0.7 or more. A strong integration index ($I > 0.2$) and an indication the item was applicable across all functions of pharmacy were also considerations for item selection. Where items such as "logical", "proficient" and "technically excellent" were shown to be highly correlated—over 0.9—only one of the items was selected. This is because items correlated this highly are effectively measuring the same thing—they duplicate each other.

In the end, 36 items were selected from the original 65. While the majority of these met the criteria listed in 1 and 2 above, five items with a discrimination index below 0.7 were also included. The decision to incorporate these items was made for a number of different reasons.

The item "taking a wide view" had a relatively low power to discriminate between competent and not-competent pharmacists (a discrimination index of 0.64), but it did differentiate among all three levels of competence. In addition to this, it had one of the highest integration indices—0.63—and applied to all functions pharmacists perform and so was included.

The item "motivated to learn" effectively differentiated between competent and not-competent performers and was included because it focused on the importance of ongoing learning. Determining whether this item will correlate strongly with professional competence when judged by pharmacists assessing themselves was of interest.

"Practise legally and ethically" was also included although it did not meet the criteria listed above to determine whether this item's correlation with the model changed when the model was tested using self-rating of a pharmacist's own performance. In addition it was felt that there should be an item relating specifically to legal and ethical practice in the test.

Another item that did not meet the criteria, but was included, was "participate in peer review". This item was included because some of the results obtained in the initial item analysis were due to the ambiguous nature of the test item, and the opportunity was taken to attempt to reword it.

The final item "welcomes peer support" did not correlate strongly with professional competence, did not differentiate between levels of competence or discriminate between competent and not-competent performers. It was deliberately included as a "marker item", a check of the comparative results between the two steps in the research.

In developing the self-assessment questionnaire, the wording of all the test items was reviewed in an attempt to remove any ambiguity, and they were then converted into "I" statements. Turning the test items into "I" statements was important because the self-assessment questionnaire asked participants to rank themselves against each of the test items using a five-point Likert scale as shown below:

1	2	3	4	5
Never applies	Sometimes applies	Applies half the time	Usually applies	Always applies

The final 36 items selected for the self-assessment questionnaire are shown in Table 9.7.

Table 9.7 – Selected items for self-assessment questionnaire

Number	Item
1.	I provide a "wider" service, look after the whole person and have an holistic approach.
2.	In my practice, I anticipate and deal with potential problems and look beyond the surface of things. I have a "gut feeling" for when things aren't right and act on it.
3.	I do a really good patient history and clinical review and I am proactive in mitigating potential problems.
4.	I manage high pressure situations without getting wound up. I am relaxed in my job and do not let things overwhelm me.
5.	I ask people for their opinion and welcome peer support.
6.	I am accurate and work to the highest possible standards.
7.	I am technically excellent. I use appropriate techniques.
8.	I act as a resource for others, including other pharmacists and/or consultants.
9.	I am a good communicator. I listen and am willing to talk and transfer information, pitching it to the right level in both content and context.
10.	I am able to inspire, mentor and teach others. I am willing to pass experiences on, including where I have made mistakes so that others can learn from these mistakes.
11.	I provide opportunities for others to develop, and create an atmosphere that encourages others to learn from their mistakes and share experience.
12.	I am transparent, ethical and honest.
13.	I have a positive attitude and see the strengths in others. I do not put people down.
14.	I am confident in dealing with other health professionals.
15.	I act as leader, motivate the team and initiate action.
16.	I am confident making decisions and am prepared to stand by the decisions I make. I am self-assured and take responsibility and accountability.
17.	I am confident, happy in my role, in my own knowledge and in my ability to apply my knowledge.
18.	I am willing to take risks and to challenge myself.
19.	I am interested in what I am doing and am motivated to learn and achieve more, and to develop my skills. I engage in CPD.

Number	Item
20.	I learn from experience and accept feedback. I am open to new ideas and adapt to new situations.
21.	I examine my own performance, undertake self audit and am realistic about my goals. I am self-aware.
22.	I believe professional responsibility goes beyond work hours. I am passionate about pharmacy and I see it as a vocation/calling.
23.	I am able to approach problems from different perspectives, can identify comprehensive solutions, and can come up with more and unusual ways to deal with a problem. I recognise there is often more than one solution to a problem.
24.	I am able to integrate information from a range of different sources and I can recognise the importance of apparently unconnected information.
25.	I am proactive.
26.	I have extensive clinical knowledge that is up-to-date and covers theoretical and practical aspects of pharmacology and pharmacy practice.
27.	I am able to apply information from a range of sources in decision-making. I make decisions from first principles and adapt information to New Zealand and local conditions.
28.	I can extrapolate known information to unknown situations to achieve results
29.	I have specialised in a particular field of medicine and have an in-depth knowledge in a specific area of specialisation.
30.	I can access, retrieve, interpret and evaluate information including clinical data, including evidence of efficacy and safety.
31.	I have experience in both pharmacy and life, and I am able to integrate knowledge with practice.
32.	I am able to think laterally, logically and in different ways.
33.	I practise legally and ethically.
34.	I represent the pharmacy and represent the views of others where required. I am the face of the pharmacy.
35.	I train staff so they can manage customers and difficult situations.
36.	I participate in peer review

The next step in the research was to trial the self-assessment questionnaire with novice and experienced pharmacists to test its performance and to gather further evidence of content, construct and criterion-related validity along with evidence of its internal consistency reliability. Evidence was also obtained regarding the importance of each of the test items in relation to professional competence

Results of this step of the research are covered in Chapter Ten.

Chapter Ten
Evaluating the model performance in practice

In this step of the research, a shortened questionnaire containing 36 behavioural statements—worded as self-assessment items—was administered to novice and experienced pharmacists. The questionnaire asked participants to rate their own performance against each of the behavioural statements, used as test items—employing a 5-point Likert scale—and to provide an overall assessment of their competence. At the same time, participants were asked to rate each of the statements for importance as further evidence of content validity of the model of professional competence.

The 36 items used in the self-assessment questionnaire were selected from the 65 items evaluated by an "expert" panel as discussed in Chapter Nine. Thirty-one of these were chosen because of their potential to differentiate between levels of competence, integrate domains of competence and apply to all the professional functions that pharmacists perform. Five items were included in the self-assessment even though they did not appear to meet these criteria as well as other items because they were nevertheless deemed to be important for content validity or other reasons as discussed in Chapter Nine.

The self-assessment questionnaire was administered to a sample of 863 practitioners—144 novice and 719 experienced pharmacists. By the cut-off date for return of the questionnaires, 360 responses had been received and 356 contained data that were able to be analysed. A further six questionnaires were received after the cut-off date and were not included in the analysis. See Chapter Eight for further discussion of the methods used.

The data from all 356 responses were entered into three Excel spreadsheets, one for importance scores, one for rating scores, and one for demographic data, and then entry checked to ensure accurate input. The data were then subjected to a number of statistical techniques aimed at providing further evidence of validity and reliability. In

addition to calculating and comparing means and standard deviations, analysis of variance, principal component analysis, calculation of factor scores, and discriminant function analysis were undertaken.

10.1 The self-assessment questionnaire

The self-assessment questionnaire contained three parts. In the first part, participants were asked to rate each of the test items for importance in relation to professional competence. Item rating scores use a 5-point scale that ranged from 1.0, meaning the item was not important, to 5.0 meaning it was extremely important.

Part two of the questionnaire asked participants to rate their own performance against the self-assessment items and to give an overall assessment of their competence. Item rating scores ranged from 1.0, meaning the pharmacist did not demonstrate the behaviour, to 5.0 meaning the pharmacist demonstrated that behaviour all the time. Overall assessments of competence ranged from 1, meaning the person perceived themselves as not-competent, to 3, meaning they considered themselves to be expert.

Part three of the self-assessment questionnaire asked pharmacists to describe how their practice had changed over the past five years and to provide information about the current practice along with basic demographic information.

Data from parts one and two of the self-assessment questionnaire were analysed separately. Frequency tables for each data-set were prepared and means and standard deviations calculated. The frequency tables for both data-sets are contained in Appendix 9. Further analyses, including analysis of variance, principal component analysis (PCA), calculation of factor scores and discrimination indices, and discriminant function analysis (DFA), were undertaken on the data.

10.1. Initial statistics

Asking pharmacists to rate each of the test items for importance provided further evidence of content validity in respect of the behaviours considered important for

professional competence. Mean scores higher than 3.0 indicate that the item was considered to be important.

Pharmacists were also asked to rate the frequency with which they demonstrated the behaviour described in the self-assessment item. Mean scores higher than 3.0 indicated that pharmacists demonstrated this behaviour most of the time. Means and standard deviations for both importance and self-rating scores are shown in Table 10.1.

Table 10.1 – Means and standard deviations for importance and self-rating scores

	Importance		Self-rating	
Item	**Mean**	**SD**	**Mean**	**SD**
Holistic approach	3.23	0.94	3.48	0.81
Wide view	2.56	1.25	3.88	0.84
Patient history and clinical review	3.58	0.98	3.25	0.99
Manage high pressure situations	3.87	1.07	3.70	0.80
Welcome peer support	3.84	0.83	4.14	0.87
Accurate	4.66	0.64	4.39	0.60
Technically excellent	3.72	1.11	4.02	0.71
Act as a resource for others	3.12	1.31	3.54	1.04
Good communicator	2.80	1.37	4.15	0.69
Inspire, mentor and teach others	2.03	0.39	3.74	0.99
Provide opportunities for others to develop	4.14	0.81	3.67	0.99
Ethical and honest	4.30	0.73	4.56	0.63
Positive attitude	4.19	0.83	4.21	0.74
Confident in dealing with other health professionals	4.37	0.65	4.03	0.80
Leader, motivate the team and initiate action	4.34	0.77	3.40	1.00
Confident making decisions	4.92	0.29	4.07	0.85
Confident	4.52	0.64	3.79	0.82
Willing to take risks	4.10	0.86	3.34	0.94
Motivated to learn and achieve more	4.75	0.48	3.87	0.97
Learn from experience and accept feedback	4.37	0.72	4.25	0.69
Undertake self-audit and self-aware	4.24	0.75	3.92	0.86
See pharmacy as a vocation/calling.	4.76	0.57	3.44	1.08
Approach problems from different perspectives	4.52	0.67	3.56	0.86
Integrate information from a range of different sources	4.56	0.61	3.65	0.86
Proactive	4.17	0.83	3.65	0.89
Extensive clinical knowledge	4.62	0.56	3.29	0.87
Apply information from a range of sources in decision-making	4.53	0.64	3.62	0.87
Extrapolate known information to unknown situations	3.66	0.96	3.48	0.81
Specialised in a particular field of medicine	4.50	0.64	3.88	0.84
Access, retrieve, interpret and evaluate information	4.50	0.64	3.25	0.99
Experienced in both pharmacy and life	4.35	0.73	3.70	0.80
Think laterally, logically and in different ways	3.82	1.01	4.14	0.87
Practise legally and ethically	4.13	0.78	4.39	0.60
Represent the pharmacy	4.19	0.76	4.02	0.71
Train staff	4.20	0.79	3.54	1.04
Participate in peer review	4.39	0.74	4.15	0.69

Three items—inspire, mentor and teach others, wide view, and good communicator —had mean importance scores of less than 3.0 indicating that they are perceived to be of less importance. These results are surprising as it would be expected that two of the items—wide view and good communication—would be very important for professional competence. As a check on these results, the strength of the correlation between the importance items and professional competence were calculated using Pearson-Product Moment Correlation.

These results showed that the correlations for the three items—inspire, mentor and teach others, wide view, and good communicator — all had an $r > 0.4$, indicating that they nonetheless correlated positively with professional competence.

Ten items had an $r > 0.6$, showing the strongest correlation between importance and professional competence. These were the ability to:

- integrate information from a range of sources (0.66)
- think laterally, logically and in different ways (0.66)
- be self-aware and undertake self-audit (0.65)
- apply information from a range of sources in decision-making (0.65)
- extrapolate known information to unknown situations (0.64)
- approach problems from different perspectives (0.64)
- participate in peer review (0.63)
- learn from experience and accept feedback (0.62)
- be proactive (0.62)
- be experienced in both pharmacy and life (0.60).

These items were also shown to be highly correlated in the analysis of the theoretical performance of the model as discussed in section 9.1.3. Two items, accurate and practise legally and ethically had an $r < 0.3$, indicating weaker correlation. This may be due to the perception that these items are perceived to be more closely associated with technical competence rather than professional competence. Review of the integration index scores obtained from the expert panel for these two items suggests that "practises legally and ethically" was indeed an item with a low integration score. "Accurate", on the other hand, had a high integration score; however, the difference obtained in results could be due to the different make-up of the test populations.

Means for the self-rating scores showed that no item scored below 3.25, indicating that pharmacists perceived they used all these behaviours most of the time in their practice. Thirteen of the 36 items had a mean greater than 4.00, indicating that these behaviours were used nearly all the time; of these items, one—being ethical and honest—had a mean of 4.56, designating that this behaviour underpins all work that pharmacists perform. This is not an unexpected result.

Comparisons of means for self-rating and importance are shown in Figure 10.1. Correlations between these means are given in Table 10.2. This shows that for all but four items—patient history, peer support, clinical knowledge, and trains staff—have a self-rating score that mirrors the items' importance score. Possible reasons for this are that pharmacists may demonstrate a behaviour often even when they do not think it is important—the case with "welcome peer support"—or pharmacists believe it is important, but do not use it as often as they should—the possible case with "take a comprehensive patient history", and "exhibit extensive clinical knowledge"—or the pharmacists' roles do not require them to demonstrate the behaviour often—the probable case for the difference seen with "train staff". These are suggested interpretations, but clearly not conclusive.

Internal consistency reliability for both data-sets were calculated. The Cronbach alpha for both importance and self-rating was 0.94, indicating very high internal consistency reliability for both scales.

Table 10.2 – Table of correlations between importance and self-ratings scores

Item number	Item	*r*
1.	Holistic approach	0.577
2.	Wide view	0.493
3.	Patient history	0.495
4.	Manage high pressure situations	0.332
5.	Welcome peer support	0.593
6.	Accurate and high standards	0.261
7.	Technically excellent	0.437
8.	Resource for others	0.248
9.	Good communicator	0.297
10.	Inspire, mentor and teach others	0.279
11.	Develop others	0.419
12.	Transparent, ethical and honest	0.460
13.	Positive	0.318

Item number	Item	*r*
14.	Confident with other health professionals	0.215
15.	Leader, motivate team and initiate action	0.425
16.	Confident making decisions	0.330
17.	Confident, in ability to apply knowledge	0.256
18.	Willing to take risks and to challenge self	0.495
19.	Motivated to learn	0.491
20.	Learn from experience	0.449
21.	Undertake self audit and self-aware	0.484
22.	See pharmacy as a vocation/calling	0.597
23.	Problem-solving	0.415
24.	Integrate information	0.351
25.	Proactive	0.458
26.	Extensive clinical knowledge	0.236
27.	Make decisions and adapt information	0.271
28.	Extrapolate known information to unknown situations	0.501
29.	Specialised in a particular field of medicine	0.423
30.	Access, retrieve, interpret and evaluate information	0.507
31.	Experience in both pharmacy and life	0.389
32.	Think laterally, logically and in different ways	0.359
33.	Practise legally and ethically	0.682
34.	Represent the views of others	0.647
35.	Train staff	0.455
36.	Participate in peer review	0.513

All correlations are significant at the 0.01 level (2-tailed)

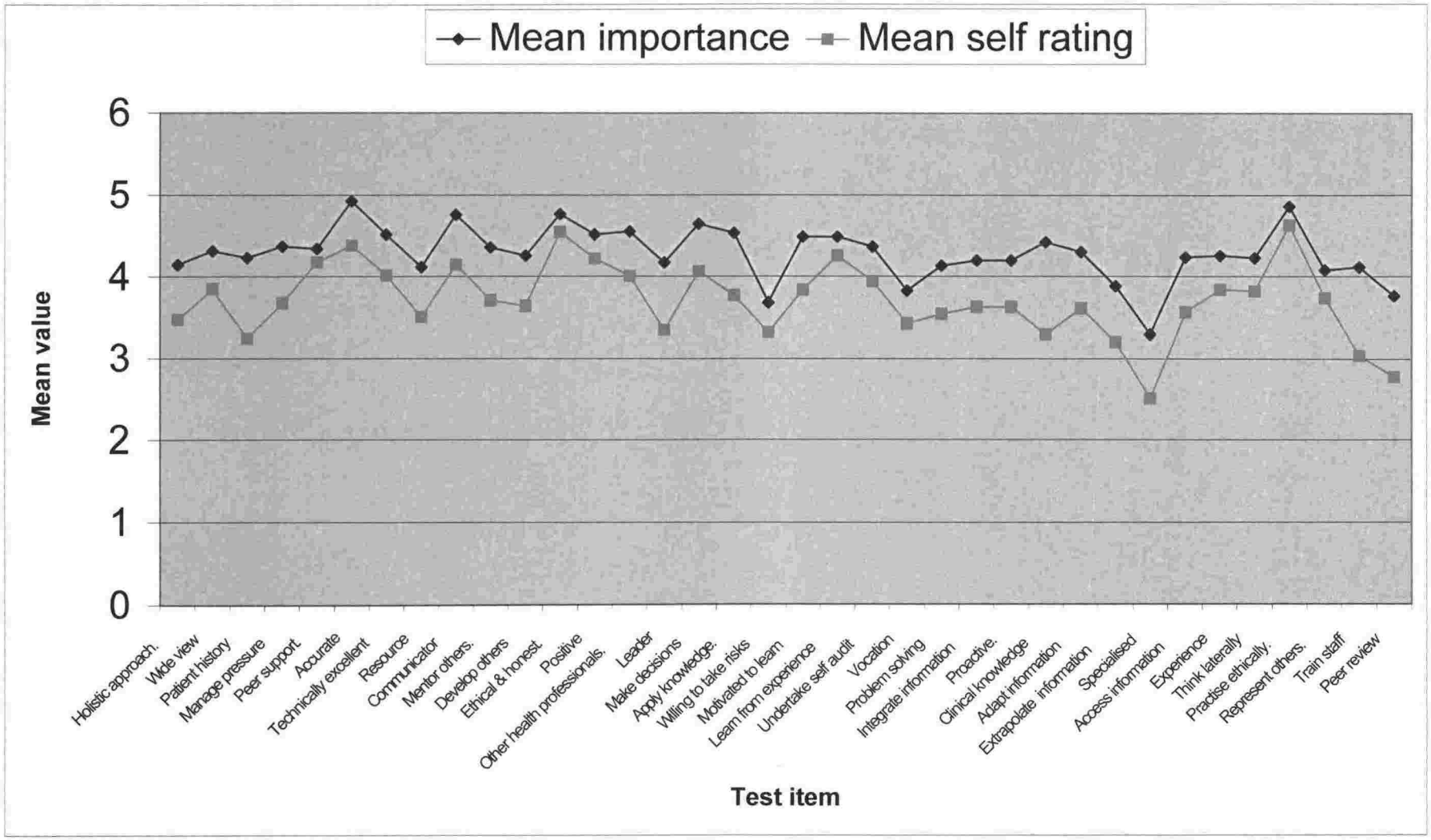

Figure 10.1 – Comparisons of means for importance and self-ratings

10.1.2 Self-assessment of competence

Of the 360 participants responding to the questionnaire, 356 rated their overall competence. Twenty-two rated themselves as not-competent, 293 rated themselves as competent and 29 rated themselves as expert. In addition, three respondents rated themselves as between not-competent and competent, and nine rated themselves as between competent and expert. These results are illustrated in Figure 10.2.

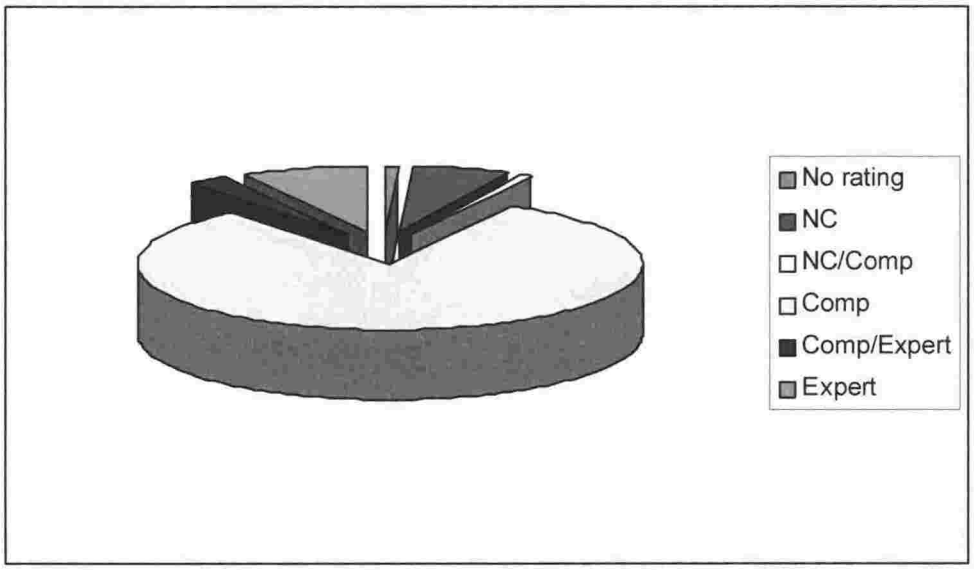

Figure 10.2 – Self-rating of competence

Of the 22 participants rating themselves as not-competent, 21 were novice pharmacists and one was an experienced pharmacist. The three rating themselves as between competent and not-competent were all experienced pharmacists. One novice pharmacist rated his/herself as expert.

Twenty-one of the pharmacists rating themselves as either not-competent or between not competent and competent fell within the age group 21 – 30 while three were in the age group 51 or older. Sixty-eight percent of the pharmacists rating themselves expert or between expert and competent were in the 41 to 50 (n=12) and 51 and over age groups (n=14). Six were in the 31 to 40 age group, while four were in the 21 to 30 age group.

This finding is in contrast with the data obtained from the interviews, which suggested that pharmacists typically became expert after five years of practice. The difference is possibly due to the bias associated with self-rating. While others may rate a practitioner as expert after a period of say five years, the practitioner will not rate themselves as expert until they have been practising a significantly longer period of time.

Pharmacists rating themselves as expert were most likely to have a postgraduate qualification—69 percent of experts—and be principally engaged in dispensing or contributing to the rational use of medicines. Eight of the 25 (32 percent) experienced pharmacists, practising in hospital pharmacy, rated themselves as expert, while 10 percent of community pharmacists rated themselves as expert.

The changes to their practice over the past five years include increased specialisation, becoming more patient focused, increased clinical work, focus on CPC, greater involvement with mentoring, teaching, and working with other health professionals.

10.1.3 Comparison of means

The means of the self-rating scores of items were compared for experienced and novice pharmacists; and for pharmacists rating themselves as expert, competent and not-competent to determine which of the items show a significant difference in scores. These are shown in Table 10.3.

Table 10.3 – Comparison of means on item scores

Item	Mean total	% mean	Mean exp'd.	Mean novice	Mean exp't.	Mean comp.	Mean N/C
Holistic approach	3.42	68	3.43	3.40	4.00	3.41	2.96
Wide view	3.83	77	3.89	3.73	4.57	3.83	3.07
Patient history	3.18	64	3.10	3.33	4.10	3.14	2.59
Manage high pressure	3.66	73	3.71	3.58	4.00	3.65	3.41
Welcome peer support	4.11	82	4.03	4.25	4.33	4.09	4.04
Accurate	4.34	87	4.48	4.08	4.57	4.34	4.00
Technically excellent	3.89	78	3.96	3.78	4.40	3.87	3.63
Act as a resource for others	3.51	70	3.78	3.02	4.33	3.50	2.70
Good communicator	4.12	82	4.14	4.08	4.33	4.15	3.56
Inspire, mentor others	3.71	74	3.94	3.28	4.57	3.67	3.15
Develop others	3.64	73	3.90	3.16	4.23	3.62	3.11
Ethical and honest	4.53	91	4.65	4.29	4.73	4.52	4.30
Positive attitude	4.11	82	4.07	4.18	4.10	4.14	3.78

Item	Mean total	% mean	Mean exp'd.	Mean novice	Mean exp't.	Mean comp.	Mean N/C
other health professionals							
Leader	3.30	66	3.56	2.84	4.10	3.29	2.59
Confident making decisions	4.05	81	4.29	3.64	4.47	4.07	3.44
Self-confident	3.76	75	3.94	3.43	4.53	3.75	2.96
Willing to take risks	3.27	65	3.30	3.22	4.23	3.22	2.81
Motivated to learn	3.81	76	3.92	3.61	4.43	3.81	3.15
Learn from experience	4.23	85	4.21	4.25	4.33	4.23	4.11
Undertake self-audit	3.90	78	3.93	3.84	4.40	3.87	3.63
Vocation/calling	3.42	68	3.50	3.27	4.00	3.41	2.85
Approach problems from different perspectives	3.53	71	3.68	3.27	4.13	3.53	2.85
Integrate information	3.63	73	3.77	3.38	4.40	3.60	3.07
Proactiv.	3.57	71	3.58	3.57	4.30	3.54	3.07
Extensive clinical knowledge	3.28	66	3.35	3.14	4.10	3.25	2.63
Apply information	3.60	72	3.74	3.36	4.50	3.54	3.22
Extrapolate	3.15	63	3.22	3.02	3.93	3.12	2.59
Specialised	2.49	50	2.68	2.16	3.60	2.45	1.74
Information access	3.55	71	3.58	3.50	4.27	3.52	3.15
Experienced	3.84	77	4.20	3.19	4.70	3.85	2.74
Think laterally	3.81	76	3.94	3.57	4.53	3.77	3.41
Practise legally and ethically	4.59	92	4.71	4.38	4.77	4.61	4.22
Represent the pharmacy	3.66	73	3.90	3.24	4.03	3.68	3.04
Train staff	3.03	61	3.42	2.33	3.60	3.05	2.22
Participate in peer review	2.71	54	2.84	2.50	3.63	2.69	2.00

Four items—"takes a patient history and clinical review", "welcomes peer support", "has a positive attitude", and "learns from experience"—had mean scores higher for novice pharmacists than experienced pharmacists. This possibly reflected a number of factors including changes in pharmacist education, where more emphasis is now given to training pharmacists to undertake clinical reviews; the situation that novice pharmacists are in training and therefore welcome the support of their peers in developing their skills; and their positive attitude being reflected in being new to the profession.

