A complex view of professional competence

This presentation portrays the findings of a PhD study into the nature of professional competence. The study set out to develop a model of professional competence that takes into account the complexity associated with pharmacy practice in New Zealand. The resulting model uses complexity theory to move beyond traditional conceptions of competence, which are based on performance of roles and functions and a 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. It conceptualises competence in a way that recognises it is a multi-levelled entity that develops and changes over a practitioner's practicing life. The model developed from this research enables the characteristics that differentiate between levels of performance to be identified.

The study concluded that the methods used for competence assurance of health professionals should take a complex view of professional competence, focus on the integrated behaviours that differentiate performance and use evaluation methods. It also proposes that the integrated, complex model of professional competence could have profound impacts on curriculum development for professional education. In addition, the principles underpinning the model could be used for curriculum development in all vocational settings.

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A Complex View of Professional Competence

Competence and competency-based assessment have underpinned the vocational and professional education field for many years now. Competency-based standards have been used, amongst other things, to support programme development and delivery, assess competence for registration and guide qualification design. In the pharmacy profession, for example, competency standards have been developed and used to assess pharmacists for registration, to develop a competency-based programme for the internship year (the professional training year post university graduation) and to develop a self-assessment and professional development programme called ENHANCE that is being used to meet the requirements of the Health Practitioners Competence Assurance Act (HPCA) (NZ Govt, 2003).

Based on experience to date, educationalists and professionals working in the field of competency-based education have expressed a great deal of dissatisfaction with current models for conceptualising competence. For example, Gonczi, Hager and Hall (Gonczi et al., 1990; Gonczi & Hager, 1991; Hager & Gonczi, 1993; Gonczi, 1999; Hall, 2000) suggest that traditional approaches used to develop competency standards are reductionist, mechanistic and concentrate only on the tasks to be performed or the generic capabilities that are said to underpin competency. They are also concerned over the inability of currents model to easily take account of the context in which the competency standards are applied or the context in which the practitioner practices. Wolfe (1993) characterises this problem as a never ending specification of tasks and the creation of endless checklists to take into account the variety of circumstances and tasks a practitioner must perform.

Raven (1996) and Churchman and Hall (1997) also criticise the way in which current conceptualisations of competence trivialise the importance of knowledge and are not able to be applied to high-level cognitive capabilities. In the same vein, Schön and Benner (Schön, 1983; Benner, 1984; Dreyfus & Dreyfus, 1977; Dreyfus & Dreyfus, 1980; Dreyfus, 1981) all point to their inability of to take into account the transition from competent to expert or master-level performance.

Many of these concerns arise from the way competence has been conceptualised. Competence is defined as the ability to demonstrate, in a variety of practice situations, possession of the requisite knowledge, skills, values and attitudes and the ability to use these in a variety of combinations to undertake occupational tasks. For example, Gonczi (1999, p.182) describes a competent person as “one who possess the attributes necessary for job performance to the appropriate standard”. When considering how to conceptualise these standards, however, we (and I am speaking from a New Zealand perspective here) have taken a mechanistic approach whereby a person demonstrating competence in a range of occupational tasks, assessed independently of each other, is considered competent in the occupation/profession. In other words, competence is viewed as cumulative – you demonstrate competence in tasks a, b and c and have the bits of knowledge covered in d, e and f you are therefore competent overall.

Researchers, educationalists and practitioners such as Hall, the New Zealand Vice Chancellors Committee and Viskovic (Hall (1994), NZVCC (1994), and Viskovic (1993)) believe that the current approaches to standards-based assessment deal 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”.
They argue that conceptualising competence as a collection of discrete tasks does not reflect a good understanding of the processes that professional engage in.

Recognising these weaknesses, a number of researchers have used complex systems theory to develop more integrated approaches to conceptualising competence arguing that mechanistic approaches are not applicable to human systems. Complex systems 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. 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 (the so called “butterfly effect” (Gleick, 1987)).

Complex approaches to determining competence and competent performance enable consideration of the interaction of the individual with their environment, and the impact of social factors on both of these. In this view of competence, individual competence is conceptualised as one “whole” or subset, nested with a number of other “wholes” that make up the social, cultural and physical environment or context in which the individual works, and these all need to be taken into account when attempting to understand the parts. Using this type of thinking has led to the development of more integrated conceptions of competence.