Two of these items "welcomes peer support", and "has a positive attitude" also do not show differences of at least 0.1 between the mean scores obtained from self-rating expert, competent and not-competent pharmacists. Differences of 0.1 or more between means, was arbitrarily chosen for this "screening" stage of the research instead of significance testing as the main focus was on finding the overall pattern of behaviours that are associated with professional competence rather than information at the item level.

The comparisons in mean scores are shown in Figures 10.3 and 10.4.

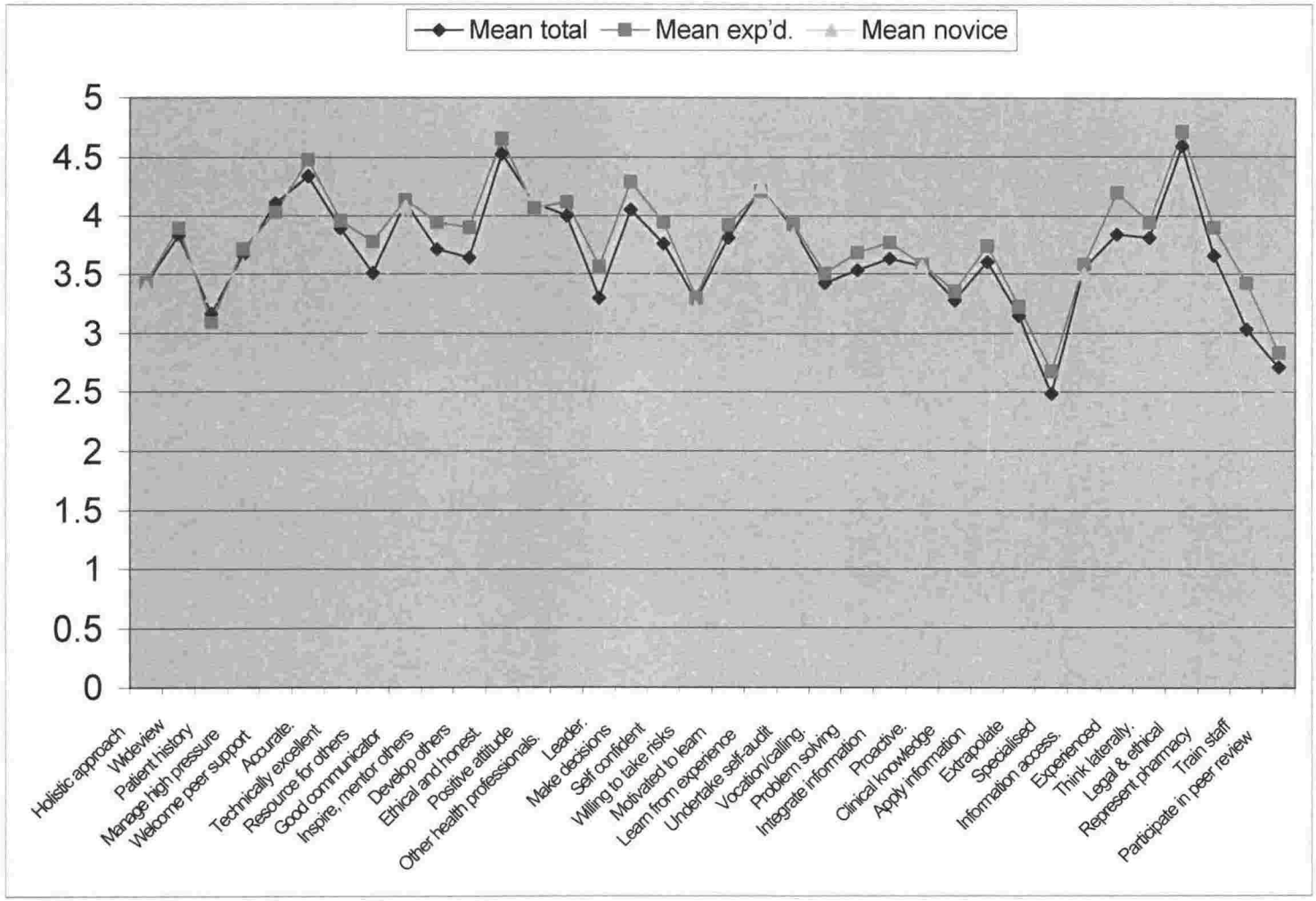

Figure 10.3 – Comparisons in means—experienced and novice

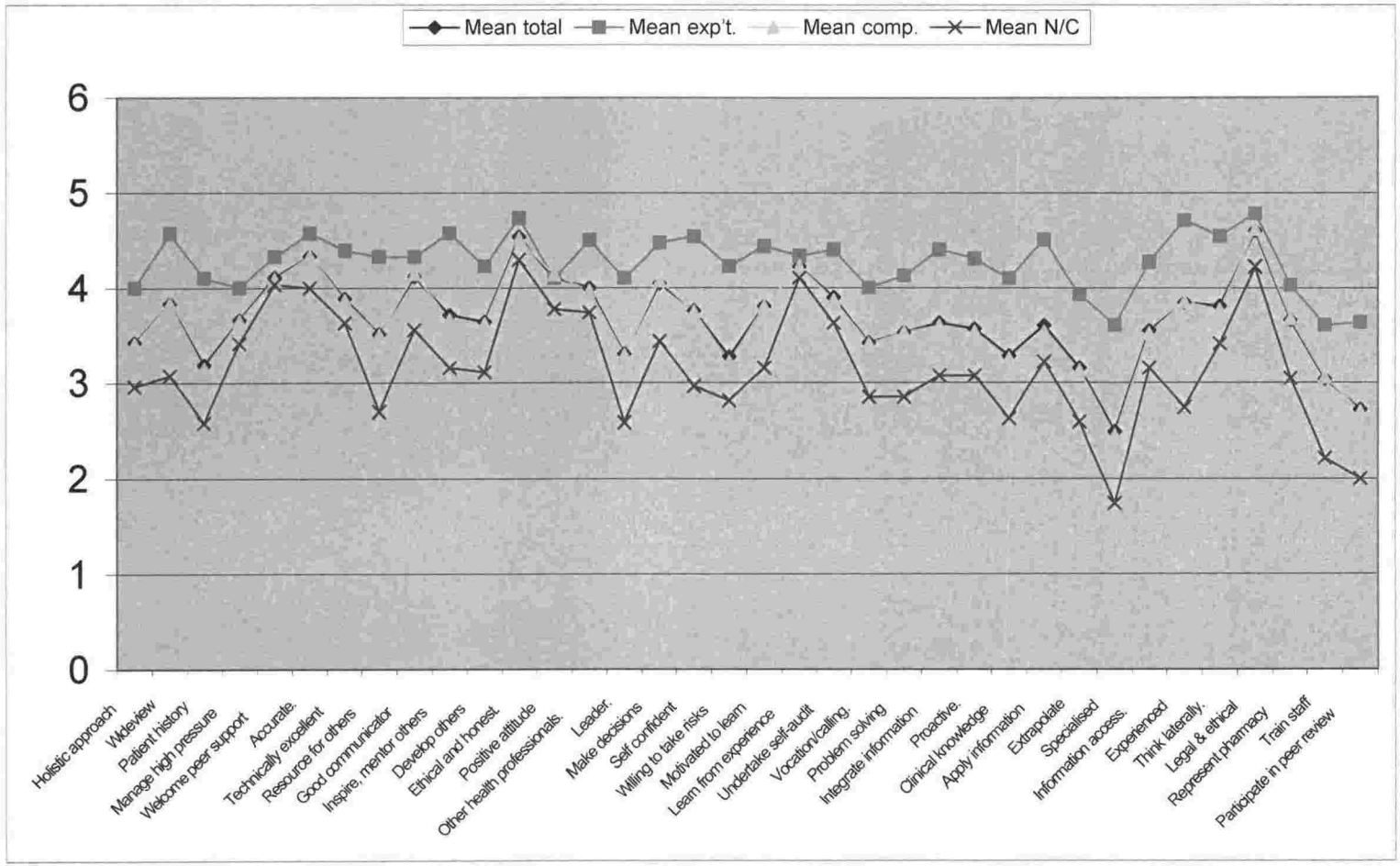

Figure 10.4 – Comparisons in means—level of competence

10.1.4 Analysis of variance

Having identified the composition of each of the groups, rating themselves as expert, competent, and not-competent, the next step was to determine if the assessment, as a whole, showed a significant difference in the total mean scores obtained by each of these groups.

Analysis of variance in means (ANOVA) for the sum of the self-rating scores for the three groups—expert, competent, and not-competent practitioners—was calculated. Comparisons of the mean rating scores between experienced and novice partitioners and the whole group were also made. Results are shown in Tables 10.4 and 10.5, and Figures 10.5 and 10.6.

Table 10.4 – ANOVA results for comparison of means: expert, competent and not-competent

Source of variation	Sum of squares	d.f.	Mean squares	F	Sig.
Between groups	22.52	2	11.26	50.67	0.001
Error	23.24	105	0.22		
Total	45.86	107			

Table 10.5 – ANOVA results for comparison of means: experienced and novice practitioners

Source of variation	Sum of squares	d.f.	Mean squares	F	Sig.
Between groups	2.00	2	1.00	4.37	0.01
Error	2.07	105	0.23		
Total	26.07	107			

Figure 10.5 shows the plot of means for the three groups—expert, competent and not-competent—for a 95 percent confidence level. Figure 10.6 shows the means of the two groups—novice and experienced practitioners—for a 95 percent confidence level.

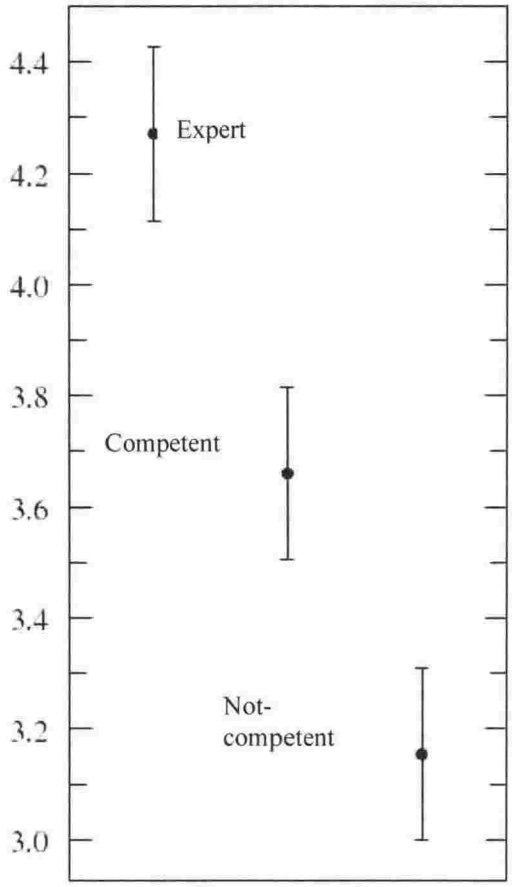

Figure 10.5 – Plot of variance in means in levels showing 95 percent confidence level

The results of this analysis show that the self-assessment, when considered as a whole, indicate a significant difference in the total mean scores for pharmacists rating themselves as expert, competent and not-competent.

The results also show that the self-assessment appears to discriminate between novice and experienced pharmacists when compared with the whole group.

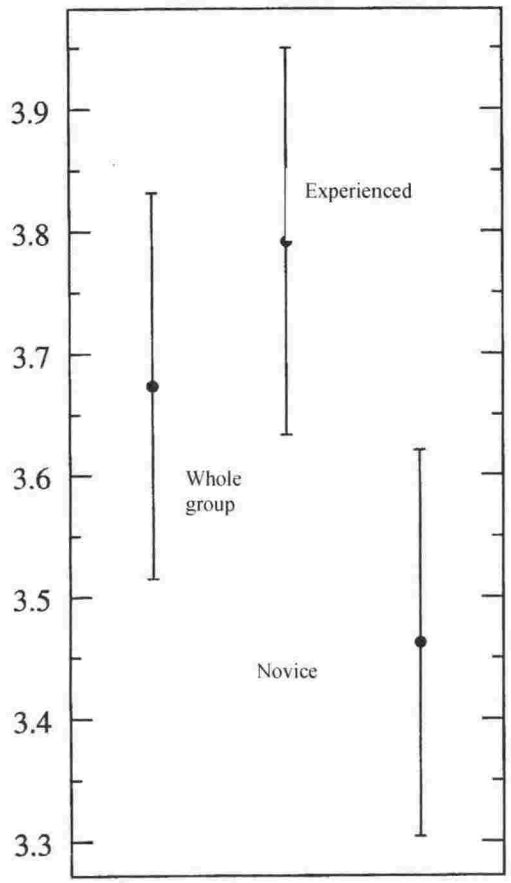

Figure 10.6 – Plot of variance in means of groups showing 95 percent confidence level

This suggested that the self-assessment questionnaire, in addition to pointing to content validity, also demonstrated criterion-related validity, which, when combined with the evidence obtained for internal consistency reliability, pointed to the potential usefulness of the test to predict competency as a self-evaluation instrument.

10.2 Principal Component analysis of self-assessment data

In order to extract principal components from the self-assessment data, a correlation matrix was prepared and the relationships within the data were identified. These were then grouped into major components that accounted for the variance seen in the data. These components were then rotated, using varimax rotation, to maximise the

variance between the components and to improve their ability to be interpreted. The aim of varimax rotation, then, is to make components as simple as possible by maximising the variance of the loadings across the variables within the component (Tabachnick & Fidell, 1983). However, this step should be seen as exploratory—the results of the unrotated solution are also of significance if the patterns suggest a dominant first component. The latter would be needed to support the "integrative" theory, but the former is still useful from the perspective of exploring and understanding the relationships in the data.

Eigenvalues for each of the extracted components were plotted on a scree plot. This plot is shown in Figure 10.7. Plotting eigenvalues on a scree plot is one of the accepted methods used to determine how many components are required to interpret the data. The point at which the scree plot shows a significant flattening out is used as a cut-off point for determining significance of the components. The other accepted method is to select those components with an eigenvalue greater than 1.0

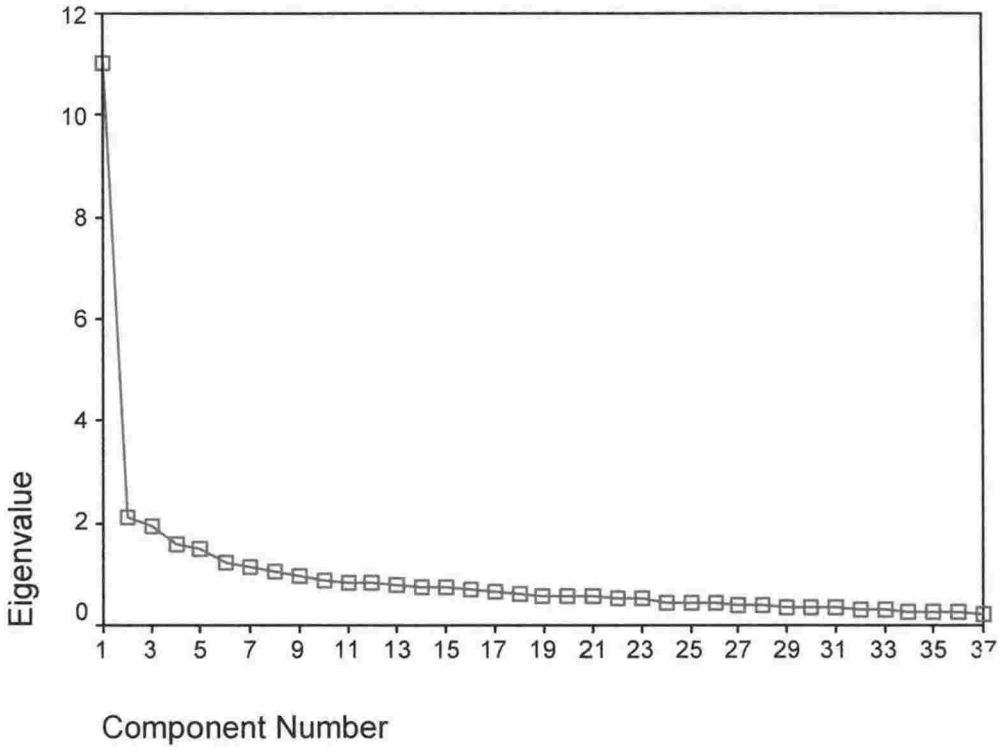

Figure 10.7 – Scree plot for self-rating data

Eight components had eigenvalues greater than 1.0 however, the first component—with an eigenvalue of 10.99—was over five times as large as the next component meaning that the first component accounts for the majority—29.71 percent—of the variance seen in the data and dominates the analysis. The component eigenvalues are listed in Table 10.6.

Table 10.6 – Eigenvalues for principal components of self-rating data

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	10.99	29.71	29.71	4.78	12.93	12.93
2	2.13	5.75	35.45	3.04	8.21	21.14
3	1.92	5.18	40.63	2.88	7.78	28.92
4	1.59	4.29	44.93	2.49	6.72	35.64
5	1.49	4.02	48.94	2.39	6.46	42.09
6	1.24	3.35	52.29	2.27	6.15	48.24
7	1.14	3.07	55.36	2.26	6.12	54.36
8	1.07	2.88	58.24	1.44	3.88	58.24

Based on the scree plot, there is a strong case for arguing that the self-ratings provide evidence of a dominant single trait underpinning professional competence in pharmacy performance. In other words, there is strong evidence for the integrative theory. However, for exploratory purposes, the results for the first eight components of the rotated structure matrix were also examined.

The eight principal components collectively describe 58.24 percent of the variance seen (it is not uncommon for multivariate analysis to account for less than 50 percent of the variance in the social sciences). The variables loading onto each of the components were investigated to enable interpretation of each component. Variables loading onto a component with a correlation of at least 0.30 were considered in the interpretation of that component. A variable that is highly correlated (>0.6) with only one component is a considered a pure measure and is called a marker variable; those that correlate (>0.3) with more than one component are complex variables (Tabachnik & Fidell, 1983).

The component matrix is shown in Table 10.7. It shows that six of the eight components have at least two pure measures loading at levels considered to be excellent (correlation > +/−0.7) or very good (> +/−0.6) that act as marker variables (Comrey, 1973). Component six has one such variable. The eighth component contains one pure measure and five complex variables with poor loading (around +/−0.32) and is therefore difficult to interpret and not considered further (Tabachnik & Fidell, 1983).

Table 10.7 – Rotated component matrix

Rotated Component Matrix(a)

	Component							
	1	2	3	4	5	6	7	8
26. Extensive clinical knowledge	.813	.104	.035	.083	.081	.083	-.116	.055
30. Access, retrieve, interpret and evaluate information	.730	.081	.000	.168	.065	.066	.086	.076
27. Confident, in ability to apply knowledge	.688	.148	.296	.203	.093	.020	.159	.096
24. Integrate information	.649	.302	.147	.061	.149	.095	.178	.017
28. Extrapolate known information to unknown situations	.570	.172	.350	.055	.155	.068	.167	.159
14. Confident with other health professionals	.484	-.050	.350	.200	-.090	.330	.027	-.119
19. Motivated to learn	.462	.002	-.097	.163	.326	.237	.183	.121
29. Specialised in a particular field of medicine	.461	.304	.205	-.008	.200	-.007	-.051	.404
23. Problem-solving	.450	.434	.226	-.021	.246	.032	.120	-.041
25. Proactive	.368	.170	.239	-.053	.279	.351	.272	.020
22. See pharmacy as a vocation/calling	.359	.313	.125	.026	.246	.128	.278	.087
35. Train staff	.043	.724	.281	.206	.101	.112	-.118	.194
34. Represent the views of others	.171	.714	.186	.156	.048	.010	.117	.121
31. Experience in both pharmacy and life	.392	.560	.237	.173	.167	.209	-.018	-.010
32. Think laterally, logically and in different ways	.411	.445	.215	.025	.224	.279	.135	-.224
33. Practise legally and ethically	.226	.392	-.079	.333	.105	.183	.250	-.325
11. Develop others	.097	.219	.735	.182	.185	.018	.161	.020
10. Inspire, mentor and teach others	.160	.284	.711	.040	.161	.185	.108	.014
15. Leader, motivate team and initiate action	.212	.310	.550	.193	.162	.368	-.096	.007
8. Resource for others	.373	.073	.523	.190	.036	.145	-.027	.341
6. Accurate	.116	.161	.078	.748	.022	.086	.033	.022
7. Technically excellent	.121	.128	.088	.732	.118	.013	.027	.105
16. Confident making decisions	.269	.082	.339	.541	.017	.277	.090	-.030

Rotated Component Matrix(a)

	Component							
	1	2	3	4	5	6	7	8
12. Transparent, ethical and honest	.089	-.003	.167	.497	.204	.071	.413	-.207
2. Wide view	.049	.187	.083	.187	.688	.122	.086	.047
1. Holistic approach	.093	.197	.184	-.012	.668	-.006	.169	-.006
3. Patient history	.259	-.122	.029	.035	.619	.148	.084	.346
18. Willing to take risks and to challenge self	.159	.092	.173	-.025	.170	.644	.079	.201
17. Confident, in ability to apply knowledge	.317	.130	.306	.291	.069	.572	.047	.064
4. Manage high pressure situations	.003	.153	.013	.357	.134	.532	.104	-.118
20. Learn from experience	.096	.268	-.131	-.092	.141	.309	.642	-.105
13. Positive	.075	-.043	.222	.240	.032	-.197	.607	.004
5. Welcome peer support	-.077	-.089	.085	-.011	-.004	.428	.574	.388
21. Undertake self-audit and self-aware	.266	.421	-.053	.129	.070	.042	.487	.174
9. Good communicator	.213	-.104	.265	.141	.280	.260	.413	-.145
36. Participate in peer review	.271	.252	.028	.026	.221	.104	.050	.645

10.3.1 Interpreting the components

The seven components that could be described as defining the latent variables associated with professional competence are:

1. Knowledge
2. Leadership
3. Mentoring
4. Technical excellence
5. Holistic approach
6. Self-management
7. People skills.

These "labels" are suggested interpretations from the variables that load on the respective components.

Knowledge

Fourteen variables loaded on this component, and these are listed in Table 10.8. Four variables appear to be marker variables and cover having a broad knowledge-base,

being able to access, interpret and integrate information, and being able to apply that knowledge and information in decision-making.

The remaining ten items appear to be complex variables related to the importance of pharmacists' orientation towards development and their ability to build their knowledge-base by integrating and extrapolating information and experience; solving problems using a range of approaches including lateral thinking; being confident in dealing with other health professionals and acting as a resource for others; specialising in a particular area of practice; and having a willingness to continue to learn. Ability to be proactive was also important, as was having a professional orientation.

This interpretation suggests that the ability of a practitioner to integrate the cognitive domain with the intra/interpersonal, technical, organisational and ethical domains is a very important component of professional competence. It accounts for 12.93 percent of the variance seen.

Table 10.8 – Breakdown of component 1

Number	Item	Factor loading
26	I have extensive clinical knowledge that is up-to-date and covers theoretical and practical aspects of pharmacology and pharmacy practice.	.813*
30	I can access, retrieve, interpret and evaluate information including clinical data, including evidence of efficacy and safety.	.730*
27	I am able to apply information from a range of sources in decision-making. I make decisions from first principles and adapt information to NZ and local conditions.	.688*
24	I am able to integrate information from a range of different sources and I can recognise the importance of apparently unconnected information.	.649*
28	I can extrapolate known information to unknown situations to achieve results	.570
14	I am confident in dealing with other health professionals.	.484
19	I am interested in what I am doing and am motivated to learn and achieve more, and to develop my skills. I engage in CPD.	.462
29	I have specialised in a particular field of medicine and have an in-depth knowledge in a specific area of specialisation.	.461
23	I am able to approach problems from different perspectives, can identify comprehensive solutions, and can come up with more and unusual ways to deal with a problem. I recognise there is often more than one solution to a problem.	.450
32	I am able to think laterally, logically and in different ways.	.411
31	I have experience in both pharmacy and life and I am able to integrate knowledge with practice.	.392
8	I act as a resource for others including other pharmacists and/or consultants.	.373
25	I am proactive.	.368
22	I believe professional responsibility goes beyond work hours. I am passionate about pharmacy and I see it as a vocation/calling.	.359

* Marker variable

Leadership

Seven variables loaded on this component, and these are shown in Table 10.9. Two items appear to be marker variables and cover training others so they can manage clients, and being the face of the pharmacy.

The remaining variables in this component suggest the ability of professionals to be self-aware; solve problems; have an ability to use their experiences to train others; and able to represent the pharmacy and the views of others, is important for professional competence. Leadership also appears to be correlated with the ability to think laterally and logically, to practise legally and ethically, and to have a professional orientation.

This component represented the integration of the organisational, intra/interpersonal, legal/ethical, organisational and cognitive domains, and accounted for 8.21 percent of the variance.

Table 10.9 – Breakdown of component 2

Number	Item	Factor loading
35	I train staff so they can manage customers and difficult situations.	.724*
34	I represent the pharmacy and represent the views of others where required. I am the face of the pharmacy.	.714*
31	I have experience in both pharmacy and life and I am able to integrate knowledge with practice.	.560
32	I am able to think laterally, logically and in different ways.	.445
23	I am able to approach problems from different perspectives, can identify comprehensive solutions, and can come up with more and unusual ways to deal with a problem. I recognise there is often more than one solution to a problem.	.434
21	I examine my own performance, undertake self audit and am realistic about my goals. I am self-aware.	.421
33	I practise legally and ethically.	.392

* Marker variable

Mentoring

Seven variables loaded on to this component, and these are shown in Table 10.10. Two items appear to be marker variables and these cover mentoring and developing others, and passing experiences on so others can learn from them.

The other variables in this component all relate to the ability to be a resource for others and to create opportunities for others to learn and develop; to extrapolate known information to unknown situations and make decisions; to share experiences; and to demonstrate confidence and leadership skills.

This component intimates the integration of the organisational, intra/interpersonal, technical and cognitive domains, and accounted for 7.78 percent of the variance.

Table 10.10 – Breakdown of component 3

Number	Item	Factor loading
11	I provide opportunities for others to develop and create an atmosphere that encourages others to learn from their mistakes and share experience.	.735*
10	I am able to inspire, mentor and teach others. I am willing to pass experiences on, including where I have made mistakes so that others can learn from these mistakes.	.711*
15	I act as leader, motivate the team and initiate action.	.550
8	I act as a resource for others including other pharmacists and/or consultants.	.523
16	I am confident making decisions and am prepared to stand by the decisions I make. I am self-assured and take responsibility and accountability.	.339
14	I am confident in dealing with other health professionals.	.350
28	I can extrapolate known information to unknown situations to achieve results	.350

* Marker variable

Technical excellence

Six variables loaded onto this component, and these are shown in Table 10.11. Two items—being technically excellent, and accurate—appear to be marker variables.

The other variables appearing in this component relate to making decisions, and taking responsibility for the decisions made; managing pressure; and using lateral thinking. Transparency, and ethical and honest behaviour was also correlated with this component.

This component represented the integration of the technical, cognitive, ethical/legal, organisational, and intra/interpersonal domains, and accounted for 6.72 percent of the variance.

Table 10.11 – Breakdown of component 4

Number	Item	Factor loading
6	I am accurate and work to the highest possible standards.	.748*
7	I am technically excellent. I use appropriate techniques.	.732*
16	I am confident making decisions and am prepared to stand by the decisions I make. I am self-assured and take responsibility and accountability.	.541
12	I am transparent, ethical and honest.	.497
4	I manage high pressure situations without getting wound up. I am relaxed in my job and do not let things overwhelm me.	.357
33	I practise legally and ethically.	.333

* Marker variable

Holistic approach

Four variables loaded on this component, and these are shown in Table 10.12. Two items—taking a wide view and having a holistic approach—appear to be marker variables.

The variables in this component appear to reflect the ability of effective practitioners to look at treatment from a patient perspective; to anticipate and deal with potential problems; and to take a good patient history and complete a clinical review. Being interested in what they are doing and motivated to learn more was also correlated with this component.

This component seems to represent the integration of the cognitive, technical and intra/interpersonal domains and accounted for 6.46 percent of the variance.

Table 10.12 – Breakdown of component 5

Number	Item	Factor loading
2	In my practice, I anticipate and deal with potential problems and look beyond the surface of things. I have a gut feeling for when things aren't right and act on it.	.688*
1	I provide a "wider" service, look after the whole person and have an holistic approach.	.668*
3	I do a really good patient history and clinical review and I am proactive in mitigating potential problems.	.619
19	I am interested in what I am doing and am motivated to learn and achieve more, and to develop my skills. I engage in CPD.	.326

* Marker variable

Self-management

Seven variables loaded onto this component, and these are shown in Table 10.13. Two items appear to be marker variables—being willing to take risks and challenge oneself, and being self-confident.

The other variables loading on this component seem to relate to practitioners' ability to manage pressure; their willingness to accept support from their peers; their confidence in dealing with other professionals; their proactivity; and their ability to demonstrate leadership skills.

This component appears to represent the integration of organisational, intra/inter personal, and cognitive domains and accounted for 6.15 percent of the variance.

Table 10.13 – Breakdown of component 6

Number	Item	Factor loading
18	I am willing to take risks and to challenge myself.	.644*
17	I am confident, happy in my role, in my own knowledge and in my ability to apply my knowledge.	.572*
4	I manage high-pressure situations without getting wound up. I am relaxed in my job and do not let things overwhelm me.	.532
5	I ask people for their opinion and welcome peer support.	.428
15	I act as leader, motivate the team and initiate action.	.368
25	I am proactive.	.351
14	I am confident in dealing with other health professionals.	.330

* Marker variable

People skills

Six variables loaded onto this component, and these are shown in Table 10.14. Two items—see strengths in others, and learning from experience—appear to be marker variables. Having good communication skills is an item that is only correlated to this component but is not strongly correlated enough to be considered a marker.

The other variables that loaded on this component seem to reflect the importance of practitioners' self-awareness and ethical orientation; their ability to accept feedback and peer support, and to adapt their performance.

This component represented the integration of the intra/interpersonal and cognitive domains and accounted for 6.12% of the variance.

Table 10.14 – Breakdown of component 7

Number	Item	Factor loading
20	I learn from experience and accept feedback. I am open to new ideas and adapt to new situations.	.642*
13	I have a positive attitude and see the strengths in others. I do not put people down.	.607*
5	I ask people for their opinion and welcome peer support.	.574
21	I examine my own performance, undertake self audit and am realistic about my goals. I am self-aware.	.487
9	I am a good communicator. I listen and am willing to talk and transfer information, pitching it at the right level in both content and context.	.413+
12	I am transparent, ethical and honest.	.413

* Marker variable
+ Pure variable but not a marker

The components extracted by this analysis suggest the seven latent variables underpinning the construct of professional competence. Only one item investigated—participates in peer review—did not correlate with one of the components in this analysis. This item did not show evidence of correlation with the construct of professional competence in the first step of this phase of the research.

10.3.2 Factor scores

Factor scores were calculated for each of the components extracted from these data. These factor scores represent the estimated score subjects would receive on each latent variable, if they had been measured directly. Factor scores are calculated by multiplying the observed score with the component score coefficient to obtain an individual's score for each factor.

Factor scores were then used to identify the factors that discriminate between expert, competent and not-competent performers, which were fed into the discriminant analysis covered in the next section.

10.4 Discriminant function analysis

Following the principal component analysis, discriminant function analysis was undertaken using the principal components and factor scores to identify which components were most important in differentiating between competent and not-competent pharmacists, and expert and competent pharmacists. The ability of the self-assessment instrument to predict membership within classifications was also analysed, including the classification of pharmacists who did not classify themselves as either competent, not competent or expert.

10.4.1 Discriminating between competent and not-competent pharmacists

The discriminant function analysis was first performed comparing pharmacists classifying themselves as competent or not-competent. These results are shown in Tables 10.15, and 10.16. These results show that all components contributed to discriminating between competent and not-competent performance and that the resulting discriminant function was effective at discriminating between the performance of competent and not-competent pharmacists—Wilks lamba 0.86 (significance <0.001).

Table 10.15 – Table of eigenvalues

Eigenvalues				
Function	**Eigenvalue**	**% of Variance**	**Cumulative %**	**Canonical Correlation**
1	.164	100.0	100.0	.375

Table 10.16 – Test significance

Wilks' Lambda				
Test of Function(s)	**Wilks' Lambda**	**Chi-square**	**df**	**Sig.**
1	.859	43.832	8	<0.001

Standardised coefficients enabled identification of the components that contributed most to determining the scores on the discriminate function. This was done by examining the magnitude of the standardised coefficient (ignoring the sign). The larger the magnitude, the greater was that component's contribution (Klecka, 1980).

This Table of coefficients and the resulting component matrix is shown in Table 10.17.

Table 10.17 – Table of regression factor coefficients for components

Standardised Canonical Discriminant Function Coefficients	
	Function
	1
Knowledge	.387
Leadership	.468
Mentoring	.260
Technical excellence	.470
Holistic approach	-.027
Self-management	.360
People skills	.556

While the eighth factor—"peer review"—obtained a regression coefficient of 0.12 it was not included in the final analysis as it was considered an unreliable component, with much of the variance attributed to it due to the interaction of the variables in this component with other variables. For this reason it has been excluded.

The component, "holistic approach", contributed little to the discriminant function and thus was not important in discriminating between the performance of competent and not-competent pharmacist, while the component, people skills, was the most important. The contribution made by four of the remaining five components—leadership, technical excellence, knowledge and self-management—was also important.

The regression scores obtained can be used to classify participants in the self-assessment exercise. Participant scores on each of the components were adjusted and summed to enable classification of individual cases into competent and not-competent groups. The results of this classification are shown in Table 10.18.

Table 10.18 – Table of classifications

Classification Results(a)					
			Predicted Group Membership		Total
		Two Categories	Not-competent	Competent	
Original	Count	Not-competent	14	7	21
		Competent	56	218	274
		Ungrouped cases	1	9	10
	%	Not-competent	66.7	33.3	100.0
		Competent	20.4	79.6	100.0
		Ungrouped cases	10.0	90.0	100.0
78.6% of original grouped cases correctly classified.					

These results showed that the self-assessment instrument was able to predict classification correctly in 79 percent of cases—a very good result for a self-assessment instrument.

10.4.2 Discriminating between expert and competent pharmacists

The discriminant function analysis was also performed comparing pharmacists who classified themselves as expert or competent. These results are shown in Table 10.19. As with the results obtained for competent and not-competent, these findings indicate that all components contribute to discriminating between expert and competent performance, and that the resulting discriminant function was effective at discriminating between the performance of competent and not-competent pharmacists—Wilks lamba 0.79 (significance <0.001).

Table 10.19 – Table of eigenvalues

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.260	100.0	100.0	.454

Table 10.20 – Test significance

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.794	63.500	8	<.001

Standardised coefficients were calculated to determine the scores on the discriminate function. This table of coefficients and the resulting component matrix are shown in Tables 10.21.

Table 10.21 – Table of regression factor coefficients for components

Standardised Canonical Discriminant Function Coefficients	
	Function
	1
Knowledge	.783
Leadership	.254
Mentoring	.501
Technical excellence	.202
Holistic approach	-.166
Self-management	.226
People skills	.457

As in the first discriminant function analysis, the eighth factor—"peer review"—while obtaining a regression coefficient of 0.21, was excluded from the final analysis.

The component "holistic approach", also contributed little to this discriminant function and thus was not important in discriminating between the performance of competent and not-competent performers, while the component "knowledge" was very important being able to account for most of the discriminating power of the function.

"Knowledge" was the component that contributed most to the disciminant function, and the component "mentoring" was also important. The remaining five components contributed little to the discrimination power of self-assessment to differentiate between expert and competent pharmacists.

Participants were classified into expert and competent groups based on the adjusted component scores. The results of this classification are shown in Table 10.22.

Table 10.22 – Table of classifications

Classification Results(a)					
			Predicted Group Membership		Total
			Competent	Expert	
Original	Count	Competent	197	54	251
		Expert	6	24	30
		Ungrouped cases	21	3	24
	%	Competent	78.5	21.5	100.0
		Expert	20.0	80.0	100.0
		Ungrouped cases	87.5	12.5	100.0
78.6% of original grouped cases correctly classified.					

These results, similar to the analysis for competent and not-competent, indicate that the self-rating instrument was able to predict classification correctly in 79 percent of cases—a very good result for a self-assessment instrument.

10.5 Conclusion

This phase of the research set out to answer the following questions:

- What specific attributes differentiate the performance of competent, not-competent, and expert pharmacists?
- Do pharmacists agree these are important?
- Can a self-assessment instrument be developed from the model of professional competence?
- Does a self-assessment instrument created from these attributes enable practitioners to make a judgement of their competence?
- How reliable are such judgements?

The research has enabled all these questions to be answered. These results confirm the usefulness of the model of professional competence to identify those attributes of

pharmacists that make a difference to their performance. These conclusions, along with how the model may be used, are discussed in Part Four of this thesis.

Part Four
Using the Model

The research described in this thesis has resulted in a new conceptualisation of the professional competence of pharmacists that links professionalism with competent performance. This conceptualisation focuses on the traits that characterise not-competent, competent, and expert performance, rather than only focusing on the tasks or functions pharmacists perform. The resulting model defines domains of competence encompassing knowledge, cognitive skills, technical skills, intra- and interpersonal behaviour, working ethically and legally, and being able to organise oneself, one's environment and others. It suggests that while these are important components, the essential element for professional competence is the ability of pharmacists to integrate these domains while performing their professional functions.

The model has been developed empirically from research undertaken with registered, practising pharmacists in New Zealand, and has been validated using quantitative research methods. It has been shown to have face, construct, content and concurrent validity, and to be reliable when tested in practice.

Models and the attributes associated with it, such as those identified in this research, can be used in a number of ways to support the development of the pharmacy profession. They can guide curriculum development for programmes to prepare people for entry to the profession, they can assist in the design of professional improvement initiatives to support ongoing professional competence, and they can guide the creation of relevant assessment methodologies and instruments.

In this part of the thesis, the research and its future implications are discussed, and potential further research is identified. Implications for the model of professional competence to be used in other professions and areas of education debate are considered.

Chapter Eleven considers the impact of the model on curriculum design and development and its application to Continuing Professional Development (CPD) initiatives. It also considers the application of the model to the assessment of competence both for initial registration and for the award of Annual Practising Certificates, as required by The Health Practitioners Competence Assurance Act 2003. The opportunity is taken to investigate whether the attributes can be used for competence assurance.

Chapter Twelve concludes this thesis by discussing the implications of this research to the field of professional education and suggests further areas for research.

Chapter Eleven
Curriculum development, Continuing Professional Development and competence assurance

The model of professional competence and its associated attributes developed in this thesis have the potential to impact on the pharmacy profession in a number of ways. Firstly, the model can be used to guide the curriculum design of professional education programmes. This, in turn, will influence the way in which pharmacists are educated and prepared for professional practice.

Secondly, the model can impact on the focus given to Continuing Professional Development (CPD) initiatives, particularly by shifting the focus of activities from knowledge development to the integration of knowledge with practice. It identifies the importance of taking an integrated approach to knowledge and skills development and ensuring that the intra and interpersonal dimensions of professional competence are supported.

Finally, the model can influence the development of assessment regimes for both the assessment of initial competence for registration and ongoing competence assurance for the award of Annual Practising Certificates as required by The Health Practitioners Competence Assurance Act 2003.

This chapter discusses the potential use of the model for these purposes.

11.1 Curriculum development

The starting point for all curriculum development is a concept map, which is a description of the purpose and intended outcomes of the instruction. As such, the type of map used will have a profound impact on how curriculum is conceived, developed and delivered (Bourgeois, 1995; Klausmeier, Ghatala & Frayer, 1974; Stepien, 1994).

The concept map is a description of what the curriculum sets out to achieve. This may be defined in terms of graduate outcomes, which are often expressed as behavioural statements: for example, "being able to practise as a reflective practitioner", or in terms of the roles and functions graduates will be able to perform, for example, "being able to accurately dispense medicines, minimising potential errors".

Having identified the overall graduate outcomes, learning outcomes are specified that identify the processes and products of learning that must be successfully achieved to meet the graduate outcomes. Learning outcomes are the instructional objectives of a curriculum described in terms of what the learner will be able to do as a result of a module of instruction (Grönlund, 1985).

Learning outcomes play a key role in the instructional process as they provide direction for the teaching process, and set the stage for assessment and evaluation of student learning and preparedness to graduate. Learning outcomes assist in structuring and sequencing learning into courses or modules, and in designing assessment tasks and instruments. Following delivery of the curriculum, evaluation of its effectiveness is usually undertaken and the results used for continuous improvement.

For vocationally oriented programmes of study—particularly at lower levels of the National Qualifications Framework (NQF)[5]—learning outcomes have traditionally been defined in terms of a set of tasks, described as unit standards[6], for which standards of performance are specified. The NQF does not specify how these tasks are used in combination to ensure seamless performance, and most qualifications do not describe the behaviours resulting from such combinations. The model of professional competence described in the thesis provides an alternative approach.

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[5] New Zealand's National Qualification Framework (NQF) provides a framework for defining qualifications in terms of levels and credits. The framework has 10 levels with levels 5 to 7 being equivalent to undergraduate university level learning and levels 8 to 10 being equivalent to post-graduate education.

[6] A unit standard is a description of learning outcomes, expressed in terms of what a person successfully completing the unit can do. The unit breaks the outcome into its component elements, and specifies the performance criteria to be used to measure successful achievement.

As stated previously, the description of graduate outcomes when used as the concept map will have a profound impact on the design of the curriculum. If, for example, the concept map is based on the *pharmacist as defined by the competent performance of a set of roles and functions*, then the curriculum will centre around developing the skills and knowledge required to perform these roles and functions. If, on the other hand, the concept map is based around *being professionally competent as defined in this thesis*, then the curriculum will centre around the constructs associated with being professionally competent, and the integration of skills and knowledge required to demonstrate professional competence. In this approach, the tasks and functions pharmacists perform provide the content and context for instruction.

As discussed in Chapter One, people currently seeking to become pharmacists must complete a Bachelor of Pharmacy degree at an approved university and then complete a pre-registration training programme. On completion of the pre-registration training, an evaluation of their competence is made and those deemed to be competent are registered as pharmacists.

Currently the curriculum for undergraduate programmes focuses on the knowledge and technical skills required for competent practice, and these are often taught serially as both theoretical and applied subjects. The teaching includes knowledge of basic and applied sciences, technical knowledge and skills, communication, legal and ethical knowledge and behaviour, and organisational skills.

If the model of professional competence developed in this thesis were used as a concept map, then the learning outcomes for the programme could be structured around integrated learning that embeds in various ways the 35 behavioural statements that the research identifies as correlating with the model. These would help develop the learning outcomes to be achieved in order to develop practitioners who are self-aware, actively engaged in the learning and assessment processes, and able to engage in critical reflection (Boud, 1999). Understanding the self and developing attributes such as self-esteem, responsibility, sociability, self-management, motivation, empathy, integrity and honesty are core to this (McNabb, 1997; Cherniss, 1999).

The behavioural statements could be further grouped or assembled to produce a smaller number of statements that would form the basis of a graduate profile. For example, the seven principal components identified in the research could be used for this purpose (see section 10.2).

11.1.1 An integrated approach to curriculum development

Using the integrated model of professional competence to develop a curriculum would then enable both graduate outcomes and learning outcomes to be specified in terms of developing professionally competent practitioners, who are able to perform the tasks and functions required by the profession. As mentioned, learning outcomes could be developed out of the 35 behavioural statements identified in this research as being characteristic of professional competence. For example, graduates of a programme with a curriculum developed from the model would be able to (taking six of the 35 statements):

- provide a "wider" service, look after the whole person and have an holistic approach
- apply information from a range of sources in decision-making, and adapt information to New Zealand and local conditions
- communicate well, listening and speaking, and able to transfer information, pitching it to the right level in both content and context
- manage high pressure situations without getting wound up and be relaxed in their job without letting things overwhelm them
- ask people for their opinion and welcome peer support; and
- be technically excellent and use appropriate techniques.

The integrated model suggests that professional competence, and indeed expertise, develop as practitioners cultivate their ability to use the skills and knowledge contained in the five domains of competence in a fully integrated and seamless manner. The curriculum of programmes designed to support the development of competent professionals should, therefore, deliver not only the requisite skills and knowledge for proficient practice but should also develop practitioner's capacity to use those skills and knowledge in a seamless, integrated manner consistently across all their performance. This will require a curriculum that will progressively develop

the level of integration across its duration. A five-year curriculum based on this concept is illustrated in Figure 11.1.

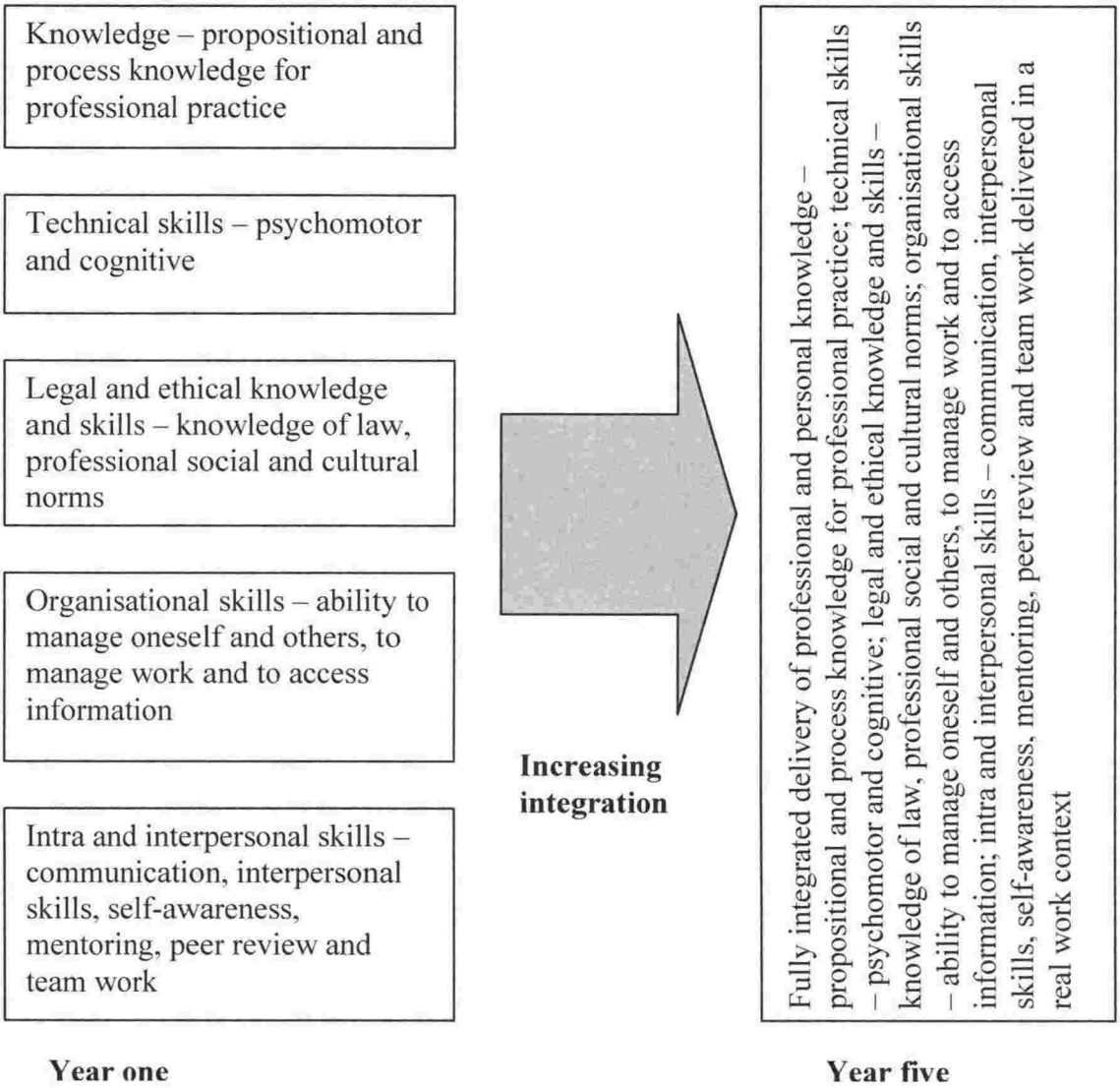

Figure 11.1 – Illustration of integrated curriculum

Delivering this type of curriculum requires the use of learning philosophies that support integrated delivery. These include problem-based learning, project-based learning, and collaborative learning. Such approaches are called "pedagogical strategies" (Meyer, 2003). Of these, problem-based learning is the approach most often used in medical education.