A wide range of integrated models of competence have been developed, many based on the field of management. Some researchers have focussed on skills, for example, Mansfield and Mathews (1985) who defined managerial competence as resulting from the interrelatedness of four sets of skills. Others such as Donaldson (1997) have focused on the interrelatedness of inter and intrapersonal skills. Anyling and Constanzo (1984) considered the integration of knowledge and skills while Benner (1984), investigating the nursing profession, described the development of competence to expertise by the application of knowledge on practice through experience. Boyatzis (1982) and Schroder (1989) developed integrated models that described managerial competencies arising from the merging of technical and cognitive skills with attitudes, behaviours and knowledge use.
Some researchers have taken the integrated approach one step further by drawing together the characteristics of competence into a single framework. In 1996, Cheetham and Chivers (1996) developed an integrated model of professional competence that they adapted further in 1998. Their model of professional competence was based on four core components – knowledge/cognitive competence, functional competence, personal/behavioural competence and values/ethical competence – that interrelate with an overarching meta-competency that encompassed communication, problem-solving and self-development. The 1998 version of the model took into account the importance of reflection, motivation and personality along with the environmental context in which a practitioner operates.

As a holistic model it provided a useful framework to investigate professional competence in the pharmacy profession that was the focus of this research. It was hoped that developing such an integrated model would address some of the issues that had been encountered with the current competence standards, for example, large number of elements contained in the standards, duplication, not taking into account expertise and costly to assess.

**Research Method**

The research interviewed 20 pharmacists representative of the profession in terms of scope of practice, age, gender and experience. The interview process used a modified Kelly's Repertory Grid technique (Kelly, 1955) with a follow-up questionnaire. All interviews were recorded and transcribed. The data from both the interviews and questionnaires was combined and analysed, drawing together the key themes.
The analysis resulted in the development of a new integrated model of competence that identified five domains of competence that appeared to be essential components that when fully integrated result in behaviours and characteristics that typify professional competence.

The five domains of competence are:

- the cognitive domain
- the technical domain
- the legal/ethical domain
- the organisational domain; and
- the inter/intra-personal domain.

Professional competence develops as practitioners develop their capability to integrate the skills, knowledge and behaviours associated with each of these domains to the point where the domains and their skills and knowledge are fully integrated. At this point, a practitioner is classed as professionally competent. If a practitioner cannot fully integrate any one of the domains then they are not yet competent, for example, a pharmacist who does not have a good grasp of English, is not ethical or who has not kept their knowledge up to date.

As a practitioner gains more experience and confidence in their ability, they are able to integrate the knowledge, skills and behaviours associated with the domains more consistently and to a greater extent and thus exhibit the characteristics associated with expertise.
If, however, they develop their skills and/or knowledge in just one domain, they are classed as specialists. Thus a practitioner who develops their skills in the organisational domain may become a specialist manager, while a person developing their skills in the technical domain may become a specialist in sterile dispensing or drug information management.

The domains of competence
The model proposes that each of the domains exists on a continuum ranging from the skills, knowledge and behaviours exhibited in isolation from the other domains to behaviours that fully integrate the skills, knowledge and behaviours from all other four domains.

The cognitive domain encompasses:
- technical knowledge
• professional knowledge
• personal knowledge; and
• cognitive skills including problem solving

The technical domain covers:
• psychomotor skills
• technical skills; and
• technical cognitive skills

The legal/ethical domain covers:
• knowledge of the law
• morals
• the ability to work ethically by interpreting and applying the law and the professions code of ethics
• altruism; and
• the ability to work in socially and culturally appropriate ways

The organisation domain encompasses the ability to
• source information
• interpret new information
• manage the conflicting task required in professional practice
• organise ones work; and
• manage others

The intra/interpersonal domain covers:
• communication – verbal, non-verbal and written
• empathy
• self awareness and self confidence – the skills and attributes of knowing oneself, ones strengths, weaknesses and limitations
• making decisions with confidence
• referring to others when necessary;
• leadership; and
• working with others and as part of a team.