11.1.2 Integrated delivery

Problem-based learning is used in many medical programmes. In these programmes, case problems are used to deliver concepts, in basic and clinical sciences, in an integrated situational context, that enables processes of learning to be emphasised as much as the content (Miller, 1999).

A problem-based approach emphasises process as well as content. Engel (1991) identifies that the graduate outcomes for such a programme using problem-based learning strategies would: produce graduates who deal with problems and reason critically and creatively; make reasoned decisions in unfamiliar situations; adapt to and participate in change; make self-evaluations and identify own strengths and weaknesses and undertake appropriate remediation; and would work productively as a team member. In this approach, the pharmacy domain, along with the social, cultural, economic and environmental milieu in which pharmacy practice provides the context in which the processes required to produce graduate outcomes are developed and assessed. A problem-based learning "pedagogical strategy", therefore provides a useful approach to delivering an integrated curriculum that combines process with content and context.

Problem-based learning uses a range of delivery mechanisms including integrated learning, progression, and cumulative learning. In these approaches the subject is not learned in depth at any one time, but is introduced in increasing levels of complexity during the programme. It also emphasises consistency in learning whereby all aspects of the learning experience, including the learning environment and assessment, are used to support the problem-based approach (Engel, 1991). As the programme progresses from year to year it is anticipated that the problems presented to students become more complex, requiring demonstration of greater creativity and integration to address.

A major challenge in implementing a problem-based curriculum is deciding how to assess learning. Because problem-based learning is concerned with both the content and process of learning, the assessment system used must address both of these. Possible assessment methods include case-based assessment, written case-reports, and assessment by expert peers. Boud (1999) also suggests that the ability to self-assess is

an essential skill of competent professionals and should be developed in such programmes along with the skills of critical reflection.

Whatever assessment models are used, they must be linked to the outcomes of the programme and the concept-map used to guide curriculum development.

11.1.3 Integrated assessment

Embedded in the development of curriculum is the selection of appropriate assessment methods and tasks. As stated previously, these should be linked clearly to the concept-map and learning outcomes of the programme to ensure meaningful assessment and internal and external coherence. Assessment should not only determine a person's achievement (what they can do) and their aptitude (what they will do), it should also encourage students to seek deeper understanding of the subject and engage their interest. It should also encourage the development of self-assessment skills (Hall, 2002).

The model of professional competence suggests that professional competence is determined by the ability to integrate the domains of competence and it has been proposed that this ability should be developed in undergraduate programmes. Pedagogical strategies, such as problem-based learning that support integration should be used. Assessment methodology will, therefore, follow the pedagogical strategy. If the strategy adopted begins by developing a foundation of skills and knowledge in isolation and then progressively develops concepts and behaviours based on the integration of the domains, assessment would then follow a similar approach. In the early stages of the programme, individual components would be assessed as stand-alone subjects while, in later stages, assessment would focus on integrated outcomes and would use assessment methods to facilitate this. In line with problem-based approaches used for instruction, similar models of assessment should also be considered.

Supporters of problem-based learning recommend the use of authentic assessment methods because they connect learning with doing; they are designed to correspond to real world experiences, have meaning in themselves, and are meaningful to the learner

(Custer, 1994). Researchers, including Custer (1994), Lazar and Bean (1991), Reif (1995) and Rudner and Boston (1994), argue for choosing assessment methods that enable inferences of competency to be made. The validity of such methods is enhanced by collecting a wide range of evidence on which to base an assessment judgment. To collect a wide range of evidence, multiple assessments may be used, including simulations, demonstrations or performances, interviews, oral presentations, informal and formal observations by experienced practitioners and peers, case studies, self-assessments, and portfolio assessments.

An approach of this kind has been advocated by Bailey (1995). He argues that there is a need to adopt an evidence-based assessment strategy, akin to the way the legal system makes judgments in the courts. In the legal system, as much evidence is collected as is necessary to make a safe judgment either "beyond reasonable doubt" or "on the balance of probabilities". Similarly, sufficient evidence is needed to make a safe judgement about occupational competency. The reliability of such judgments enhanced by strategies such as using three sets of evidence that produce triangulation, for example, self-assessment, peer assessment and customer feedback.

Such approaches to curriculum development and assessment are worthy of further research in the pharmacy profession, using the model of professional competence as a design framework.

11.2 Continuing Professional Development

Continuing professional development (CPD) is the process used by professionals to stay up-to-date with the developments in their profession and to maintain their competence. CPD includes formal learning opportunities such as postgraduate courses and qualifications, short courses offered by organisations such as the New Zealand College of Pharmacists, and seminars. It also covers informal, non-assessed activities such as journal reading and conference attendance.

Within the pharmacy profession, CPD is not mandatory for continuing registration. Rather, pharmacists are encouraged to engage in focused CPD using a range of

mechanisms. Firstly, the ENHANCE programme—discussed in Chapter one—provides a mechanism for pharmacists to undertake a self-audit to identify gaps in their abilities. They are then encouraged to prepare a development plan to address these weaknesses. The self-audit and resulting development plan are evaluated by their peers, and this process is used for the issue of Annual Practising Certificates. Currently, it is voluntary.

Secondly, the New Zealand College of Pharmacists offers a comprehensive range of programmes that support the development of professional skills and knowledge. The Associate programme requires pharmacists to engage in a minimum of 25 hours of CPD activities that can include formal professional courses and programmes, such as learning the skills associated with medication review, specialist programmes, such as management development, reading professional journals, and attending conferences. On the other hand, the Membership and Fellowship programmes require practitioners to complete more structured programmes. The Membership programme includes a mix of clinical, legal, communication and management modules, while the Fellowship programme focuses on the development of clinical skills and knowledge.

Thirdly, the profession has a local branch structure with regional branches throughout New Zealand. These branches run monthly professional development seminars and many also offer weekend workshops for practising pharmacists in the region.

Other mechanisms used to support CPD include seminars and information provided by drug companies and national and international conferences. Some of these provide generalised up-skilling while others have a more specialist focus, for example, the Specialist Interest Groups (SIG) that exist within the Hospital Pharmacists Association, which provides annual workshops and discussion forums for members.

While some of these programmes make use of the existing pharmacist competence standards to guide curriculum design and/or assessment, the model of professional competence developed in this research provides an opportunity to review and, if necessary, redevelop CPD activities. Such redevelopment could utilise programmes that develop the ability of practitioners to integrate the domains of competence while at the same time developing their knowledge in specific areas. The model also

provides the basis for a self-evaluation instrument that pharmacists could use to identify areas of focus for their professional development.

11.2.1 Self-evaluation

The self-audit tool currently used as part of the ENHANCE programme is based on the competence standards used to assess competence for registration into the profession. As such it is based on a functional model and asks pharmacists to rate their performance on the elements relating to each of the functional areas of pharmacy practice.

The model of professional competence developed in this research provides an alternative approach to this self-audit process. The research has identified a scale of items that are clearly related to competent performance. The research identified 15 items that were highly correlated with professional competence and were shown to be important for interpreting the principal component analysis (see section 10.2). These 15 items are:

1. Having extensive clinical knowledge that is up-to-date and covers theoretical and practical aspects of pharmacology and pharmacy practice.
2. Being able to access, retrieve, interpret and evaluate information, including clinical data, and including evidence of efficacy and safety.
3. Being able to apply information from a range of sources in decision-making. Making decisions from first principles and adapting information to New Zealand and local conditions.
4. Training staff so they can manage customers and difficult situations.
5. Representing the pharmacy and representing the views of others where required. Being the face of the pharmacy.
6. Providing opportunities for others to develop, and creating an atmosphere that encourages others to learn from their mistakes and share experience.
7. Being able to inspire, mentor and teach others. Being willing to pass experiences on, including mistakes made so that others can learn from those mistakes.
8. Being accurate and working to the highest possible standards.

9. Being technically excellent and using appropriate techniques.
10. Anticipating and dealing with potential problems and looking beyond the surface of things. Having a "gut feeling" for when things are not right and acting on it.
11. Providing a "wider" service, looking after the whole person and having an holistic approach.
12. Being willing to take risks and to challenge oneself.
13. Managing high pressure situations without getting wound up. Being relaxed in the job and not being overwhelmed by things.
14. Having a positive attitude and seeing the strengths in others. Not putting people down.
15. Being a good communicator. Listening and being willing to talk and transfer information, pitching it at the right level in both content and context.

The research has also developed a self-assessment instrument that was trialled with a wide range of novice and experienced pharmacists. The results showed that this self-assessment instrument, based on the model of professional competence, demonstrated construct, content and concurrent validity, and that it appeared to enable pharmacists to make reliable judgements about their own competence. When used formatively, this provides a reliable guide for identifying weaknesses and preparing a professional development plan to address these.

Having identified professional strengths and weaknesses against an integrated framework, it makes sense to develop integrated CPD activities that promote the development of professional expertise, where expertise is defined by a greater ability to integrate domains of competence.

11.2.2 CPD focused on developing professional expertise

Current approaches to CPD see it being primarily about ongoing accumulation of discrete pieces of information through a combination of formal courses and informal learning opportunities, and as such, could be seen to be focused on developing specialisation rather than expertise, as defined by the model of professional competence (see section 7.2). Using the model to develop CPD activities that are

focused on developing professional expertise, suggests that such activities should centre on assisting practitioners to enhance their capability to integrate the domains of competence and so use their skills and knowledge in integrated ways. This points to the importance of collaborative learning approaches to CPD in which practitioners can share and critically reflect on their learning experiences in a "community of practice". Lave and Wenger (1991) define a community of practice as:

> ...a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice. A community of practice is an intrinsic condition for the existence of knowledge, not the least because it provides the interpretive support necessary for making sense of its heritage. (p. 98)

The Specialist Interest Groups (SIG) used by the Hospital Pharmacists Association are examples of such communities. Mentoring, peer support, and participating in formal and informal peer review are other methods that could be adopted.

Exploring how the model could be used as a framework for the community of practice to explore and develop knowledge, skills and expertise is an area worthy of further research.

11.3 Competence assessment and competence assurance

The model also has implications for both the assessment of initial competence and the assurance of ongoing competence. Both competence assessment and competence assurance are interested in determining the *typical* behaviours of practitioners, that is, what they will do, rather than what they can do. Assessment methods suitable for this purpose include personality appraisals, self-assessment, interview, and peer appraisal. To improve validity and reliability, a combination of techniques should be used.

11.3.1 Assessment of initial competence

The discriminant function analysis undertaken on the self-assessment data identified three components as being particularly important in discriminating between competent and not-competent performance (see section 10.4). These were:

- People skills
- Leadership, and
- Technical excellence.

The self-assessment items most linked to these were:

- Having a positive attitude and seeing the strengths in others. Not putting people down.
- Being a good communicator. Listening and being willing to talk and transfer information, pitching it at the right level in both content and context.
- Training staff so they can manage customers and difficult situations.
- Representing the pharmacy and representing the views of others where required. Being the face of the pharmacy.
- Being accurate and working to the highest possible standards.
- Being technically excellent and using appropriate techniques.

Any assessment methodology used to determine competence for initial registration should therefore include these notions and give them significant weighting.

Current assessment practices used to acquire evidence for registration includes an interview, the purpose of which is to evaluate communication skills along with attitudes towards legal and ethical behaviour and confidence. The findings of this research suggest that assessment for initial competence should also gather evidence of the practitioner's ability to learn from experience and to accept feedback, and his or her ability to take a wide view and to anticipate potential problems. Methods for doing this could include, respectively, peer review or preceptor evaluation, and performance on a case-study. In this process, interview techniques are used to assist practitioners to critically reflect on their practice to produce evidence of competent performance.

The findings from this research suggest that the retention of the interview as part of the formal process for obtaining evidence of communication ability is extremely important.

11.3.2 Competence assurance

Competence assurance methods should evaluate a pharmacist's professional competence while taking into account the likely premise that the practitioner being evaluated is competent. Pharmacists who are registered will have been assessed, at some stage of their career, as competent, whether by being evaluated against objective criteria or by the subjective assessment of an experienced practitioner.

Competence evaluation used for assurance purposes should focus, then, on what changes have occurred in the practitioner's practice environment—both content and context—and the steps taken to maintain that competence in the face of change. For example, if the external environment changes significantly and causes a shift in one of the domains, typically, the use of new knowledge or new skills, then these are the domains on which assessment should focus. Has the candidate, assuming he or she was competent in the past, maintained his or her knowledge and learnt new skills? Evaluation instruments should be designed to elicit this information.

There are two aspects of competence assurance that need to be considered—the instrument used for the evaluation process and the process itself.

The evaluation instrument

The discriminant function analysis (DFA) carried out as part of this research identified one component—knowledge—as being important in discriminating between expert and competent performers. Four test items were shown to be strongly correlated with this component, and are:

- I am able to apply information from a range of sources in decision-making. I make decisions from first principles and adapt information to New Zealand and local conditions.
- I act as a resource for others, including other pharmacists and/or consultants.
- I have specialised in a particular field of medicine and have an in-depth knowledge in a specific area of specialisation.
- I am able to think laterally, logically and in different ways.

These items, along with the items that discriminate between competent and not-competent performers, should be included in any evaluation used to determine continuing competence, and given particular weighting when interpreting results.

The evaluation process

The second aspect of competence assurance is the process used. Self and/or peer assessments are preferred for this. While the ability to accurately assess oneself and one's peers is an important attribute of competent professionals, researchers studying the validity and reliability of such assessments sound a note of caution. Miller (1999) reports that research shows that high-achieving students tend to underestimate their own performance, while low-achieving students tend to overestimate their own performance.

The weaknesses associated with self and peer assessment are well known. Accurate self-assessment may be impaired by the tendency of a person to wish to present themselves in a good light and to mask deficiencies (Falchikov & Boud, 1989). Peer assessment is widely used and research shows it is widely accepted; however, there may be a tendency for peers to be more lenient towards their friends or to people they like (Falchikov, 1994; 1995a; 1996b). Weaknesses in both forms of assessment can be offset somewhat by having clear criteria, providing training in assessment to participants, and externally moderating assessment (Brown, Bull & Pendlebury, 1997).

In quality assurance processes, which somewhat mirror competence assurance processes, triangulation is commonly used. Triangulation combines self-assessment, with client and peer assessment and looks for consistency across all three dimensions. Where there is a discrepancy in evidence from sources, this identifies an area for further investigation, usually gathering further evidence.

This approach is analogous to that used in British Columbia, Canada, where the College of Pharmacists combine self and peer assessment with moderation by an external experienced panel to assure competence (College of Pharmacists of British Columbia, 2003). The process used is illustrated in Figure 11.2.

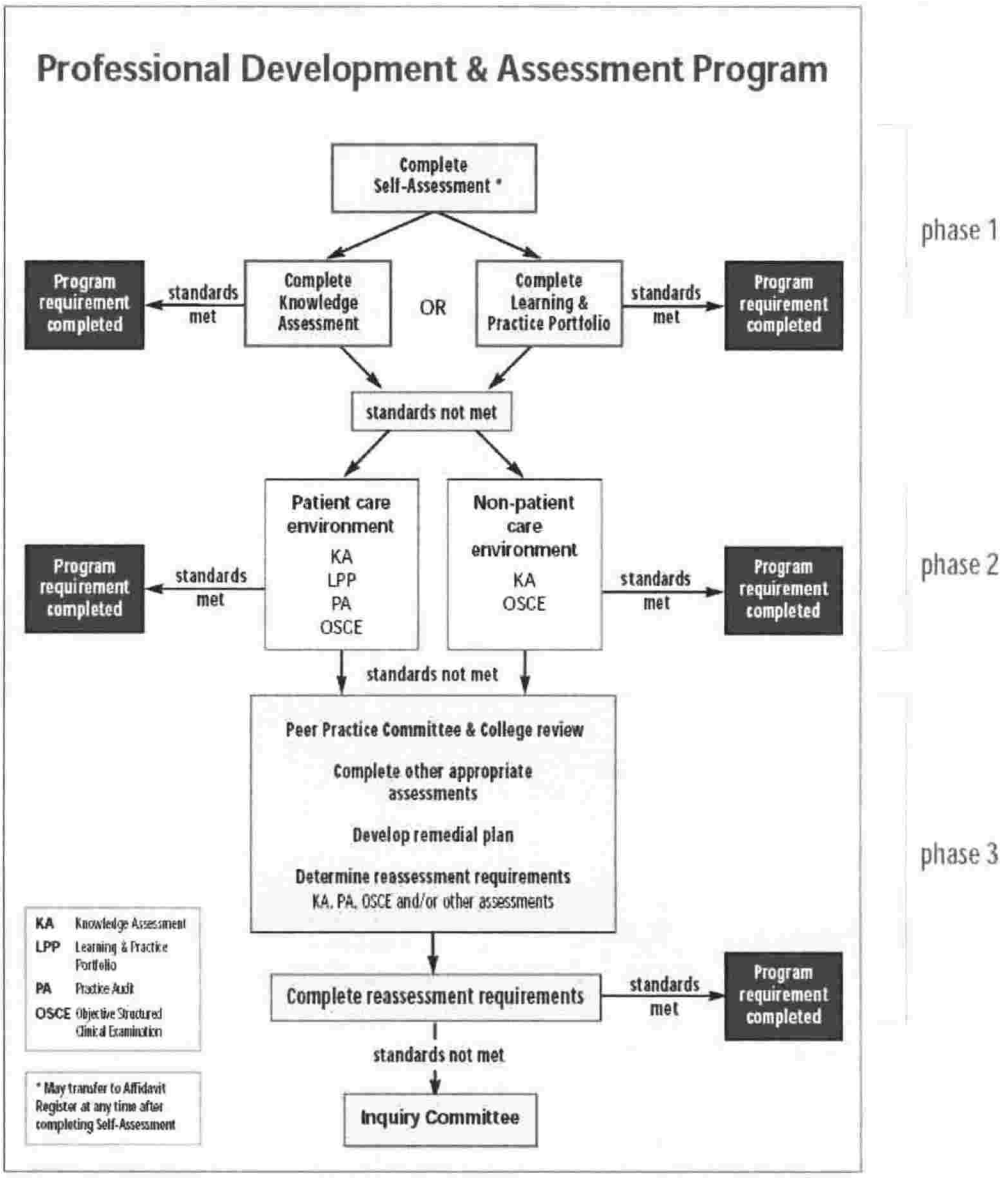

Figure 11.2 – Competence assurance process used by College of Pharmacists of British Columbia[7]

This model uses self-assessment, combined with either a knowledge assessment or assessment of a learning and practice profile, which are evaluated by a peer. If insufficient evidence is obtained from these processes or if the practitioner does not meet the standards required, further evidence is sought using objective assessment techniques, including knowledge assessment, Objective Structured Clinical

[7] College of Pharmacists of British Columbia, 2003, p. 14

Examination (OSCE), or practice audit. Practice audits are conducted by peers who have been trained in the process. Results are reviewed by a panel of experienced peers.

A similar approach could be adopted in New Zealand using the scale items developed in this research as the basis of a self and peer assessment instrument. A pharmacist would complete the self-evaluation and submit it to the Pharmacy Council together with a form nominating five peers to complete the peer assessment on his or her behalf.

The Pharmacy Council would then approach these peer pharmacists for their evaluations against the same criteria. The combined evidence would be used to determine the next actions, which could include further evaluation, such as obtaining customer feedback and/or practice audit, or award of a practising certificate.

Valid and reliable use of the model and its associated self-assessment items developed in this research for this purpose, are worthy of further investigation.

11.4 Cautionary notes on the use of the model

While the model forms a useful concept-map that could be used for a number of purposes, Gordon (1984) identifies a number of dangers of excessive reliance on such formal models. These dangers include the risk of equating the model with reality. A model is only a theoretical conceptualisation, and care must be taken to remember this.

Associated with this is the risk of devaluing traits that are not formalised by the model and, as a corollary to this, including too much detail that overwhelms or oversimplifies a complex situation. Further risks associated with the use of models are the risk of excessive conformity, that is, requiring everyone to conform to the model, the typical rather than the particular, and alienation of experienced practitioners through a focus on minimum standards.

Gordon cautions that formal models should be:

> used with discretion and that their features not be overvalued in favour or in eclipse of traits that are not formalisable, such as the relational, the contingent, the nonverbal, the holistic or the intuitive. (Gordon, 1984, p. 242)

With this caution it is timely to look at what would be useful next steps in further developing the model. This is discussed in Chapter Twelve.

Chapter Twelve
Conclusion and next steps

This thesis has described the development and validation of an integrated, holistic model of professional competence, and has discussed how this model may be used to inform the development of professional curriculum, CPD activities and competence assurance.

12.1 Conclusions

A number of conclusions can be drawn from the research. The first of these is that professional competence can be conceptualised as an entity in its own right. Professional competence is defined by the ability of the practitioner to integrate five domains of competence—cognitive/knowledge, technical/functional, legal/ethical, organisational and intra/interpersonal domains. When practitioners can integrate the skills and knowledge associated with each of these domains and apply the resulting behaviours in the performance of their professional roles, then they are considered to be competent. Thus, to determine a pharmacist's suitability for registration or for issue of the Annual Practising Certificate, evaluation should focus on determining the degree to which he or she can demonstrate the attributes associated with professional competence rather than the ability to perform competently required professional tasks and functions.

As such, professional competence is distinct from functional competence. Having said that, professional function and situation form the context and content for specifying behavioural outcomes that are used to determine the extent to which a practitioner demonstrates professional competence. Specific outcomes used for this purpose could be defined as either functionally-specific outcomes, for example, "takes a comprehensive patient history" or redefined as generalisable-outcomes, for example, "undertakes professional tasks in a comprehensive manner".

The construct of professional competence has been shown in this research to have content, construct and criterion-based validity, and to produce reliable results when tested theoretically and in a self-rating context.

The second conclusion from this research is that conceptualising professional competence as an entity in its own right enables levels of competence to be defined, namely not-competent, competent, and expert. The research has identified that these levels of performance can be discriminated through self-assessment with a fair degree of accuracy. The self-assessment instrument used for this purpose showed the ability to predict membership of groups with a reliability of approximately 80 percent. Further research with a larger sample of pharmacists would be useful to confirm this result.

The third conclusion from the research is that specialist performance, it appears, can be differentiated from expertise. Specialist practitioners demonstrate a greater capability to integrate just one or two domains of professional competence rather than the higher degree of integration required to demonstrate expertise. The discriminant function analysis suggests that the component "knowledge" is the most important among pharmacists rating themselves as expert, and this could indicate that many practitioners who consider themselves to be experts may be better classified as specialists. This hypothesis requires further research before any conclusions can be drawn.

In this research the characteristics of specialist performers were not explored, and so this classification was not tested. This would be worth further investigation.

The fourth conclusion from the research is that conceptualising professional competence as an entity in its own right has considerable utility. It enables the pre-registration education and training of pharmacists to be structured to focus on the development of professional competence as well as functional competence.

This suggests that undergraduate curricula should emphasise the integration of the domains of competence and use problem and project-based approaches to learning. Collaborative learning should also be emphasised to develop the practitioner's ability

to mentor and train others, and to be open to feedback, peer review and peer support. In a profession that has traditionally been dominated by sole owner-operators of small to medium businesses this would pose a radical change.

The model of professional competence identifies that when decisions are made regarding whether a person should be registered as a pharmacist, these should be based on evidence that the practitioner meets the standards of professional competence identified in this research.

The model of professional competence also provides a framework to design continuing professional development (CPD) programmes and activities, and to design a self-evaluation instrument that pharmacists can use to plan their professional development activities. The value of using the model of professional competence for this purpose is that it enables pharmacists to identify their areas of strength and weakness across the whole five domains of competence. The choice can then be made to focus development activities on one of the domains, for example, clinical knowledge to stay up-to-date with new treatments, legal knowledge to learn about the implications of a new act, or organisational knowledge to learn how to apply the new restrictions applied by PHARMAC[8]. Alternatively, the pharmacist may choose to focus development on developing his or her professional competence, for example, improving the ability to consider the whole person when determining appropriate treatments, taking a comprehensive patient history and being able to build better rapport with patients and other health practitioners.

Successfully implementing CPD programmes to develop professional competence and expertise would seek to maximise the learning opportunities available from the existence of communities of practice—Special Interest Groups, membership of the New Zealand College of Pharmacists, and regional branches of the Pharmaceutical Society of New Zealand. To develop effectively the capability to integrate the domains, learning activities would most likely make use of formal and informal mentoring programmes, workshops, and case studies, where practitioners are

[8] PHARMAC is the organisation in New Zealand responsible for the approval and distribution of pharmaceuticals subsidised by the government and the rules that govern this.

encouraged to work together, share experiences and engage in critical reflection, as described by Boud (1999).

The model of professional competence also provides a valid and reliable framework for the design of self and peer evaluation instruments to be used for quality assurance processes used for the award of Annual Practising Certificates. A self-evaluation instrument has been developed and trialled as part of this research and a process proposed for its further use. Utility of this instrument for peer review is worth further research, as is the validity and reliability of results obtained by combining self-evaluation scores with peer-review scores.

While this research has enabled conclusions to be drawn on the nature and use of the construct of professional competence there are a number of limitations associated with the research that impact on the generalisability of the research findings.

12.2 Limitations of the research

Limitations of the generalisablity of the research findings come from a number of sources, namely its use of case study and evaluation methodologies, the nature of the population used to obtain data for quantitative analysis, the sample-size available for analysis, and the reliance on self-assessment data.

Firstly, the use of evaluation and case-study methodologies means that the research has focused on the pharmacy profession only. While the data obtained from the research has enabled conclusions to be drawn that are valid for the sample of pharmacists studied, restricting the study to only pharmacy professionals means that no evidence is available for whether the model is a generic model, applicable to the wider pharmacist population or indeed to other professions.

Secondly, the population of pharmacists from which data was obtained was made up of a large sample of novice pharmacists and a proportionately much smaller sample of experienced pharmacists. In addition to this, the experienced pharmacists used for this research were all actively engaged in self-review through the ENHANCE programme.

Restricting the research population in this way limits the validity of conclusions drawn from the research on the model's applicability across the entire pharmacy profession. Undertaking a wider study of the pharmacy profession is outside the scope of this research, as its focus has been to develop a model of professional competence and to test its validity. Proving its applicability more widely across the profession is research that would be worth pursuing.

Thirdly, the sample of data obtained for the quantitative analysis was only "adequate" to obtain valid and reliable results. Larger samples, that is, greater than 500, are considered to be "very good", and samples larger than 1000, to be "excellent" in producing valid and reliable results when using techniques such as principal component analysis or discriminant function analysis (Comrie, 1973). If the research were repeated, action should be taken to ensure that a data sample in excess of 500 is obtained.

Finally, the data obtained for analyses were all based on self-evaluations of competence and, as such, are likely to contain errors. Based on the literature, such error will be due to either under-reporting of competence—expected from experienced and expert practitioners—or over-reporting of competence—from novice practitioners. The way to address this error is by obtaining external data to validate the self-assessed ratings. This could be achieved by either obtaining a rating of competence from a peer or by using an external criterion for competence, such as performance on an objective assessment, such as an OSCE or knowledge test. To be valid, any such assessment would need to be based on the construct of professional competence as defined by the model.

Any further research undertaken to test the conclusions drawn from this research should seek to address these limitations.

12.3 Future research opportunities

As identified above there are a number of opportunities for further research arising from this thesis. Firstly, there is the opportunity to further test the model of

professional competence with the pharmacy profession both here in New Zealand and overseas. This could be done by widely promulgating the findings of this research and inviting people to respond. One opportunity arising is the Lifelong Learning in Pharmacy Conference being held in Canada in June 2005. The findings of this research will be presented at this conference and participants invited to respond.

Secondly, there is the opportunity to determine how applicable the model of professional competence is to other professions. When undertaking this research, an opportunity arose to present the model to a wide range of other professionals and initial indications were that it was well received. Some data have been obtained on the applicability of the behaviour statements—indicative of competent and expert performance—to other professions, but this has yet to be analysed. Further research to identify the applicability of the research to other professions is worth pursuing.

Thirdly, there is the opportunity to explore further the nature of specialist performance and to identify the features that differentiate expert performance from that of specialists. A similar evaluative research project using both qualitative and quantitative research methodologies could be used for this purpose.

Finally, there is the opportunity to explore further the uses that the model of professional competence can be put to, including developing undergraduate curricula, competence assessment and competence assurance instruments and methods, and continuing professional development initiatives.

12.4 Concluding remarks

If this and future research contribute further evidence of the validity and reliability of the model of professional competence, along with its generalisability to other professions, then this raises some exciting opportunities to reconceptualise professions and professional services. Focusing on the professional as a complex human entity, performing technical tasks in a professionally competent way, has the potential to address some of the debate about what differentiates the technician from the professional.

This has the potential to impact on issues such as the fees paid for professional services as it moves the focus of debate beyond the task that is seen to be performed to the complex skills that underpin it. This may be useful, for example, when negotiating professional services fees with government agencies.

The model also has the potential to assist in the reconceptualisation of all vocational education by moving beyond the idea that a competent trades person or technician is a person who can perform a range of tasks competently, to being a complex whole, able to integrate a range of skills, knowledge and attitudes to perform a technical role.

Whatever the outcome, the research described in this thesis has been a lot of fun and I hope it proves interesting and useful to others.

To sum up Gonczi states:

> The argument that emerges here is that a "holistic" or "integrated" competency-based approach has many advantages over traditional approaches:
>
> - It provides a curriculum and training framework which links practice to theory in more coherent ways than currently exist.
> - It potentially provides a way of breaking the dichotomy between "knowing that" (knowledge/theory) and "knowing how" (skills/practical) which has characterised Anglo-American education and which has resulted in the belief that education which is practical is both different from and inferior to that which is theoretical.
> - It provides the basis for approaches to teaching and learning which could enhance students' adaptability and flexibility over their lives.
>
> (Gonczi, 1999, p. 182)

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Appendix One – Competence standards

Competence Standard 1
Practise Pharmacy in a Professional Manner

This competence standard describes the professional, legal and ethical responsibilities of the pharmacist. These responsibilities apply to all aspects of professional pharmacy practice.

Range Statement: Legislation referred to in this competence standard includes the following (refers to the latest editions and amendments)
Health Information Privacy Code Health (Retention of Health Information) Regulations
Medicines Act and Regulations Misuse of Drugs Act and Regulations
Health Practitioners Competence Assurance Act Toxic Substances Regulations
Medicines Amendment Act 2003 Pharmacy Council Code of Ethics 2003
Health and Disability Commissioner (Code of Health and Disability Consumers' Rights) Regulations

Element 1.1 Work professionally in pharmacy practice

1.1.1 Behaves in a professional manner

Examples of Evidence:
Maintains conduct becoming to a pharmacist towards other health professionals, patients & public e.g. behaviour, demeanour, conduct

1.1.2 Maintains a consistent standard of work

Examples of Evidence:
Expects consistent standard of work from self & others
Leads by example
Explains quality systems & who is responsible in workplace

1.1.3 Accepts responsibility for own work tasks and performance

Examples of Evidence:
Owns the results of her/his work
Identifies tasks / aspects of practice for which she/he is personally responsible
Identifies wider effect of his/her actions on individuals and the community

1.1.4 Works within the limitations of own professional expertise

Examples of Evidence:
Identifies professional limitations
Accesses information, advice & assistance for work tasks outside own professional expertise or experience

1.1.5 Works accurately

Examples of Evidence:
Minimises mistakes
Acts immediately to rectify harm arising from mistakes.
Documents errors & steps taken to prevent their recurrence

1.1.6 Shares professional strengths with others

Examples of Evidence
Trains other staff e.g. gives presentations relevant to pharmacy practice
Discusses aspects of pharmacy practice with pharmacist colleagues

Element 1.2 Resolve problems and conflicts

1.2.1 Solves own problems

Examples of Evidence:
Differentiates between personal & professional problems
Recognises indicators of impaired personal performance
Ensures safe personal practice

1.2.2 Resolves conflicts

Examples of Evidence:
Identifies conflicts in workplace
Participates in conflict resolution processes

1.2.3 Works to resolve workplace and professional practice problems

Examples of Evidence:
Identifies & explains potential workplace & professional practice problems
Adopts questioning & analytical approach to problem-solving
Seeks solutions & opportunities to improve
Works with others to resolve workplace or practice problems

Element 1.3 Undertake continuing professional development

1.3.1 Reviews own professional practice

Examples of Evidence:
Monitors performance against set standards e.g. ENHANCE - Reflection
Identifies learning needs for Continuing Professional Development (CPD)

1.3.2 Undertakes professional development

Examples of Evidence:
Discusses professional & practice issues with colleagues
Reads pharmacy publications, e.g. *Pharmacy Today*, *Interactions*, professional journals. (as in ENHANCE – Planning/Action)
Participates in PSNZ branch activities (as in ENHANCE – Planning/Action)
Attends product /service seminars
Completes courses, as necessary, to achieve identified learning goals

Element 1.4 Practise pharmacy within a New Zealand cultural framework

1.4.1 Demonstrates empathy and sensitivity to others' needs and values

Examples of Evidence:
Is sensitive to different ethnic approaches to health
Responds to New Zealand's cultural diversity

1.4.2 Complies with the intent of partnership, as set out in the Treaty of Waitangi

Examples of Evidence:
Demonstrates awareness of New Zealand's bicultural society
Ensures that Maori receive pharmacy services that meet their needs, as necessary
If appropriate, liases with Maori and Maori Health providers

Element 1.5 Comply with legal requirements and codes of ethics

1.5.1 Understands and is able to explain the application of the legislation and codes relating to pharmacy practice

Examples of Evidence:
Explains the application of the current legislation relating to pharmacy practice
Accesses, explains the legal implications of negligence of & refers to the legislation

1.5.2 Complies with those parts of the legislation that apply to his/her pharmacy practice

Examples of Evidence:
Fulfils legal requirements regulating pharmacy practice, e.g. if supplying poisons, complies with Toxic Substances Reg.
Complies with the Code of Health & Disability Services Consumers' Rights

1.5.3 Complies with code of ethics for pharmacy practice

Examples of Evidence:
Complies with the Code of Ethics of the Pharmaceutical Society of New Zealand
Complies with workplace codes
Discusses the application of code of ethics

Element 1.6 Communicate effectively

1.6.1 Speaks clear English

Examples of Evidence:
Speaks English equivalent to at least overall band 7.5 on the General Skills Category of the International English Language Testing System (IELTS), with at least band 8 in speaking and 7 in listening
Note: A fluent English speaker with full operational command of the language is equivalent to an IELTS band 9 – this describes most university graduates, born & raised in New Zealand.

1.6.2 Writes clear English

Examples of Evidence:
Writes English of a standard expected of a professional practitioner, e.g. correct grammar & spelling
Structures & presents written information in appropriate way for situation & meets needs of the receiver, e.g, faxes, emails, prescription annotations, letters, memos, referrals & appraisals

1.6.3 Communicates effectively with others

Examples of Evidence:
Communicates effectively with others (pharmacy staff, colleagues, other health professionals, patients & other members of the public)
Listens actively
Asks questions that fit the situation
Provides advice, information & recommendations

Competence Standard 2
Contribute to the Quality Use of Medicines

This competence standard covers the role of the pharmacist in promoting the quality use of medicines within an environment of professional pharmaceutical care. The pharmacist's role includes selecting, recommending, monitoring and evaluating medicine therapy as part of a health-care team. Rational medicine use refers to the evidence-based selection, monitoring and evaluation of medicine therapy in order to optimise health outcomes.

Range Statement:
At this level the pharmacist's responsibilities are reactive, in that he/she carries out the tasks described in this standard in response to requests about individual patients. The pharmacist is responsible for making recommendations on and providing information about common medicines to other health professionals.
Common medicines are those listed in the latest edition of the MIMS New Ethicals
Readily available references are those available from within the pharmacy including current editions of Martindale, MIMS New Ethicals, BNF, Pharmaceutical Schedule and Pharmacy Practice Handbook.

Element 2.1 Obtain individual patient history

2.1.1 Accesses patient medicine records

Examples of Evidence:
Accesses records on pharmacy computer
Obtains copies of records (computer/hard copy) from other health professionals.

2.1.2 Interviews individual patients or their caregivers and/or other health professionals to obtain history of medicines and other therapies, if necessary

Examples of Evidence:
Obtains patient medicine history of prescription & non-prescription medicines, complementary therapies and compliance details

Element 2.2 Interpret information about medicines

2.2.1 Identifies common medicines by their approved generic, trade or common names

Examples of Evidence:

If given one form of a common medicine name, promptly identifies other forms from memory or a reference source

2.2.2 Evaluates the available medicines, dose forms and methods of administration

Examples of Evidence:
Using readily available references, determines the advantages & disadvantages of different medicines, their dosages & dose forms for specific situations or patients

2.2.3 Interprets generic equivalence of medicines from different manufacturers

Examples of Evidence
Determines brand equivalence from readily available reference sources.

Element 2.3 Review the medicine therapy of individual patients

2.3.1 Interprets individual patient's medical history and medicine records

Examples of Evidence:
Explains possible purposes of each medicine

2.3.2 For each medicine, checks the dosages and methods of administration are optimal

Examples of Evidence:
Assesses efficacy & safety of medicine recognising pharmacokinetic factors, e.g age, weight, pregnancy, other therapies
Assesses the suitability of dosage form with respect to efficacy, safety & compliance, e.g tablets in a child, inhaler type for asthmatic

2.3.3 Assesses the effectiveness of the total medicine therapy

Examples of Evidence:
Considers patient's history, indicators of efficacy & patient factors that may affect outcomes
Evaluates factors affecting availability & cost of medicine, e.g unavailable brands, Pharmaceutical Schedule considerations

2.3.4 Identifies which adverse drug reactions (ADRs) should be reported to the Centre for Adverse Reactions Monitoring (CARM) and facilitates the reporting of these

Examples of Evidence:
Identifies reportable ADRs and facilitates the reporting of these
Can explain how to report to CARM if the need arises

Element 2.4 Recommend necessary changes to medicine therapy of individual patients

2.4.1 Identify necessary changes to medicine therapy

Examples of Evidence:
Identifies potential medicine therapy problems e.g overdoses, contraindications, interactions, incompatibilities, possible ADRs, possible effects with complementary therapies

2.4.2 Recommends the optimal medicine, dose form and method of administration for the patient

Examples of Evidence:
If necessary, calculates optimal medicine dose for patient
For specific medicines, explains recommendations, including their dose forms, formulations, methods of administration

2.4.3 On request monitors the medicine therapy of individual patients

Examples of Evidence:
Recognises patient symptoms that indicate medicine therapy should be monitored e.g. patient on warfarin is bruising easily; patient on NSAID develops GI problems
Liases with methadone clinic re monitoring reducing doses in patients
Recommends blood tests for therapies that need monitoring e.g. lithium, TPN
Interprets patient indicators for therapy recommendations, e.g blood tests for lipid lowering agents, clozapine, gentamicin dosing, warfarin dosing

Element 2.5 Maintain patient records

2.5.1 Records patient information and updates patient records

Examples of Evidence:
Complies with workplace procedures & regulations to maintain patient records
e.g. maintains prescription records for 10 years

2.5.2 Maintains privacy and security of patient information

Examples of Evidence:
Complies with the Health Information Privacy Code and amendments & workplace procedures regarding security of patient information

2.5.3 Records clinical decisions and recommendations.

Examples of Evidence:
Documents recommendations & outcomes of medicine therapy reviews
e.g interventions book, annotations on prescriptions, written report to prescriber

Element 2.6 Communicate effectively

2.6.1 Communicates verbal and written information fit for the receiver

Examples of Evidence
Uses language fit for the receiver, e.g avoids unnecessary technical jargon
Uses questioning & listening skills effectively
Explains clinical & medicine information clearly

2.6.2 Communicates effectively with prescribers and other health professionals

Examples of Evidence:
Uses questioning & listening skills to elicit information
Communicates clearly with individual health professionals
Provides medicine information & recommendations in format fit for the situation: letters, faxes, emails & verbally by telephone or face-to-face

2.6.3 Communicates effectively with patients

Examples of Evidence
Uses questioning & listening skills to elicit patient history information
Explains clinical & medicine information clearly
If necessary uses aids to ensure patients understand information,
e.g language cards, videos, large print labels and Braille cards.

Competence Standard 3
Provide Primary Health-care

This competence standard concerns the role of the pharmacist in encouraging and assisting people to take responsibility for their own health. Primary health incorporates holistic care of patients including attention to lifestyle, diet, health promotion, illness prevention, referral and the supply of non-prescription medicines, therapies, diagnostic and therapeutic aids. This involves the pharmacist in treatment, referral and education.

Range Statement:
At this level the pharmacist's responsibilities are reactive in that he/she provides primary health-care advice and treatment to individual patients in response to requests. The pharmacist provides assessment, treatment and advice for common minor conditions. The pharmacist's treatment options include all over-the-counter medicines (including Pharmacist Only medicines) and therapies, common diagnostic and therapeutic aids, advice and counselling and referral to other health professionals. Therapies includes complementary medicines, herbal remedies and other health-care products not provided by another health-care provider.

Element 3.1 Elicit a patient history

3.1.1 Elicits relevant patient history information

Examples of Evidence:
Ascertains current signs & symptoms, other medical conditions, current & previously tried medicines, allergies & sensitivities
Observes patient, e.g. approximate age, visible symptoms
Ensures patient privacy & confidentiality of patient information

3.1.2 Identifies the immediate problem with which the patient presents

Examples of Evidence:
Makes an assessment of patient's condition on basis of history

3.1.3 Interprets patient medicine records

Examples of Evidence:
If appropriate, looks in records for contraindications, interactions & factors contributing to presenting problem

Element 3.2 Determine the best treatment options for patients

3.2.1 Evaluates patients' situations to determine whether to treat or refer

Examples of Evidence:
Evaluates signs, symptoms & history to determine what can be managed by pharmacist
Identifies situations that cannot be managed by pharmacist

3.2.2 Refers patients and complies with professional, ethical and workplace conventions and legal requirements when referring patients

Examples of Evidence:
Explains to patient the need to see another health professional
Refers patients to prescriber if patients' medicine fails in its purpose or causes an untoward effect
Offers to assist with accessing other health professionals
Seeks informed consent, maintains confidentiality & fulfils requirements of the Privacy Act when contacting another health professional on behalf of patient

Element 3.3 Facilitates the supply of non-prescription medicines or therapies

3.3.1 Selects non-prescription medicines to meet patient's acute needs

Examples of Evidence:
Checks ingredients to ensure product is indicated for patient's situation
Checks that product is safe for patient,
e.g considers interactions, contraindications & patient factors (e.g. pregnancy & age).
Checks appropriate dose form e.g liquid for child

3.3.2 Counsels patients about the use of non-prescription medicines

Examples of Evidence:
Informs patients on correct & safe use, side-effects, storage, precautions & contraindications

3.3.3 Complies with legal requirements and professional and ethical conventions regarding the supply of non-prescription medicines

Examples of Evidence:
Records sales of Pharmacist Only Medicines
If an accredited Emergency Contraceptive Pill (ECP) pharmacist, supplies ECP in accordance with PSNZ standards and best practice guidelines
Identifies requests that indicate potential for misuse
Complies with PSNZ & workplace guidelines regarding potential misuse of non-prescription medicines

Element 3.4 Advise on diagnostic aids

3.4.1 Explains the use and purpose of diagnostic products

Examples of Evidence:
e.g. blood glucose test kits, pregnancy tests, blood pressure meters

3.4.2 Advises and counsels patients about the use of diagnostic aids

Examples of Evidence:
Advises on correct use & care of diagnostic aids
Demonstrates & explains the correct way to use products, e.g. safety & hygiene
Checks for patient understanding, e.g. asks patient to repeat back instructions

Element 3.5 Advise on non-pharmaceutical methods to treat current primary health conditions

3.5.1 Counsels patients about self-help measures to reduce current symptoms or discomfort

Examples of Evidence:
Provides advice on non-medicine measures to alleviate symptoms, e.g. steam inhalations for head cold congestion

3.5.2 Informs and advises patients about community health support agencies/organisations and pharmacy-based primary health-care programmes

Examples of Evidence:
Advises patients about available agencies & programmes & where & how to access them,
e.g Plunket, Maori health workers, Age Concern, Asthma Society
e.g Pharmacy Self Care, methadone & needle exchange programmes Comprehensive Pharmaceutical Care® & Pharmaceutical Review Services (PRS)

Element 3.6 Apply first aid

3.6.1 Applies emergency first aid measures

Examples of Evidence:
Holds a current First Aid Certificate (completed within the previous 2 years) in the NZQA unit standards **6400** - Manage First Aid , **6401** - Provide First Aid and **6402** – Provide Resuscitation level 2. .

3.6.2 Refers first aid emergencies to other health professionals

Examples of Evidence:
Explains referral procedures for specified first aid emergencies,
e.g. cardiac arrest ? ambulance, asthma attack ? doctor.
Identifies symptoms of, & potential for, poisoning from medicine overdoses

3.6.3 Provides treatment for minor injuries

Examples of Evidence:
Range: minor sprains, strains, cuts & grazes, burns, allergic reactions.
Uses Standard Precautions when dealing with blood/body fluids, e.g. wears gloves for handling blood/body fluids; washes hands between patient contacts

3.6.4 Advises on the use of bandages and dressings

Examples of Evidence:
Explains purpose & use of different dressings/bandages
Advises & counsels patients about correct use of bandages/dressings

Element 3.7 Counsel and advise to promote good health and reduce disease

3.7.1 Counsels patients about lifestyle changes, which may reduce illness

Examples of Evidence:
Counsels patients about measures to promote health & reduce disease,
e.g. smoking cessation, exercise, healthy diet, moderating alcohol intake, sun protection, lifestyle factors related to heart disease, diabetes & osteoporosis.

3.7.2 Informs and advises patients about preventing the spread of disease

Examples of Evidence:
Counsels patients about preventing the spread of disease including: encourages appropriate immunisation, preventing the spread of meningococcal disease, headlice, chicken pox, measles, safe sexual practices related to STDs and HIV/AIDS, intravenous drug use & blood-borne diseases.

3.7.3 Informs and advises patients about screening programmes and community programmes relating to health-care and medicines

Examples of Evidence:
Counsels patients about measures to detect diseases, e.g. cervical screening, mammography, glaucoma checks, mole & skin cancer checks.
Participates in national programmes and local initiatives, e.g. provides sun-sense information, DARE programmes, safe disposal of medicines campaign (DUMP).

Element 3.8 Communicate effectively

3.8.1 Establishes rapport with the patient.

Examples of Evidence:
Uses body-language to establish empathy & rapport
Uses open & approachable body stance, facial expression
Respects individual & cultural differences

3.8.2 Uses active listening techniques and asks questions relevant to the situation

Examples of Evidence:
Is attentive to patient and asks relevant questions in a logical sequence
Paraphrases to confirm & clarify information from patient

3.8.3 Tailors information to fit the patient and the situation

Examples of Evidence:
Adapts information for patient's level of comprehension & avoids technical jargon
Uses varied formats (e.g. verbal & written information, physical demonstration, diagrams/pictures, placebo devices) to best fit patients' needs

3.8.4 Checks patients' understanding

Examples of Evidence:
Listens, questions & interprets body-language to ensure understanding
Gets patient to demonstrate or explain the treatment or advice
Asks patient to repeat back information if necessary

Competence Standard 4
Apply Management and Organisation Skills

This competence standard covers the organisation and management skills common to all pharmacists. It encompasses the ability to deal with contingencies in the workplace as well as routine work.

Range Statement:
At this level the pharmacist is responsible for management and organisation of his or her own work and professional duties within the workplace. The pharmacist may work alone or with other pharmacists and, if in a pharmacy, takes responsibility for the work of non-pharmacist staff.

Element 4.1 Take responsibility in the workplace

4.1.1 Organises own work

Examples of Evidence:
Explains own work & responsibilities in work place
Meets deadlines
Prioritises work
Decides what to do, plans to get it done & does it

4.1.2 Takes responsibility for the work of non-pharmacist staff

Examples of Evidence:
Describes roles & responsibilities of non-pharmacist staff
Supervises work of non-pharmacist staff e.g technicians & assistants
Works with others to prioritise & organise workflow

4.1.3 Supports the work of colleagues in the workplace

Examples of Evidence:
Describes pharmacist's role & responsibilities in workplace
Works in partnership with colleagues in work place, if applicable, to ensure safe practice

Element 4.2 Work effectively within the workplace organisation

4.2.1 Works with the documented procedures and systems

Examples of Evidence:
Works within organisation's Standard Operating Procedures (SOPs).
Uses computer programmes & other systems in workplace

4.2.2 Maintains effective working relationships with other staff

Examples of Evidence:
Works with others to maintain an open & supportive team
Explains the effects of own actions on other staff

4.2.3 Supports workplace-based training

Examples of Evidence:
Participates in workplace-based training
Trains staff in workplace systems & operations

Element 4.3 Facilitate a safe working environment

4.3.1 Complies with legislation relating to occupational health, welfare and safety

Examples of Evidence:
Explains own responsibilities under the Health & Safety in Employment Act 1992

4.3.2 Ensures work areas are safe and hygienic

Examples of Evidence:
Takes responsibility for maintaining cleanliness & safety of workplace
Ensures work areas comply with the *Quality Standards for Pharmacy in NZ*

4.3.3 Ensures the safe handling, storage and disposal of potentially hazardous materials

Examples of Evidence:
Follows workplace guidelines for the handling, storage & disposal of potentially hazardous materials – both pharmaceutical and workplace chemicals
Oversees non-pharmacist staff to ensure they follow workplace guidelines for the handling, storage & disposal of potentially hazardous materials

4.3.4 Follows the safety procedures to be implemented in the event of an emergency

Examples of Evidence:
Describes examples of pharmacy emergencies
Explains existing workplace safety procedures

Element 4.4 Contribute to the management of workplace services

4.4.1 Contributes to the maintenance and development of workplace procedures and services

Examples of Evidence:
Works with other staff to develop & amend work place procedures (e.g. SOPs)
Contributes ideas for improving services
Works with others to ensure adequate staffing levels
If a locum, contributes suggestions for developing workplace procedures

4.4.2 Works with others to ensure adequate supplies of stock and equipment

Examples of Evidence:
Works within work place guidelines to order medicines & equipment
Oversees non-pharmacist staff to ensure they work within work place guidelines for ordering medicines & equipment

4.4.3 Complies with agreed conditions of employment

Examples of Evidence:
If an employee, complies with employment conditions agreed with employer e.g hours of work
If an employer, complies with employment conditions agreed with employee

Element 4.5 Communicate effectively

4.5.1 Communicates effectively with other personnel in the workplace

Examples of Evidence:
Participates in staff discussions
Explains new or changed procedures to staff members
Maintains constructive dialogue with all staff

4.5.2 Communicates effectively with representatives from outside the workplace

Examples of Evidence:
If necessary, maintains constructive dialogue with drug company representatives, stock & equipment wholesalers & manufacturers & other health professionals

Competence Standard 5
Research and Provide Information

This competence standard covers the role of the pharmacist in providing health-related information to other health professionals, patients and the public. The pharmacist's role includes finding, interpreting, evaluating, compiling, summarising, generating and disseminating information, for the purpose of optimising medicine related health outcomes.