By integrating the skills and knowledge contained within these competency domains, practitioners develop the ability to perform their professional roles and functions at the requisite level. The professional behaviours that characterise professional competence that were identified in the research are integrated behaviours, containing dimensions of each of the domains. Thus, in order to assess professional competence as an entity in itself, one must assess the level of integration, potentially by assessing the degree to which a practitioner exhibits each of the characteristics identified as typifying this integration, in appropriate situational and functional contexts.

To use an example from pharmacy:
A professionally competent pharmacist working in a community or hospital pharmacy is able to:
1. Use their professional and personal knowledge to undertake the technical tasks associated with the role, for example, dispense medicines, provide medicines advice, manufacture a pharmaceutical product. All these tasks require an underpinning body of knowledge about drugs and how they work to prepare the product for delivery to the client.
2. Be technically skilled in these tasks including being able to calculate dosages and the quantities of ingredients needed when modifying a pharmaceutical formulation.

3. Communicate with patients and other health professionals. No matter what role pharmacists perform, i.e. whether they work in community or hospital pharmacies, industry or research organisation, they need to be able to communicate both with other health professionals and with lay people.

4. Make legal and ethical decisions using their knowledge. All pharmacy practice is governed by the profession’s Code of Ethics and laws such as Human Rights Act, Medicines Act, Consumer Guarantees Act and Misuse of Drugs Act all have an impact on the work pharmacists do regardless of the context. At the same time pharmacists must be able to work in culturally appropriate ways in an increasingly multi-cultural society.

5. Ensure that all these day to day activities and the conflicting priorities arising from dealing with client requests are completed efficiently and effectively, delegating where necessary. Competent professionals are able to prioritise and manage their workloads and minimise their stress levels.

While both situation and functional contexts provide the framework in which the behaviours are elucidated, the initial analysis of the research results suggested that the behaviours that explain professional practice are essentially context free and able to be assessed across all functions professionals perform.

The next step in the research was to validate the model. This was done in two stages. During the initial analysis of the research data, 65 behavioural statements were identified as being essential to professional competence. In the first of the validation stages, these were evaluated by an expert panel to determine whether, in their view, these behaviours would be normally exhibited by experts, competent and not yet competent practitioners. A 5-point Likert scale was used for this evaluation to determine whether the behaviours would be always exhibited (5), exhibited half the time (3) or never exhibited (1) by an “ideal” expert, competent and not yet competent practitioner.

The analysed results showed that all 65 statements were able to differentiate performance between the “ideal” competent and not yet competent practitioner and 63 of the 65 statements differentiated the performance of expert and competent professionals. The two statements that were not able to differentiate these levels of performance were:

“counsels patients” and
“practises legally and ethically”

This was not a surprising finding given that these behaviours underpin all of professional pharmacy practice.

The 36 items showing the greatest potential for differentiating performance were then selected and used to develop a self-assessment instrument to be used in the second stage of model validation. This self-assessment instrument was then given to 144 novice pharmacists (interns in their internship training year) and 719 practising pharmacists who had been engaged in the ENHANCE programme in 2004. Of those approached to participate in the research by completing the self-assessment instrument, 360 responded (132 novice and 228 experienced pharmacists).

The self-assessment instrument asked participants to rate the extent to which they exhibited each behaviour on a 5-point Likert scale with 1 being never use it to 5 being
always do it. Respondents were then asked to state whether they considered themselves to be experts, competent or not yet competent professionals. Comparison of the mean scores for people self-identifying as expert competent and not yet competent showed that all but 4 items showed differences in means of more than 0.1 – the level arbitrarily chosen to assess then differences at this stage of the research. These 4 items were:

- “Takes a patient history and clinical review”
- “Welcomes peer support”
- “Has a positive attitude”; and
- “Learns from experience”.

ANOVA analysis was used to determine whether the differences in scores between groups (i.e. the groups self-rating as expert, competent and not yet competent) was statistically valid with the results from this analysis showing that this was indeed the case. This suggests that collectively the 32 items showing differences between self-rating groups did indeed differentiate levels of performance.