The research component of this standard applies to both applied and practice-based research covering medicines and all areas within pharmacy and health. This includes science, social, cultural, economic and management factors in the health field.

Range Statement:
The pharmacist's medicine and health-care information responsibilities are reactive, in that he/she carries out the tasks described in this standard in response to requests from patients, members of the public and health professionals. The pharmacist accesses and uses standard references sources to obtain information about medicines or health-care and provides accurate information to other health professionals, patients and the public in a manner that is timely and suitable for the receiver.
Common medicines are those listed in the latest edition of the MIMS New Ethicals.
Readily available references are those available from within the pharmacy including current editions of Martindale, MIMS New Ethicals, BNF, Pharmaceutical Schedule, a medical dictionary and web-based sources.

The pharmacist undertakes workplace-based research that provides new personal knowledge and/or facilitates more effective medicine use or workplace management.

Element 5.1 Use reference sources to compile medicines and health-care information

5.1.1 Describes reference sources

Examples of Evidence:
Describes availability & scope of common reference sources including reference texts and computer databases
Explains limitations of available reference sources

5.1.2 Finds information in reference sources

Examples of Evidence:
Accesses tertiary medicine information sources e.g. *BNF, New Ethicals Catalogue*
Accesses secondary medicines information sources e.g. *Martindale, Medline*
Selects optimal reference sources for situation
Finds specified information in a timely manner, including information on: patient factors, interactions, precautions & contraindications, therapeutic efficacy, dosages, dose forms, methods of administration & side-effects

Element 5.2 Interpret information about medicines and health-care

5.2.1 Evaluates situation to determine if able to provide information to the required level or needs to refer

Examples of Evidence
Responds to enquiries, if within own level of expertise
If necessary, refers enquiry to another health professional e.g specialist medical practitioner, CARM, medicines information centre

5.2.2 Differentiates between information sources regarding their reliability

Examples of Evidence:
Recognises differences between peer-reviewed research and promotional material e.g. advertising material
Explains difference between manufacturers information (e.g. Medicines data sheets) & independent editorial-based sources (e.g. Martindale)

5.2.3 Compares information from different sources

Examples of Evidence:
Compares information when two reference sources give different advice, and determines what outcome to recommend e.g. significance of drug interactions
Recognises that cultural, economic and political contexts shape information from different sources

5.2.4 Interprets information on behalf of other health professionals, patients and members of the public

Examples of Evidence:
Relates information to specific situations. patients or requests
Relates information found to the situation e.g. gives patient-specific answer if appropriate

Element 5.3 Provide information about medicines use and health-care.

5.3.1 Explains the pharmacology and therapeutic use of common medicines

Examples of Evidence:
Either from memory or reference sources, explains therapeutic use, patient factors, ADRs, interactions & contraindications for common medicines
Provides references to substantiate information

5.3.2 Advises about the use of medicines

Examples of Evidence:
Explains the safe use of medicines, including warnings & precautions & special storage requirements of specific medicines

5.3.3 Provides medicines and health-care information to individuals and groups

Examples of Evidence:
Provides responses to queries from members of the public or other health professionals
If asked, addresses groups of health-care professionals, patients or members of the public
e.g. Asthma Society meeting or a group of diabetes patients

Element 5.4 Apply research findings in the workplace

5.4.1 Identifies research opportunities in the workplace

Examples of Evidence:
Identifies the need for research,
e.g. Identify the need to: improve workflow in the dispensary, cut down clerical calls to doctors, improve use of pharmacy floor space

5.4.2 Gathers information and resolves identified problems

Examples of Evidence:
Gathers information on a workplace/research problem & works to resolve this
e.g. produces a regular bulletin to doctors about Pharmac changes
Adopts a questioning approach to problem-solving

Element 5.5 Communicate effectively

5.5.1 Responds to queries and requests for medicines and health-care information

Examples of Evidence:
Listens and interprets information from enquirer e.g. paraphrases to ensure request is understood
Asks questions to elicit all the information
Agrees on time frame for response

5.5.2 Communicates verbal and written information fit for the receiver

Examples of Evidence:
Avoids technical jargon when talking with patients
Provides information fit for situation: letters, faxes, emails & verbally by telephone & face-to-face

5.5.3 Communicates effectively with other health professionals and patients

Examples of Evidence:
Communicates clearly with individual health professionals to pass on information
Explains information clearly to patients & if necessary uses additional aids
e.g. language cards, videos, interpreters, large print labels & Braille cards

Competence Standard 6
Dispense Medicines

This competence standard covers the supply of Prescription Medicines and Pharmacist Only Medicines, including extemporaneously compounded products. The dispensing process includes all actions and responsibilities of the pharmacist from receipt of a prescription, medicine order or patient request through to counselling the patient about the use of the medicine.

Range Statement:
The pharmacist processes all prescriptions and medicine orders (including Practitioners Supply Orders and Bulk Supply Orders) received in written form or by fax, telephone or computer. He or she dispenses Pharmacist Only Medicines and all categories of Prescription Medicines.

Element 6.1 Validate prescriptions

6.1.1 Checks prescriptions are complete, legal and authentic

Examples of Evidence:
Identifies whether or not prescriptions are complete &/or legal.
Checks compliance with Regs 41 & 42, Med Regs 1984
Identifies possible fraudulent prescriptions

6.1.2 Obtains information needed to make prescriptions complete and correct

Examples of Evidence:
Obtains information from prescriber, patient & other sources as defined in Reg 41 Med Regs 1984
Checks with prescriber if instructions/prescription details unclear

6.1.3 Annotates prescriptions

Examples of Evidence:
Annotations as defined in DHB's Procedures Manual
e.g. ensures annotations are distinguishable from what doctor has written
Annotates according to hospital pharmacy procedures (e.g. SOPs)

6.1.4 Verifies prescriptions received by fax, telephone or email

Examples of Evidence:
Complies with legal requirements: Reg 40 Meds Regs 1984, Reg 34 Misuse of Drugs Regs 1977
Follows workplace practices & professional conventions when verifying prescriptions

Element 6.2 Assess Prescriptions

6.2.1 Determines whether individual prescriptions should be dispensed

Examples of Evidence:
Recognises problem prescriptions, eg incorrect/inappropriate prescribing

6.2.2 Follows workplace dispensing criteria when dispensing a prescription item

Examples of Evidence:
Checks medicine funding status in the Pharmaceutical Schedule
Checks if medicine fulfils hospital dispensing criteria

6.2.3 Prioritises prescriptions

Examples of Evidence:

Checks urgency needed to dispense each prescription
Organises prescriptions in order of priority

6.2.4 Determines the stock availability of prescribed medicines

Examples of Evidence:
Checks medicine available in pharmacy
Determines where & when the medicine can be obtained if not available, eg wholesaler or another pharmacy

Element 6.3 Interpret prescriptions

6.3.1 Identifies prescribed medicines

Examples of Evidence:
Identifies trade, generic & common names for prescribed medicines
Uses reference sources to find medicine names

6.3.2 Explains the therapeutic use of prescribed medicines

Examples of Evidence:
Explains pharmacology of each medicine, using reference if necessary

6.3.3 Interprets prescription instructions

Examples of Evidence:
Interprets abbreviations of dosage & dose forms
Interprets the prescriber's intention

Element 6.4 Review patients' medicines in relation to their histories

6.4.1 Accesses patient medicine records

Examples of Evidence:
Accesses computerised/written records held in own pharmacy.
Accesses medicine records held in other pharmacies or by other health professionals.

6.4.2 Verifies details of patient medicine records with patients, their caregivers or other health professionals

Examples of Evidence:
Ensures records reflect actual medicine intake of patient

6.4.3 Detects medicine problems from individual patients' medicine histories

Examples of Evidence:
Identifies omissions, dosage changes, inappropriate use, ADRs, non-compliance, prolonged use, misuse or abuse, interactions, incompatibilities, contraindications

6.4.4 Identifies patient factors likely to affect the efficacy or safety of specified medicines

Examples of Evidence:
e.g. age, weight, pregnancy, breast-feeding, disabilities, allergies, risk factors, other medicines

Element 6.5 Decide what is safe and appropriate to dispense

6.5.1 Confirms that each selected medicine is suitable for the patient

Examples of Evidence:
Confirms that dosage, route of administration & duration of therapy are suitable
Identifies possible interactions or incompatibilities

6.5.2 Addresses factors likely to affect patient compliance

Examples of Evidence:
Identifies factors likely to affect patient compliance & determines ways to deal with these, e.g. tablet use in children, breaking tablets
Selects compliance aids, e.g. asthma spacers; tablet cutter; single dose packaging

6.5.3 Applies all patient information to dispensing decisions

Examples of Evidence:
Based on all information gathered decides whether can dispense or need to contact prescriber or patient

6.5.4 Contacts prescriber to recommend medicine, dose or dose form changes.

Examples of Evidence:
Contacts prescriber and documents discussion outcomes, e.g. annotates on prescription, records in interventions book

Element 6.6 Fill prescriptions

6.6.1 Obtains prescribed medicines

Examples of Evidence:
Locates stock in pharmacy
Obtains stock from other sources, if not available in pharmacy

6.6.2 Maintains a logical, safe and disciplined dispensing procedure

Examples of Evidence:
Selects correct product, dose form & quantity for each prescribed medicine
Dispenses off prescription, not label

6.6.3 Fulfils the conditions & requirements specified in the relevant legislation

Examples of Evidence:
Complies with legal requirements of Misuse of Drugs Regs and Medicines Regs

6.6.4 Provides emergency supplies of prescription medicines

Examples of Evidence:
Determines need for an emergency supply
Complies with legal requirements & professional conventions regarding dispensing emergency supplies of prescription medicines (Reg 44 Meds Regs 1984)

Element 6.7 Package medicines to optimise safety and compliance

6.7.1 Packages medicines in suitable containers

Examples of Evidence:
Selects optimal container for the medicine, e.g. light-protective container
Selects optimal container for the patient, e.g. child resistant closures, single dose packaging

6.7.2 Produces comprehensible and complete labels for medicines

Examples of Evidence:
Includes all information specified by prescriber & necessary cautions/advice
Attaches labels securely without obscuring relevant information, eg expiry date
Fulfils legal requirements & professional conventions re labelling of medicines (Reg 23 Meds Regs 1984)
Adapts labelling to meet patients' needs, e.g. poor sight

Element 6.8 Maintain dispensing records

6.8.1 Maintains patient records

Examples of Evidence:
Maintains patient medicine records, including patients' administrative information & details of prescribed medicines, e.g. repeats allowed, prescriber details.

6.8.2 Maintains medicine records

Examples of Evidence:
Maintains medicine records, e.g. emergency supply, Pharmacist Only Medicines, Controlled Drugs, unregistered medicines

6.8.3 Fulfils legal requirements and professional conventions regarding maintenance of records

Examples of Evidence:
Complies with legal requirements: Reg 57 Meds Regs 1984, Health (Retention of Information) Regs 1996, Sect 18 Meds Act 1981
Maintains dispensing records of patients on IMMP & forwards to CARM in Dunedin every 4 months.

Element 6.9 Minimise dispensing errors

6.9.1 Explains the general potential for errors in the dispensing process

Examples of Evidence:
Identifies steps in dispensing procedure that are potential problem areas
Identifies actions to minimise actual/potential problem areas

6.9.2 Acts to minimise the effects of his/her dispensing errors

Examples of Evidence:
Identifies potential/actual errors in own dispensing
Acts to minimise effect on patient, e.g. contacts patient, contacts prescriber, supplies correct medicine.
Documents own dispensing errors & actions undertaken to minimise their effects
Complies with workplace procedures for documenting dispensing errors

6.9.3 Rectifies dispensing errors immediately

Examples of Evidence:
Alters own dispensing procedure to prevent recurrence of previous errors

Element 6.10 Counsel patients about their medicines

6.10.1 Ensures patient receives the correct medicine

Examples of Evidence:
Check patient details, e.g. name & address.

6.10.2 Ascertains patients' understanding of their medicines

Examples of Evidence:
Talks with/questions patients to find out their understanding of medicines purpose & compliance

6.10.3 Informs and advises about medicines

Examples of Evidence:
Explains indications for use & benefits of medicines
Advises on dosage, storage, alterations in formulation/packaging, different brands supplied on generic request medicines
Advises about precautions & adverse effects without alarming patients

Advises on frequency; relationship to food & duration of therapy
Provides written information, e.g. pamphlets, self care cards

6.10.4 Demonstrates the correct method of administering medicines

Examples of Evidence:
Provides compliance aids if necessary, e.g. asthma spacers; tablet cutter
Provides verbal & written information & physical demonstrations to explain special techniques for using:
- inhalers, ear, nose & eye drops, nasal & oral sprays, suppositories & pessaries
- creams, lotions, patches & dressings
- cutting/dissolving tablets

6.10.5 Check patients' understanding of the advice and counselling

Examples of Evidence:
Listens attentively or questions patient to determine understanding
Gets patient to repeat information to ensure understanding

6.10.6 On request informs and advises patients about their conditions and diseases

Examples of Evidence:
Ascertains patients' understanding of their conditions/diseases
Provides verbal & written advice, e.g. pamphlets, self care cards

Element 6.11 Communicate effectively

6.11.1 Communicates effectively with prescribers

Examples of Evidence :
Uses questioning and listening skills to elicit information
Clearly communicates proposed prescription changes and recommendations

6.11.2 Uses language and non-verbal communication to suit the patient

Examples of Evidence:
Talks to patients in lay terms, avoiding technical jargon
Uses gestures, voice tone, stance, & facial expressions to suit situation & patient

6.11.3 Tailors information to suit the patient

Examples of Evidence:
Adapts information to suit patient's comprehension level
Uses varied formats to provide information in a way that suits patients' needs, e.g. verbal, physical demonstration, written, pictorial, models & placebo devices

6.11.4 Asks relevant questions

Examples of Evidence Guide:
Uses questions to check patient understands advice & counselling
Listens attentively to response

Competence Standard 7
Prepare Pharmaceutical Products

This competence standard covers the preparation of pharmaceutical products in community and hospital pharmacies.

Range Statement:
The pharmacist prepares small quantities of non-sterile products and/or sterile products, including creams, ointments, suppositories, mixtures, suspensions, solutions and/or TPNs, eyedrops, injections and subcutaneous syringes.

The pharmacist prepares products according to:
- the Quality Standards for Pharmacy in New Zealand, Standard 6.3, and
- the New Zealand Code of Good Manufacturing Practice for the Manufacture and Distribution of Therapeutic Goods, Part 3, for small scale compounding.

The pharmacist explains the principles of aseptic dispensing and recognises situations in which it is necessary.

Element 7.1 Explain compounding principles and procedures

7.1.1 Explains the principles of compounding

Examples of Evidence:
Explains use of techniques & equipment,
e.g. grinding, mixing, heating, order of addition of ingredients, balances & weights.
Describes role of buffers, preservatives, antioxidants & suspending agents
Explains the principles of sterile compounding, e.g. no-touch technique, use of laminar-flow cabinets.

7.1.2 Explains the principles of medicine stability

Examples of Evidence:
Explains effects of moisture, oxygen, sunlight, temperature & micro-organisms on stability & clinical effectiveness of finished product

Element 7.2 Recognises under what conditions extemporaneously prepared products can be prepared

7.2.1 Differentiates between prescriptions that require aseptic dispensing & those that do not

Examples of Evidence:
Identifies dosage forms that must be prepared with aseptic techniques in a clean room environment
e.g. those instilled, injected or used to irrigate sterile body cavities
Does not attempt to make eyedrops in normal dispensary area

7.2.2 Recognises extemporaneously prepared products that must be prepared under special conditions to minimise environmental risk

Examples of Evidence:
Identifies cytotoxic preparations that must be prepared in a chemotherapy isolator or preparation unit.
Identifies potentially harmful ingredients and products e.g. podophyllin, and ensures they are dealt with safely, including storage and transport

Element 7.3 Determines appropriate formulation

7.3.1 Selects formulations

Examples of Evidence:
Selects correct formulations for specified products
Accesses formulations used in workplace or uses reference sources

7.3.2 Interprets formulations

Examples of Evidence :
Interprets common terminology & abbreviations, e.g. ingredients, instructions, dose forms, quantities
Identifies trade, generic & common names of ingredients
Identifies problem formulations, e.g. incorrect proportions, drug instability, vehicle instabilities, inaccuracies, precipitations, syringe compatibilities/incompatibilities.

7.3.3 Explains the purpose of ingredients within formulations

Examples of Evidence:
Explains what each ingredient is - stabilisers, therapeutic agents, preservatives, vehicles, diluents, antioxidants, suspending agents, flavouring agents e.g. methylcellulose is a suspending agent.
Explains the role of TPN components and the balance required between these

7.3.4 Modifies formulations within existing guidelines

Examples of Evidence:
Modifies formulations to ensure product is stable & suitable for intended use
Follows manufactures' guidelines, or appropriate reference source, for dilution of solutions, suspensions & ointments
Explains the limits of modifications that can be made to formulations, e.g. addition of electrolytes to TPNs, additions to creams

Element 7.4 Compound pharmaceutical products

7.4.1 Prepares worksheet and calculations and labels

Examples of Evidence:
Calculates quantities of ingredients & end product to 100% accuracy, and documents this
Produces clear labels for end products, including full patient instructions, expiry dates, storage information and any supplementary advisory labels

7.4.2 Obtains stock and equipment and prepares work area

Examples of Evidence:
Obtains correct form & strength of ingredients needed for product
Checks each ingredient to ensure it is fit to use, e.g. checks expiry date, signs of degradation, stored correctly (temperature & protection from light & moisture), stability if packaging already opened. Checks ingredient is pharmaceutical grade.
Ensures equipment and work area are appropriate, clean & tidy e.g. ointment slab cleaned; positive pressure areas maintained in sterile unit
Ensures personnel are appropriately prepared for aseptic production, e.g. handwashing, appropriate clothing

7.4.3 Compounds pharmaceutical products applying suitable compounding techniques and principles

Examples of Evidence:
Uses appropriate compounding technique to prepare product
Weighs or measures correct quantity of ingredients
Follows professional conventions & formulation principles when compounding
Uses aseptic, no-touch technique for sterile preparations

7.4.4 Examines final product for particulate contamination and homogenicity

Examples of Evidence:
Undertakes a visual final check for product, e.g. checks for particulate contamination, uniform mixing, aesthetically pleasing products
Complies with workplace quality control procedures for assessment of final product e.g. assays of active ingredients, sterility checks

7.4.5 Complies with current legislation, codes, standards and workplace practices for the compounding and preparation of pharmaceutical products

Examples of Evidence:
Complies with rules of schedule or formulary, relevant for the product
Complies with Code of GMP, Quality Standards for Pharmacy in NZ & workplace SOP's

7.4.6 Packs and labels compounded products to optimise safety and compliance

Examples of Evidence:
Packs each compounded product in container suitable for type, quantity, intended use & storage requirements of product, e.g. protected from light & moisture, container suited to product & use, bottle with dropper dispenser for ear drops.
Attaches labels securely, without obscuring relevant information, e.g. graduations on syringes, poison bottle ribs

7.4.7 Ensures optimal storage of ingredients and compounded products

Examples of Evidence:
Complies with optimal storage conditions regarding: temperature, light, moisture, type of container, transport of product

7.4.8 Cleans and maintains compounding equipment

Examples of Evidence:
Cleans all equipment after use
Checks & maintains equipment according to manufacturers' instructions & workplace SOP's
Ensures aseptic preparation areas are monitored, serviced and cleaned regularly

7.4.9 Completes documentation and records

Examples of Evidence:
Completes batch sheets, worksheets & records accurately & legibly
Completes & verifies worksheets & batch sheets & files documentation according to current legislation, codes, standards & work place practices e.g. Controlled Drug Register.
Ensures an authorised person verifies all work.

Element 7.5 Communicate effectively

7.5.1 Writes in clear English

Examples of Evidence:
Produces all labels, records & instructions in clear legible English with no spelling or grammatical errors

7.5.2 Communicates effectively with prescribers, health professionals, care givers and patients

Examples of Evidence:
Uses questioning and listening skills to elicit information
Clearly communicates proposed formulation requirements and changes with prescriber
Communicates effectively with end user of product about the use of the product, e.g. TPN administration, eye drop use.

(Pharmacy Council, 2005b)

Appendix Two – Otago University Bachelor of Pharmacy Outline

The Degree of Bachelor of Pharmacy (BPharm)

To be a registered pharmacist in New Zealand, a four year university programme leading to a Bachelor of Pharmacy degree followed by a total of 52 weeks of trainee internship at approved pharmaceutical establishments has to be undertaken. The qualification (BPharm) and practice experience is required for registration and membership (MPS) with the Pharmaceutical Society of New Zealand to practise pharmacy.

What is the Health Sciences First Year course?
Four years of study are required for the BPharm degree.
The first year, the Health Sciences First Year, provides a foundation in Chemistry, Biochemistry and Biological subjects, with English, Physics and Biostatistics, although exemptions may be considered in the latter three subjects for students whose Bursary grades are above a predetermined level. Where exemptions are given, students can broaden their education by selecting from other first year papers available for the BSc, BA or BCom degrees. A total of 42 points is required in the first year course.

Intending students for whom English is not a first language are advised to seek English Language instruction before entry to pharmacy studies as the programme has a heavy emphasis on the ability to communicate well with patients, colleagues and other health professionals. All candidates must take their Health Sciences First Year course at the University of Otago and have their course approved by advisers.

What is the best preparation for Health Sciences First Year?
The breadth and depth of the BPharm programme prepares the graduate for a choice of openings: hospital pharmacy, community pharmacy, industrial pharmacy, drug and poisons information, health education, teaching, research and medical publishing are just some of the opportunities available. As an applied health sciences qualification it also offers opportunities for work in many related areas.

Careers may also be enhanced through postgraduate professional courses and research qualifications. These are available at the University of Otago, either through its Postgraduate Certificates, Diplomas, Masters degrees, doctorates or through courses offered by the New Zealand College of Pharmacists for Member or Fellow status. Remuneration in all sectors of the profession is good at present, being very competitive with other professional groups.

What happens after Health Sciences First Year?
Students apply for admission to the School of Pharmacy at the end of the Health Sciences First Year. Other categories of admission are also listed later. Those selected will then be admitted into the Pharmacy 2 year. During this and the next two years they will study Pharmacy Practice and Pharmaceutical Sciences, as well as Anatomy, Biochemistry, Microbiology, Physiology, Pathophysiology and Pharmacology.

Pharmacy Practice
PHARMACY PRACTICE is concerned with the societal role of pharmacists in ensuring that medicines are used safely and effectively. This requires a thorough understanding of legal and professional responsibilities, as well as the many factors that influence the choice and use of medicines. It includes dispensing of prescribed medicines as well as the selection of 'over-the-counter' remedies.

Pharmacy Practice incorporates Clinical Pharmacy which is principally concerned with the application of knowledge from subjects such as physiology, pharmacology and medicinal chemistry, to selection of appropriate treatment for individual patients.

Excellent communication and management skills are required, both in providing detailed clinical information to prescribers, and in advising patients how best to use their medicines. As pharmacists now work in a variety of settings, students are exposed to community pharmacy (where most pharmacists work), hospital pharmacy, and specialty practice, such as working with groups of general practitioners. The link between foundation knowledge and current best practice is continually emphasised.

Pharmaceutical Sciences
PHARMACEUTICAL SCIENCES includes consideration of the technology involved in the preparation of dosage forms, plus the chemical, physical and biological factors affecting their performance. This includes practical aspects of dispensing sterile products. It deals with the effect of structural changes in drug molecules on their action in the human body, chemical reactivity and metabolism, plus analytical methods required for their measurement in medicines and biological fluids. An understanding of how drug levels change with time (pharmacokinetics) is gained as a further basis of drug therapy. Good manufacturing practice, quality assurance as applied to hospitals, community pharmacies and the pharmaceutical industry are an integral part of the course.

In each year there are 12-15 lectures or tutorials per week plus 10 to 15 hours of practical classes. In the final year, there is less practical work and more self-directed study. During this year, all students also undertake a research project. Students then graduate with a BPharm, sometimes with a Distinction or Credit, depending on overall level of achievement.

(Otago University, 2005)

Appendix Three – Informed consent letter

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui

School of Education
Te Putahitanga o te Matauranga

June 2003

Invitation to Participate in Research Project

Dear Fellow Pharmacist,

My name is Amanda McMurdo and I am a pharmacist undertaking study towards a PhD sponsored by the Pharmacy Education and Research Foundation. My project is to develop a method of assessing performance of pharmacists for the award of Annual Practising Certificates as will be required under The Health Practitioners Competence Assurance Act. I am inviting you to assist in this research by participating in an interview with a follow-up written questionnaire.

The general aim is to revise the existing framework for describing competence in pharmacy to enable assessment tools to be developed.

The research project will involve two phases. In the first phase, I will interview participants to determine their opinion on what differentiates a competent pharmacist from an expert pharmacist and from a not-yet-competent pharmacist. I will follow this up with a written questionnaire that will explore the constructs identified in the interviews in greater detail. I anticipate that this interview will take approximately one hour.

The interviews will be taped and transcribed by myself for analysis. No names will be recorded – the interview tape, transcription and resulting data will be allocated an identifying number. Once transcribed, the tapes and transcriptions will be stored under secure conditions and destroyed within 30 days of the completed research thesis being lodged in the library, or if you prefer, returned to you. The written questionnaire will be anonymous and will not require you to name any pharmacist.

I would like to assure you that in collecting the data, care will be taken to ensure that no pharmacist, including yourself can be identified. The processed data will be used to develop an integrated model describing standards of performance that will be used

to develop assessment tools. Results of this research will be disseminated to the profession through journal articles and conference presentations.

Participation in this research is voluntary and you may withdraw at any time. You may also choose to participate in the interview but ask for the interview not to be taped. If you agree to participate in this research, please sign the attached form and return it in the enclosed self-addressed envelop.

For further information you may contact myself at e-mail amanda.torr@xtra.co.nz or my supervisor Professor Cedric Hall on e-mail cedric.hall@vuw.ac.nz

Thank you for your time.

Yours sincerely

Amanda McMurdo

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui

School of Education
Te Putahitanga o te Matauranga

Informed Consent Form

Please complete and sign this form if you agree to participate. Please use the enclosed return addressed envelope in sending this form.

I have read the invitation to participate in the research and I understand it. I agree to participate in the proposed interview and follow-up written questionnaire. I understand that in agreeing to participate in this research, no opinions or information I contribute will be able to be attributed to me in any of the information used in this research or published as a result of this research.

Name: _____

Address where you can be contacted: _____

_____

Signature: _____

Date: _____

I agree to the interview being taped.

Yes ☐ No ☐

I would like to information on the results of the study after its completion.

Yes ☐ No ☐

Appendix Four – Interview Outline

Identifying number

Age

Gender

Area of practice you most often work in

Initial professional qualification

Post graduate qualifications

Interview questions

I want you to consider the standard "practise pharmacy in a professional manner" and I want you to think about a pharmacist you know or that you have worked with, who you consider to be an expert performer. Please describe the attributes—knowledge, skills and attitudes—that this person possesses.

Now think about a pharmacist that you know or that you have worked with that you consider to be a competent, but not expert, practitioner. What are the attributes—knowledge, skills and attitudes—that this person possesses.

Now think about a pharmacist, or it might be an intern, that you know or have worked with that you consider to be not-yet-competent. What are the attributes—knowledge, skills and attitudes—that this person possesses.

Now thinking about these three pharmacists, what is it about the expert pharmacist that sets them apart from the competent pharmacist?

What attributes sets the expert pharmacists apart from the not-yet-competent pharmacists?

What attributes sets the competent pharmacist apart from the not-yet-competent pharmacist?

Of the attributes you have described are the most important, in your opinion, for differentiating performance?

In your opinion, how long does it take for a pharmacist to become an expert performer?

Appendix Five – Explorative questionnaire

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui

School of Education
Te Putahitanga o te Matauranga

Questionnaire – Exploring Concepts of Performance in Four Roles of Pharmacists

Instructions

Think of three pharmacists you have worked or associated with at some point in your career who have demonstrated behaviour you considered to typify either expert practice, competent practice or poor practice. Think about the behaviours these pharmacists exhibited in relation to each of the domains:

- dispensing medicines,
- preparing pharmaceutical products,
- providing primary health-care, and
- contributing to the quality use of medicines

and then fill in the following sheets.

In describing the behaviours exhibited, consider what knowledge, skills, and attributes the pharmacist exhibits in each case.

(You may use different pharmacists to describe expert, adequate and poor performance in each of the domains).

All responses will be treated as confidential and no information will be generated that will enable identification of any individual pharmacist.

Please also enter you details in the box to the right. Please send return your questionnaire in the stamped addressed envelope provided.

Thank you for your participation.

Your age bracket	
20 - 30	
31 - 40	
41 - 50	
51+	

Male	
Female	

Area of primary practice	
Community	
Hospital	
Academia	
Government/Policy	
IPA/PHO	
Other	

Initial professional qualification	
PSNZ Professional Exam	
Diploma in Pharmacy	
Bachelor of Pharmacy (NZ)	
Other	

Post-graduate qualifications	
NZ College of Pharmacists	
List qualification	
Post graduate formal qualification	
List Qualification	

Dispense Medicines

Thinking about the role of dispensing medicines and the behaviours that would typically be exhibited:

Describe the behaviour of an individual in a work situation that typifies the behaviour of an expert performer. This is pharmacist A.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a competent performer who is performing at a level less than pharmacist A. This is pharmacist B.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a person who is not-yet-competent. This is pharmacist C.	

Use a series of two or three word phrases to describe what differentiates pharmacist A from pharmacist B.

What differentiates pharmacist A from pharmacist C.

What differentiates pharmacist B from pharmacist C.

Prepare Pharmaceutical Products

Thinking about the role of preparing pharmaceutical products and the behaviours that would typically be exhibited:

Describe the behaviour of an individual in a work situation that typifies the behaviour of an expert performer. This is pharmacist A.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a competent performer who is performing at a level less than pharmacist A. This is pharmacist B.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a person who is not-yet-competent. This is pharmacist C.	

Use a series of two or three word phrases to describe what differentiates pharmacist A from pharmacist B.

What differentiates pharmacist A from pharmacist C.

What differentiates pharmacist B from pharmacist C.

Provide Primary Health-care

Thinking about the role of providing primary health-care and the behaviours that would typically be exhibited:

Describe the behaviour of an individual in a work situation that typifies the behaviour of an expert performer. This is pharmacist A.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a competent performer who is performing at a level less than pharmacist A. This is pharmacist B.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a person who is not-yet-competent. This is pharmacist C.	

Use a series of two or three word phrases to describe what differentiates pharmacist A from pharmacist B.

What differentiates pharmacist A from pharmacist C.

What differentiates pharmacist B from pharmacist C.

Contribute to the quality use of medicines

Thinking about the role of contributing to the quality use of medicines and the behaviours that would typically be exhibited:

Describe the behaviour of an individual in a work situation that typifies the behaviour of an expert performer. This is pharmacist A.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a competent performer who is performing at a level less than pharmacist A. This is pharmacist B.	

Describe the behaviour of an individual in a work situation that typifies the behaviour of a person who is not-yet-competent. This is pharmacist C.	

Use a series of two or three word phrases to describe what differentiates pharmacist A from pharmacist B.

What differentiates pharmacist A from pharmacist C.

What differentiates pharmacist B from pharmacist C.

Appendix Six – Workshop Exercise

The categorisation I have used proposes the use of the following domains:

- Technical/functional – that is having the technical skills and the ability to perform technical tasks related to pharmacy;
- Knowledge/cognitive – that is having the knowledge and the ability to think and apply this to the functions and situations encountered in pharmacy;
- Personal/behavioural – that is having the ability to be able to communicate, interrelate and work with others;
- Legal/ethical – that is having the ability to work ethically and within legal parameters and make sound judgments;
- Organisational – that is having the ability to apply or develop procedures, following organisation and/or management practices

4. Is this categorisation sensible?

5. Is there anything that pharmacist does that does not fit into one or more of these domains?

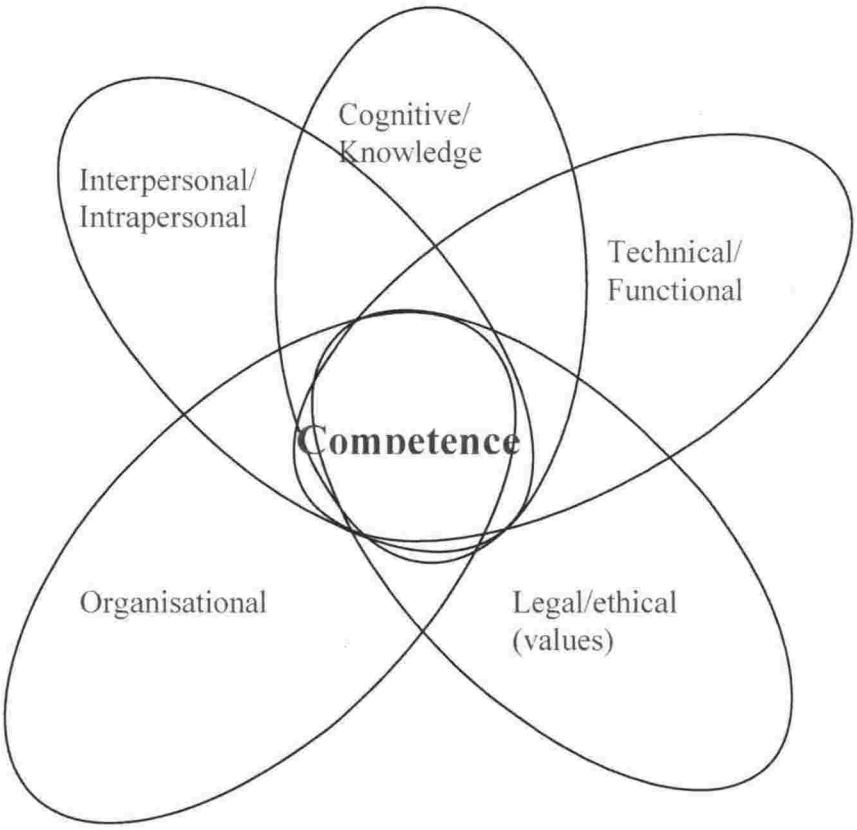
6. Is there a better way of categorising the work?

Appendix Seven – Survey instrument

Competence model and its validation

The statements in the following table have been extracted from the interviews and interviewee responses to the follow-up questionnaires. They appear to support a hypothesis that competent performance by professionals is demonstrated by their ability to integrate five **domains of competence**: knowledge/ cognitive skills, technical/ functional skills, intrapersonal/interpersonal skills, ability to organise him or herself and others, and legal and ethical behaviour.

This is illustrated in the following diagram:



In the proposed model, the five domains are exhibited on a continuum of independent to integrated. The domains are:

Cognitive/knowledge domain – a person operating at the independent end of the continuum would have some or all of the body of knowledge necessary to operate as a pharmacist, while a person operating at the integrated end of the continuum would be able to intergrate that knowledge with technical, legal and ethical, intra-personal/ interpersonal, and organisational skills in a wide range of contexts to meet the needs of clients, to problem solve and to generate new knowledge etc.

Intra-personal/interpersonal domain – a person operating at the independent end of the continuum would be able to communicate and relate to others, while a person operating at the integrated end of the continuum would be able to illicite client needs, apply knowledge to individual patients, build rapport and trust, communicate complex ideas and information to

another in a way they could understand, as well as being self-aware and able to initiate actions to develop his or herself and his or her practice.

Technical/functional domain – a person operating at the independent end of the continuum would have the technical skills to prepare pharmaceutical products, and count, pour and weigh preparations, while a person operating at the integrated end of the continuum would be able to identify errors and omissions on prescriptions, practise Comprehensive Pharmaceutical Care, develop new formulations and communicate effectively with prescribers/patients etc.

Organisational domain – a person operating at the independent end of the continuum would be reactive to events, be able to plan and prioritise work, manage time to ensure work tasks are completed. At the integrated end of the continuum he or she would be proactive, and would develop and implement operational procedures, delegate, work effectively in team, manage, develop and supervise the work of others. He or she would also be able to source and evaluate information requiring the integration of technical, cognitive and organisational domains.

Ethical domain – a person operating at the independent end of the continuum would be able to comply with legal requirements while at the integrated end of the continuum they would be able to apply legal and ethical frameworks to all decision-making and handle complex ethical situations in a respectful manner.

Initial assessment of this model has supported its intuitive validity. I now want to test it further. For the following statements:

1. Rank each statement as it applies to expert, competent and not-competent performers according to the following scale:

1	2	3	4	5
Never applies	Sometimes applies	May apply or not apply	Usually applies	Always applies

2. Determine which statement is describing
   - Technical aptitude – that is having the technical skills and the ability to perform technical tasks related to pharmacy (T);
   - Cognitive aptitude – that is having the knowledge and the ability to think and apply this to the functions and situations (C);
   - Intra-personal/interpersonal aptitude – that is the ability to be able to communicate, interrelate and work with others (I);
   - Legal/ethical aptitude – that is the ability to work ethically and within legal parameters (L);
   - Organisational aptitude – that is the ability to apply or develop procedures, following organisation and/or management practices (O); or

   A combination of two or more aptitudes – that is, you might think the statement requires an integration of one or more attitudes.

3. Determine whether the statement applies to all practice (A), dispensing (D), preparing pharmaceutical products (P), contributing to the rational use of medicines (R), providing primary health-care (H), or a combination of these.

Return the completed questionnaire to Amanda.torr@xtra.co.nz

Rank			Statement	Domains					Functions				
Expert	Competent	Not-competent		T	C	I	L	O	A	D	P	R	H
			Is able to provide a "wider" service, looks after the whole person and has an holistic approach – Considers "wider" picture, provides extras										
			Anticipates and deals with potential problems. Looks beyond the surface of things. Has a gut feeling for when things aren't right and acts on it										
			Is focused on the patient and correctly thinks about medication from the context of the person – applies knowledge to that particular person in a considered manner to get best outcome for patient, recognises that medication is different for different people and individualises treatment										
			Does a really good patient history and clinical review and is proactive in mitigating potential problems										
			Questions patient to determine need/appropriateness of product										
			Manages high pressure situations – does not get wound up, relaxed in the job, does not let things overwhelm them										
			Has a timely, logical and comprehensive approach to problems and processes – is methodical and thorough, takes time to do things properly and does not miss steps										
			Does things swiftly and proficiently— prioritises from the patient point of view and gets the job done with a minimum of fuss, focused, not easily distracted from the task at hand										
			Asks other people for their opinion, welcomes peer support										
			Is accurate and straightforward, works to the highest possible standards										
			Is able to multi-task										
			Follows through on everything including the difficult stuff – does not leave things for others										
			Technically excellent, accurate and thorough with close attention to detail. Uses appropriate techniques										
			Is very careful – sets up systems to ensure everything is checked and double checked where necessary										

Rank			Statement	Domains					Functions				
Expert	Competent	Not-competent		T	C	I	L	O	A	D	P	R	H
			Has good documentation										
			Acts as a resource for others – pharmacists, consultants										
			Manages patient expectations										
			Is a good communicator and can listen and transfer information, and pitch it to the right level in both context and content – willing to talk										
			Counsels patients										
			Is patient, can handle difficult situations – does not lose their cool										
			Is able to inspire, mentor and teach others. Passes experiences on, and is not afraid to point out errors they've made as a learning tool for others										
			Provides opportunities for others to develop – creates an atmosphere that encourages others to learn from mistakes and share experiences										
			Understands people and the limitations of others, is quick to help out and to give others a bit of latitude										
			Is an effective team member										
			Welcomes customer feedback										
			Is transparent – does not try and cover up. Is honest and ethical										
			Has a positive attitude – sees strengths in others, does not put them down										
			Has good people skills and relates well to people – is able to build relationships and get alongside people. Has empathy and is able to judge when to be friendly and when to stand off a bit. Not arrogant, non-threatening, approachable										
			Reads body-language and adjusts approach in response to feedback										
			Is confident in their dealing with other health professionals										
			Is down to earth, practical, and has common sense										
			Balances own needs with needs of patient										
			Represents others – acts as a leader, motivates the team and initiates action										
			Supervises others										

Rank			Statement	Domains					Functions				
Expert	Competent	Not-competent		T	C	I	L	O	A	D	P	R	H
			Is able to delegate										
			Is confident in decision-making, is prepared to make hard decisions and stand by them – takes responsibility and accountability										
			Can work independently without supervision										
			Is confident, happy in their role, in their own knowledge and in their ability to apply knowledge										
			Is trusted and respected. Builds trust										
			Is willing to take risks and to put themselves in situations that challenge them										
			Is not pressured into making decisions – do homework to back decisions made, know when to refer or research further										
			Is interested in what they are doing and motivated to achieve more, to learn more and to develop their skills – ambitious, dynamic, lively, energetic, has drive. Engaged in CPD										
			Knows limitations prepared to say that's outside my scope										
			Learns from experience, accepts feedback, is open to new ideas and adapts to new situations – continually self-examines performance, undertakes self audit, and is realistic about their goals. Self-aware, and self-assured.										
			Believes that professional responsibility goes beyond work hours – that it is a vocation/calling not a job. They are passionate about pharmacy										
			Is able to approach problems from different perspectives – can identify comprehensive solutions and come up with more and unusual ways to deal with a problem. They recognise there's more than one solution										
			Is able to integrate background knowledge and recognise importance of apparently unconnected information										
			Is proactive										
			Has an extensive clinical knowledge – has up-to-date knowledge about medicines, diseases, practical aspects of pharmacy and other things such as procedures and conditions										

Expert	Competent	Not-competent	Statement	T	C	I	L	O	A	D	P	R	H
			Is able to apply knowledge from a range of sources in decision-making – undertakes decision-making from first principles, not making assumptions, able to adapt information to New Zealand and local situations										
			Can extrapolate known information to unknown situations to achieve results										
			Has specialised in a particular field of medicine – has a depth of knowledge in the specific area of specialisation										
			Can access, retrieve and evaluate information/literature/clinical trial data. Can assess evidence of efficacy and safety										
			Has experience in both pharmacy and life, and is able to integrate knowledge with practice – has maturity, and is practical and down to earth. Recognises constraints of system										
			Recognises and values knowledge of others eg consultants										
			Is able to think laterally, logically, in different ways										
			Cares about people – wants to help and is involved in community										
			Practises legally and ethically										
			Wants to do a good job and have best outcome for patient – altruistic										
			Ensures the pharmacy able to operate – has solutions in place for themselves and others										
			Represents pharmacy on lots of committees – is the face of the department										
			Trains staff so they can manage customers and difficult situations										
			Works independently										
			Participates in peer review										
			Has high personal standards and standards of practice										

Appendix Eight – Self-assessment questionnaire

August 2004

Invitation to Participate in Research Project

Dear Fellow Pharmacist,

My name is Amanda Torr and I am undertaking study towards a PhD sponsored by the Pharmacy Education and Research Foundation. My project is to develop a method of assessing performance of pharmacists for the award of Annual Practising Certificates as will be required under The Health Practitioners Competence Assurance Act. I am inviting you to assist in this research by participating in trialling a self-assessment questionnaire.

The first step in developing the assessment tools has been to determine the critical factors in differentiating expert performance from adequate performance and from less than adequate performance. The resulting model of performance has been used to develop the assessment tools that I am now trialling.

The trial will involve completion of a self-assessment questionnaire which will take you approximately 20 minutes to complete. You will not be named on the questionnaire but will be assigned a unique identifying number. The key that links numbers to names will only be accessable by me and will be destroyed once the assessments have been completed. It will not be used in any part of the resulting analysis or write-up of results.

I would like to assure you that in collecting and processing the data, care will be taken to ensure that no pharmacist, including yourself can be identified.

The processed data will be used to validate the assessment tool developed and will be presented in the form of a published thesis.

If you agree to participate in this research, please sign the attached form and return it in the enclosed self-addressed envelope along with the completed questionnaire.

Thank you for your time.

Yours sincerely

Amanda Torr

Questionnaire

Attached is a self-assessment questionnaire that you will use to determine your current performance in Standard One – Practising Pharmacy in a Professional Manner. The questionnaire is based on a model of professional competence developed by Amanda Torr as part of her PhD research.

The purpose of this questionnaire is to determine whether the model is valid and able to differentiate expert performance, from competent and not-competent performance. It is not intended to determine whether you are or are not-competent, and your response to this questionnaire will be confidential.

The questionnaire is in two parts.

In the first part you are asked to rank yourself against each of the performance characteristic statements listed using the five-point Likert scale below.

1	2	3	4	5
Never do it	**Do it in some situations**	**May do it sometimes and not others**	**Do it in most situations**	**Always do it**

The statements in this section have been developed following research into the performance characteristics of pharmacists in New Zealand. They focus on Practising Pharmacy in a Professional Manner, and, in the main, they are independent of

- specific functions (such as dispensing, providing primary health-care, or contributing to the rational use of medicines); and
- specific practice situations (such as community pharmacy, hospital pharmacy, comprehensive pharmacy care etc.).

The second part asks you describe your practice and how it has changed over the last three to five years and asks for some demographic data.

Part A

Thinking about Practising Pharmacy in a Professional Manner and your day-to-day application of that, rank yourself against each of the statements in the table below using the following scale:

1	2	3	4	5
Never do it	**Do it in some situations**	**May do it sometimes and not others**	**Do it in most situations**	**Always do it**

Performance characteristic	Self rank
I provide a "wider" service, look after the whole person, and have an holistic approach.	
In my practice, I anticipate and deal with potential problems and look beyond the surface of things. I have a "gut feeling" for when things aren't right and act on it.	
I do a really good patient history and clinical review and I am proactive in mitigating potential problems.	
I manage high-pressure situations without getting wound up. I am relaxed in the job and do not let things overwhelm me.	
I ask other people for their opinion and welcome peer support.	
I am accurate and work to the highest possible standards.	
I am technically excellent. I use appropriate techniques.	
I act as a resource for others including other pharmacists and/or consultants.	
I am a good communicator. I listen, and am willing to talk and transfer information, pitching it at the right level in both content and context.	
I am able to inspire, mentor and teach others. I am willing to pass experiences on, including where I have made mistakes, so that others can learn from these mistakes.	
I provide opportunities for others to develop, and create an atmosphere that encourages others to learn from their mistakes and share experiences.	
I am transparent, honest and ethical.	
I have a positive attitude, and see the strengths in others. I do not put people down.	
I am confident in dealing with other health professionals.	
I act as a leader, motivate the team and initiate action.	
I am confident making decisions and am prepared to stand by the decisions I make. I am self-assured and take responsibility and accountability.	
I am confident, happy in my role, in my own knowledge and in my ability to apply my knowledge.	
I am willing to take risks and to challenge myself.	
I am interested in what I am doing and am motivated to learn and achieve more, and to develop my skills. I engage in CPD.	
I learn from experience and accept feedback. I am open to new ideas and adapt to new situations.	

I examine my own performance, undertake self-audit and am realistic about my goals. I am self-aware.	
I believe that professional responsibility goes beyond work hours. I am passionate about pharmacy and I see it as a vocation/calling.	
I am able to approach problems from different perspectives, can identify comprehensive solutions, and can come up with more and unusual ways to deal with a problem. I recognise there is often more than one solution to a problem.	
I am able to integrate knowledge from a range of different sources and I can recognise the importance of apparently unconnected information.	
I am proactive.	
I have extensive clinical knowledge that is up-to-date and covers theoretical and practical aspects of pharmacology and pharmacy practice.	
I am able to apply knowledge from a range of sources in decision-making. I make decisions from first principles and adapt information to New Zealand and local conditions.	
I can extrapolate known information to unknown situations to achieve results.	
I have specialised in a particular field of medicine and have an in-depth knowledge in a specific area of specialisation.	
I can access, retrieve, interpret and evaluate information including clinical data, including evidence of efficacy and safety.	
I have experience in both pharmacy and life and I am able to integrate knowledge with practice.	
I am able to think laterally, logically and in different ways.	
I practise legally and ethically.	
I represent the pharmacy and represent the views of others where required. I am the face of the pharmacy.	
I train staff so they can manage customers and difficult situations.	
I participate in peer review.	

Do you consider yourself to be:

An expert ☐

Competent ☐

Not-competent ☐

Part B

Describe how your practice has changed over the last three to five years:

_____

_____

_____

_____

_____

_____

Your age bracket	
20 - 30	
31 - 40	
41 - 50	
51+	

Gender	
Male	
Female	

Area of primary practice	
Community	
Hospital	
Academia	
Government/Policy	

Initial professional qualification	
PSNZ Professional Exam	
Diploma in Pharmacy	
Bachelor of Pharmacy (NZ)	
Other	

Postgraduate qualifications	
NZ College of Pharmacists	
List qualification:	
Postgraduate formal qualification	
List Qualification e.g. PGDip Clin Pharm	

What average proportion of time do you spend in the following functions	
Dispensing	
Preparing pharmaceutical products	
Contributing to the rational use of medicines	
Providing primary health-care	
Other	

I agree to participate in the self-assessment. I understand that in agreeing to participate in this research, no opinions or information I contribute will be able to be attributed to me in any of the information used in this research or published as a result of this research.