Principal Component Analysis was then used to identify the latent variables underpinning the construct of professional competence, the integrated “core” of the competence model. This analysis showed that the test items grouped into 7 latent variables:

1. Knowledge
2. Technical excellence
3. People skills
4. Mentoring
5. Leadership
6. Self management
7. Holistic approach

Within these variables, Discriminant Function Analysis showed that 16 of the 32 statements differentiated competent from not yet competent performance. These were:
- People skills – having a positive attitude and seeing the best in people, communicating and being able to pitch performance to the right level
- Leadership – ability to train staff and to represent the views of others
- Technical excellence – being accurate and working to the highest possible standards
- Knowledge – being able to access information and apply knowledge to practice
- Self management – able to manage pressure and being willing to challenge oneself.

Discriminant Function Analysis also enabled identification of the characteristics that differentiate expert performance. These were grouped under just two variables:
- Knowledge – having a broad base of knowledge, being able to access information and apply it to local situations, and using information to make decisions.
- Mentoring – inspiring, mentoring and teaching others and providing opportunities for others to develop.

The results of these trials of the model and its underpinning behaviours suggest that they have content, internal consistency and criterion-related reliability. These point to
the model’s potential use and impact on the pharmacy profession and other professions.

**Implications of the research**

The integrated model has the potential to impact curriculum design and delivery, continuing professional development activities and competence assessment.

**Curriculum design and delivery**

As identified by a number of researchers (for example Bourgeois, 1995; Klausmeier, Ghatala and Frayer, 1974; Stepien, 1994), the type of concept map used as the starting point for curriculum design will have a profound impact on how the curriculum is conceived, developed and delivered. Using the professional competence model developed in this research as the concept map would ensure the curriculum was designed around integrated learning.

The integrated model developed in this research suggests that professional competence and indeed expertise develops 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 curricula 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 the practitioner’s capacity to use those skills and knowledge in a seamless, integrated manner consistently across all their professional roles and functions. This will require a curriculum that progressively develops the level of integration across the duration of its delivery, starting from stand-alone subjects to fully integrated ones in the later stages. Assessment would follow a similar approach. In the early stages of a programme components could be assessed as standalone subjects while at later stages, assessment would focus on integrated outcomes.

| Knowledge – propositional and process knowledge for professional practice |
| Technical skills – psychomotor and cognitive |
| Legal and ethical knowledge and skills – knowledge of law, professional social and cultural norms |
| Organisational skills – ability to manage oneself and others, to manage work and to access information |
| Intra and interpersonal skills – communication, interpersonal skills, self-awareness, mentoring, peer review and team work |

Increasing integration

**Knowledge – propositional and process knowledge for professional practice**

**Technical skills – psychomotor and cognitive**

**Legal and ethical knowledge and skills – knowledge of law, professional social and cultural norms**

**Organisational skills – ability to manage oneself and others, to manage work and to access information**

**Intra and interpersonal skills – communication, interpersonal skills, self-awareness, mentoring, peer review and team work**

**Year one**

**Year five**

**Fully integrated delivery of professional and personal knowledge – propositional and process knowledge for professional practice, technical, legal and ethical, organisational skills, knowledge of law, professional social and cultural norms, intra and interpersonal skills – communication, interpersonal skills, self-awareness, mentoring, peer review and team work delivered in a real work context**
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. The use of authentic assessment methods that connect learning with doing and that correspond with real world experiences would be key to this.

The model of professional competence developed through this research also suggests that providing opportunities for the developing professional to mentor and support others and to practice leadership is important in building their self-confidence and self awareness which are so important for the progression from competence to expertise.

**Continuing professional development**

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 could provide a reliable guide for individuals to identify their weaknesses and prepare 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.

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. 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.
**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.

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.

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 which can be administered by self and/or peer assessments.

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).

A self/peer assessment model could be adopted in New Zealand using the scale items developed in this research. 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.
Summary
If future research contributes further evidence of the validity and reliability of this conceptualisation 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 inform the debate about what differentiates the technician from the professional.

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. Thus it shifts the focus of competence assessment from the task to the person. To sum up Gonzci 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 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”.

(Gonzci 1999, p.182)
References