Name:

Address where you can be contacted:
Signature:

Date:

I would / would not like to receive the results of my self-assessment and peer assessment once processed.

Appendix Nine – Frequency tables for importance and self-rating data

Frequency Tables—Self rating

HAS AN HOLISTIC APPROACH					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.9	0.9
	2.00	33	9.3	9.4	10.3
	3.00	136	38.2	38.9	49.1
	4.00	149	41.9	42.6	91.7
	5.00	29	8.1	8.3	100.0
	Total	350	98.3	100.0	
Missing	-1.00	6	1.7		
Total		356	100.0		
Mean		3.48	Standard deviation		0.81
Median		4	Variance		0.68

TAKES A WIDE VIEW					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	25	7.0	7.1	7.4
	3.00	67	18.8	19.0	26.4
	4.00	183	51.4	52.0	78.4
	5.00	76	21.3	21.6	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		3.87	Standard deviation		0.84
Median		4	Variance		0.70

TAKES COMPLETE PATIENT HISTORY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	12	3.4	3.4	3.4
	1.50	1	0.3	0.3	3.7
	2.00	69	19.4	19.8	23.5
	3.00	119	33.4	34.1	57.6
	4.00	115	32.3	33.0	90.5
	5.00	33	9.3	9.5	100.0
	Total	349	98.0	100.0	
Missing	-1.00	7	2.0		
Total		356	100.0		
Mean		3.25	Standard deviation		0.99
Median		3	Variance		0.99

MANAGES PRESSURE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.1	1.1
	2.00	16	4.5	4.5	5.7
	3.00	111	31.2	31.4	37.1
	4.00	174	48.9	49.3	86.4
	5.00	48	13.5	13.6	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100		
Mean		3.70	Standard deviation		0.80
Median		4	Variance		0.64

WELCOMES PEER SUPPORT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.8	0.8
	2.00	13	3.7	3.7	4.5
	3.00	55	15.4	15.6	20.1
	4.00	142	39.9	40.2	60.3
	5.00	140	39.3	39.7	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.14	Standard deviation		0.87
Median		4	Variance		0.76

IS ACCURATE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	0.3	0.3	0.3
	3.00	19	5.3	5.4	5.7
	4.00	174	48.9	49.4	55.1
	5.00	158	44.4	44.9	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		4.39	Standard deviation		0.60
Median		4	Variance		0.36

IS TECHNICALLY EXCELLENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	4	1.1	1.2	1.2
	3.00	72	20.2	20.9	22.0
	4.00	181	50.8	52.5	74.5
	5.00	88	24.7	25.5	100.0
	Total	345	96.9	100.0	
Missing	-1.00	11	3.1		
Total		356	100.0		
Mean		4.02	Standard deviation		0.71
Median		4	Variance		0.51

ACTS AS A RESOURCE FOR OTHERS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	7	2.0	2.0	2.0
	2.00	57	16.0	16.1	18.1
	3.00	97	27.2	27.4	45.5
	4.00	125	35.1	35.3	80.8
	5.00	68	19.1	19.2	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		3.54	Standard deviation		1.04
Median		4	Variance		1.08

HAS GOOD COMMUNICATION SKILLS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	5	1.4	1.4	1.4
	3.00	47	13.2	13.3	14.7
	4.00	191	53.7	54.1	68.8
	5.00	110	30.9	31.2	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.15	Standard deviation		0.69
Median		4	Variance		0.48

MENTORS OTHERS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	5	1.4	1.4	1.4
	2.00	37	10.4	10.5	11.9
	3.00	91	25.6	25.8	37.7
	4.00	132	37.1	37.4	75.1
	5.00	88	24.7	24.9	100.0
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.74	Standard deviation		0.99
Median		4	Variance		0.99

PROVIDE OPPORTUNITIES FOR OTHER TO DEVELOP					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	9	2.5	2.5	2.5
	2.00	33	9.3	9.3	11.9
	3.00	98	27.5	27.8	39.7
	4.00	139	39.0	39.4	79.0
	5.00	74	20.8	21.0	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.66	Standard deviation		0.99
Median		4	Variance		0.98

IS TRANSPARENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	2	0.6	0.6	1.1
	3.00	9	2.5	2.5	3.7
	4.00	122	34.3	34.6	38.2
	5.00	218	61.2	61.8	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.56	Standard deviation		0.63
Median		5	Variance		0.40

HAS A POSITIVE ATTITUDE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	8	2.2	2.3	2.3
	3.00	42	11.8	12.1	14.4
	4.00	166	46.6	47.7	62.1
	5.00	132	37.1	37.9	100.0
	Total	348	97.8	100.0	
Missing	-1.00	8	2.2		
Total		356	100.0		
Mean		4.21	Standard deviation		0.74
Median		4	Variance		0.54

CONFIDENT DEALING WITH OTHER PROFESSIONALS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	12	3.4	3.4	3.4
	3.00	73	20.5	20.6	24.0
	4.00	163	45.8	46.0	70.1
	5.00	106	29.8	29.9	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.02	Standard deviation		0.80
Median		4	Variance		0.64

ACTS AS A LEADER					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	12	3.4	3.5	3.5
	2.00	51	14.3	14.7	18.2
	3.00	116	32.6	33.4	51.6
	4.00	122	34.3	35.2	86.7
	5.00	46	12.9	13.3	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		3.40	Standard deviation		1.00
Median		3	Variance		1.00

CONFIDENT MAKING DECISIONS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	14	3.9	4.0	4.2
	3.00	67	18.8	18.9	23.2
	4.00	148	41.6	41.8	65.0
	5.00	124	34.8	35.0	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.07	Standard deviation		0.85
Median		4	Variance		0.72

IS SELF CONFIDENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.8	0.8
	2.00	16	4.5	4.5	5.4
	3.00	99	27.8	28.0	33.4
	4.00	170	47.8	48.2	81.6
	5.00	65	18.3	18.4	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.79	Standard deviation		0.82
Median		4	Variance		0.68

WILLING TO TAKE RISKS TO CHALLENGE SELF					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	13	3.7	3.7	3.7
	2.00	43	12.1	12.3	16.0
	3.00	137	38.5	39.3	55.3
	4.00	124	34.8	35.5	90.8
	5.00	32	9.0	9.2	100.0
	Total	349	98.0	100.0	
Missing	-1.00	7	2.0		
Total		356	100.0		
Mean		3.34	Standard deviation		0.94
Median		3	Variance		0.88

MOTIVATED TO LEARN					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.1	1.1
	2.00	27	7.6	7.7	8.8
	3.00	87	24.4	24.8	33.6
	4.00	127	35.7	36.2	69.8
	5.00	106	29.8	30.2	100.0
	Total	351	98.6	100.0	
Missing	-1.00	5	1.4		
Total		356	100.0		
Mean		3.87	Standard deviation		0.97
Median		4	Variance		0.94

ADAPTS TO NEW SITUATIONS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	3	0.8	0.8	1.4
	3.00	31	8.7	8.8	10.2
	3.50	1	.3	.3	10.5
	4.00	186	52.2	52.5	63.0
	5.00	131	36.8	37.0	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.25	Standard deviation		0.69
Median		4	Variance		0.48

SELFAWARE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	19	5.3	5.4	5.6
	3.00	82	23.0	23.2	28.8
	4.00	156	43.8	44.1	72.9
	5.00	96	27.0	27.1	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		3.92	Standard deviation		0.86
Median		4	Variance		0.74

SEE PHARMACY AS A VOCATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	18	5.1	5.1	5.1
	2.00	43	12.1	12.1	17.2
	3.00	124	34.8	35.0	52.3
	4.00	102	28.7	28.8	81.1
	5.00	67	18.8	18.9	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		3.44	Standard deviation		1.08
Median		3	Variance		1.17

PROBLEM SOLVING					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.1	1.1
	2.00	29	8.1	8.2	9.3
	3.00	130	36.5	36.8	46.2
	4.00	144	40.4	40.8	87.0
	5.00	46	12.9	13.0	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.56	Standard deviation		0.86
Median		4	Variance		0.74

INTEGRATES INFORMATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.1	1.1
	2.00	27	7.6	7.6	8.8
	3.00	108	30.3	30.5	39.3
	4.00	165	46.3	46.6	85.9
	5.00	50	14.0	14.1	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		3.65	Standard deviation		0.86
Median		4	Variance		0.73

PROACTIVE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	6	1.7	1.7	1.7
	2.00	22	6.2	6.3	8.0
	3.00	118	33.1	33.8	41.8
	4.00	146	41.0	41.8	83.7
	5.00	57	16.0	16.3	100.0
	Total	349	98.0	100.0	
Missing	-1.00	7	2.0		
Total		356	100.0		
Mean		3.65	Standard deviation		0.89
Median		4	Variance		0.79

EXTENSIVE CLINICAL KNOWLEDGE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	5	1.4	1.4	1.4
	2.00	55	15.4	15.5	16.9
	3.00	153	43.0	43.2	60.2
	4.00	113	31.7	31.9	92.1
	5.00	28	7.9	7.9	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		3.29	Standard deviation		0.87
Median		3	Variance		0.76

APPLIES KNOWLEDGE IN DECISION MAKING					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	33	9.3	9.3	9.9
	3.00	116	32.6	32.8	42.7
	4.00	150	42.1	42.4	85.0
	5.00	53	14.9	15.0	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		3.62	Standard deviation		0.87
Median		4	Variance		0.76

EXTRAPOLATES KNOWN TO UNKNOWN					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	9	2.5	2.6	2.6
	2.00	64	18.0	18.4	21.0
	2.50	1	.3	.3	21.3
	3.00	141	39.6	40.6	62.0
	4.00	101	28.4	29.1	91.1
	5.00	31	8.7	8.9	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		3.23	Standard deviation		0.94
Median		3	Variance		0.88

SPECIALISED					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	87	24.4	25.0	25.0
	2.00	92	25.8	26.4	51.4
	3.00	88	24.7	25.3	76.7
	4.00	51	14.3	14.7	91.4
	5.00	30	8.4	8.6	100.0
	Total	348	97.8	100.0	
Missing	-1.00	8	2.2		
Total		356	100.0		
Mean		2.55	Standard deviation		1.25
Median		2	Variance		1.56

ACCESS AND RETREIVE INFORMATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	5	1.4	1.4	1.4
	2.00	44	12.4	12.5	13.9
	3.00	110	30.9	31.2	45.0
	4.00	128	36.0	36.3	81.3
	5.00	66	18.5	18.7	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.58	Standard deviation		0.98
Median		4	Variance		0.95

EXPERIENCED IN PHARMACY AND LIFE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	10	2.8	2.8	2.8
	2.00	32	9.0	9.1	11.9
	3.00	72	20.2	20.4	32.3
	4.00	119	33.4	33.7	66.0
	5.00	120	33.7	34.0	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.87	Standard deviation		1.07
Median		4	Variance		1.15

THINKS LATERALLY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	14	3.9	4.0	4.5
	3.00	99	27.8	28.0	32.6
	4.00	162	45.5	45.9	78.5
	5.00	76	21.3	21.5	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		3.85	Standard deviation		0.82
Median		4	Variance		0.68

PRACTISE ETHICALLY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.9	0.9
	2.00	1	.3	0.3	1.1
	3.00	12	3.4	3.4	4.6
	4.00	82	23.0	23.4	27.9
	5.00	253	71.1	72.1	100.0
	Total	351	98.6	100.0	
Missing	-1.00	5	1.4		
Total		356	100.0		
Mean		4.65	Standard deviation		0.64
Median		5	Variance		0.41

REPRESENT PHARMACY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	16	4.5	4.6	4.6
	2.00	35	9.8	10.0	14.6
	3.00	78	21.9	22.3	36.9
	4.00	123	34.6	35.1	72.0
	5.00	98	27.5	28.0	100.0
	Total	350	98.3	100.0	
Missing	-1.00	6	1.7		
Total		356	100.0		
Mean		3.72	Standard deviation		1.11
Median		4	Variance		1.24

TRAINS STAFF					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	55	15.4	15.9	15.9
	2.00	57	16.0	16.4	32.3
	3.00	85	23.9	24.5	56.8
	4.00	93	26.1	26.8	83.6
	5.00	57	16.0	16.4	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		3.11	Standard deviation		1.31
Median		3	Variance		1.71

PARTICIPATES IN PEER REVIEW					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	84	23.6	24.3	24.3
	2.00	67	18.8	19.4	43.6
	3.00	76	21.3	22.0	65.6
	4.00	73	20.5	21.1	86.7
	5.00	46	12.9	13.3	100.0
	Total	346	97.2	100.0	
Missing	-1.00	10	2.8		
Total		356	100.0		
Mean		2.80	Standard deviation		1.37
Median		3	Variance		1.87

Frequency Tables—Competence ratings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not-competent	22	6.2	6.2	6.2
	NC/Competent	3	0.8	0.8	7.1
	Competent	291	81.7	82.4	89.5
	Competent/Expert	8	2.2	2.3	91.8
	Expert	29	8.1	8.2	100.0
	Total	353	99.2	100.0	
Missing	-1.00	2	0.6		
	System	1	0.3		
	Total	3	0.8		
Total		356	100.0		
Mean		2.03	Standard deviation		0.39
Median		2	Variance		0.15

Frequency Tables—importance ratings

HAS AN HOLISTIC APPROACH					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	11	3.1	3.1	3.7
	3.00	51	14.3	14.4	18.0
	4.00	164	46.1	46.2	64.2
	5.00	127	35.7	35.8	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		4.13	Standard deviation		0.81
Median		4	Variance		0.66

TAKES A WIDE VIEW					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	4	1.1	1.1	1.1
	3.00	44	12.4	12.4	13.5
	4.00	149	41.9	41.9	55.3
	5.00	159	44.7	44.7	100.0
Total		356	100.0		
Mean		4.30	Standard deviation		0.72
Median		4	Variance		0.53

TAKES COMPLETE PATIENT HISTORY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	9	2.5	2.6	3.1
	3.00	56	15.7	15.9	19.0
	4.00	139	39.0	39.5	58.5
	5.00	146	41.0	41.5	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		4.19	Standard deviation		0.83
Median		4	Variance		0.69

MANAGES PRESSURE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	1	0.3	0.3	0.6
	3.00	25	7.0	7.1	7.6
	4.00	167	46.9	47.2	54.8
	5.00	160	44.9	45.2	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.37	Standard deviation		0.65
Median		4	Variance		0.43

WELCOMES PEER SUPPORT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	7	2.0	2.0	2.0
	3.00	44	12.4	12.4	14.4
	3.50	1	.3	.3	14.7
	4.00	123	34.6	34.7	49.4
	5.00	179	50.3	50.6	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.34	Standard deviation		0.77
Median		5	Variance		0.59

IS ACCURATE					
		Frequency	Percent	Valid Percent	Cumulative Percent
	3.00	2	0.6	0.6	0.6
	4.00	25	7.0	7.0	7.6
	5.00	328	92.1	92.4	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		4.92	Standard deviation		0.29
Median		5	Variance		0.09

IS TECHNICALLY EXCELLENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	2	0.6	0.6	0.6
	3.00	21	5.9	6.0	6.6
	4.00	119	33.4	34.0	40.6
	5.00	208	58.4	59.4	100.0
	Total	350	98.3	100.0	
Missing	-1.00	6	1.7		
Total		356	100.0		
Mean		4.52	Standard deviation		0.64
Median		5	Variance		0.40

ACTS AS A RESOURCE FOR OTHERS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.8	0.8
	2.00	10	2.8	2.8	3.7
	3.00	67	18.8	18.9	22.6
	4.00	143	40.2	40.4	63.0
	5.00	131	36.8	37.0	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.10	Standard deviation		0.86
Median		4	Variance		0.74

HAS GOOD COMMUNICATION SKILLS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	0.3	0.3	0.3
	3.00	5	1.4	1.4	1.7
	4.00	76	21.3	21.5	23.2
	5.00	272	76.4	76.8	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.75	Standard deviation		0.48
Median		5	Variance		0.23

MENTORS OTHERS					
		Frequency	Percent	Valid Percent	Cumulative Percent
	2.00	4	1.1	1.1	1.1
	3.00	39	11.0	11.0	12.1
	4.00	135	37.9	38.0	50.1
	5.00	177	49.7	49.9	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		4.37	Standard deviation		0.72
Median		4	Variance		0.52

PROVIDE OPPORTUNITIES FOR OTHER TO DEVELOP					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	7	2.0	2.0	2.3
	3.00	40	11.2	11.3	13.6
	4.00	162	45.5	45.9	59.5
	5.00	143	40.2	40.5	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.24	Standard deviation		0.75
Median		4	Variance		0.56

IS TRANSPARENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.8	0.8
	3.00	6	1.7	1.7	2.5
	4.00	61	17.1	17.3	19.8
	5.00	283	79.5	80.2	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.76	Standard deviation		0.57
Median		5	Variance		0.32

HAS A POSITIVE ATTITUDE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	3	0.8	0.9	1.1
	3.00	20	5.6	5.7	6.9
	4.00	116	32.6	33.2	40.1
	5.00	209	58.7	59.9	100.0
	Total	349	98.0	100.0	
Missing	-1.00	7	2.0		
Total		356	100.0		
Mean		4.52	Standard deviation		0.67
Median		5	Variance		0.45

CONFIDENT DEALING WITH OTHER PROFESSIONALS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	1	0.3	0.3	0.6
	3.00	13	3.7	3.7	4.2
	4.00	123	34.6	34.6	38.9
	5.00	217	61.0	61.1	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		4.56	Standard deviation		0.61
Median		5	Variance		0.37

ACTS AS A LEADER					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.1	1.1
	2.00	4	1.1	1.1	2.3
	3.00	61	17.1	17.4	19.7
	4.00	143	40.2	40.7	60.4
	5.00	139	39.0	39.6	100.0
	Total	351	98.6	100.0	
Missing	-1.00	5	1.4		
Total		356	100.0		
Mean		4.16	Standard deviation		0.83
Median		4	Variance		0.69

CONFIDENT MAKING DECISIONS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	13	3.7	3.7	3.7
	4.00	107	30.1	30.2	33.9
	5.00	234	65.7	66.1	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.62	Standard deviation		0.55
Median		5	Variance		0.31

IS SELF CONFIDENT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	3.00	22	6.2	6.2	6.5
	4.00	118	33.1	33.3	39.8
	5.00	213	59.8	60.2	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.53	Standard deviation		0.64
Median		5	Variance		0.41

WILLING TO TAKE RISKS TO CHALLENGE SELF					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	11	3.1	3.1	3.1
	2.00	27	7.6	7.7	10.9
	3.00	94	26.4	26.9	37.7
	4.00	156	43.8	44.6	82.3
	5.00	62	17.4	17.7	100.0
	Total	350	98.3	100.0	
Missing	-1.00	6	1.7		
Total		356	100.0		
Mean		3.66	Standard deviation		0.96
Median		4	Variance		0.92

MOTIVATED TO LEARN					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	4	1.1	1.1	1.1
	3.00	16	4.5	4.5	5.7
	4.00	134	37.6	38.0	43.6
	5.00	199	55.9	56.4	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.50	Standard deviation		0.64
Median		5	Variance		0.41

ADAPTS TO NEW SITUATIONS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	1	0.3	0.3	0.6
	3.00	18	5.1	5.1	5.6
	4.00	136	38.2	38.3	43.9
	5.00	199	55.9	56.1	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		4.49	Standard deviation		0.63
Median		5	Variance		0.40

SELFAWARE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	3	.8	.8	1.4
	3.00	33	9.3	9.3	10.7
	4.00	148	41.6	41.7	52.4
	5.00	169	47.5	47.6	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		4.35	Standard deviation		0.73
Median		4	Variance		0.53

SEE PHARMACY AS A VOCATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	13	3.7	3.7	3.7
	2.00	19	5.3	5.4	9.0
	3.00	86	24.2	24.2	33.2
	4.00	139	39.0	39.2	72.4
	5.00	98	27.5	27.6	100.0
	Total	355	99.7	100.0	
Missing	-1.00	1	0.3		
Total		356	100.0		
Mean		3.82	Standard deviation		1.01
Median		4	Variance		1.03

PROBLEM SOLVING					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.8	0.8
	2.00	5	1.4	1.4	2.3
	3.00	54	15.2	15.3	17.5
	4.00	172	48.3	48.6	66.1
	5.00	120	33.7	33.9	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.13	Standard deviation		0.78
Median		4	Variance		0.61

INTEGRATES INFORMATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	9	2.5	2.5	2.8
	3.00	41	11.5	11.6	14.4
	4.00	175	49.2	49.4	63.8
	5.00	128	36.0	36.2	100.0
	Total	354	99.4	100.0	
Missing	-1.00	2	0.6		
Total		356	100.0		
Mean		4.19	Standard deviation		0.76
Median		4	Variance		0.57

PROACTIVE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.2	1.2
	2.00	4	1.1	1.2	2.3
	3.00	46	12.9	13.3	15.6
	4.00	159	44.7	45.8	61.4
	5.00	134	37.6	38.6	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		4.20	Standard deviation		0.79
Median		4	Variance		0.63

EXTENSIVE CLINICAL KNOWLEDGE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	8	2.2	2.3	2.5
	3.00	25	7.0	7.1	9.6
	4.00	136	38.2	38.5	48.2
	5.00	183	51.4	51.8	100.0
	Total	353	99.2	100.0	
Missing	-1.00	3	0.8		
Total		356	100.0		
Mean		4.39	Standard deviation		0.74
Median		5	Variance		0.55

APPLIES KNOWLEDGE IN DECISION MAKING					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	3.00	42	11.8	11.9	12.5
	4.00	164	46.1	46.6	59.1
	5.00	144	40.4	40.9	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		4.27	Standard deviation		0.71
Median		4	Variance		0.51

EXTRAPOLATES KNOWN TO UNKNOWN					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	0.3	0.3	0.3
	2.00	14	3.9	4.0	4.3
	3.00	89	25.0	25.6	30.0
	4.00	162	45.5	46.7	76.7
	5.00	81	22.8	23.3	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		3.89	Standard deviation		0.82
Median		4	Variance		0.67

SPECIALISED					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	22	6.2	6.3	6.3
	2.00	41	11.5	11.8	18.2
	3.00	148	41.6	42.7	60.8
	4.00	80	22.5	23.1	83.9
	5.00	56	15.7	16.1	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		3.31	Standard deviation		1.07
Median		3	Variance		1.16

ACCESS AND RETREIVE INFORMATION					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	5	1.4	1.4	1.4
	2.00	7	2.0	2.0	3.4
	3.00	44	12.4	12.5	15.9
	4.00	146	41.0	41.5	57.4
	5.00	150	42.1	42.6	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		4.27	Standard deviation		0.79
Median		4	Variance		0.63

EXPERIENCED IN PHARMACY AND LIFE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	4	1.1	1.1	1.1
	2.00	3	0.8	0.9	2.0
	3.00	42	11.8	11.9	13.9
	4.00	147	41.3	41.8	55.7
	5.00	156	43.8	44.3	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		4.27	Standard deviation		0.79
Median		4	Variance		0.63

THINKS LATERALLY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	0.6	0.6	0.6
	2.00	3	.8	.9	1.4
	3.00	47	13.2	13.4	14.8
	4.00	164	46.1	46.6	61.4
	5.00	136	38.2	38.6	100.0
	Total	352	98.9	100.0	
Missing	-1.00	4	1.1		
Total		356	100.0		
Mean		4.22	Standard deviation		0.75
Median		4	Variance		0.56

PRACTISE ETHICALLY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	0.8	0.9	0.9
	3.00	5	1.4	1.4	2.3
	4.00	30	8.4	8.5	10.8
	5.00	313	87.9	89.2	100.0
	Total	351	98.6	100.0	
Missing	-1.00	5	1.4		
Total		356	100.0		
Mean		4.85	Standard deviation		0.51
Median		5	Variance		0.26

REPRESENT PHARMACY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	7	2.0	2.0	2.0
	2.00	12	3.4	3.4	5.4
	3.00	65	18.3	18.5	23.9
	4.00	130	36.5	37.0	61.0
	5.00	137	38.5	39.0	100.0
	Total	351	98.6	100.0	
Missing	-1.00	5	1.4		
Total		356	100.0		
Mean		4.08	Standard deviation		0.94
Median		4	Variance		0.89

TRAINS STAFF					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	7	2.0	2.0	2.0
	2.00	13	3.7	3.8	5.8
	3.00	56	15.7	16.2	22.0
	4.00	135	37.9	39.0	61.0
	5.00	135	37.9	39.0	100.0
	Total	346	97.2	100.0	
Missing	-1.00	10	2.8		
Total		356	100.0		
Mean		4.09	Standard deviation		0.94
Median		4	Variance		0.88

PARTICIPATES IN PEER REVIEW					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	16	4.5	4.6	4.6
	2.00	22	6.2	6.3	11.0
	3.00	92	25.8	26.5	37.5
	4.00	123	34.6	35.4	72.9
	5.00	94	26.4	27.1	100.0
	Total	347	97.5	100.0	
Missing	-1.00	9	2.5		
Total		356	100.0		
Mean		3.74	Standard deviation		1.07
Median		4	Variance		1.14