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A systematic program of research regarding the assessment of speech-language pathology competencies.

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Abstract
This paper explores the nature and development of competence in speech-language pathology and is informed by the development and validation of a competency-based assessment tool to assess Australian speech-language pathology students’ professional performance in the workplace (COMPASS®). Background is provided on speech-language pathology competency frameworks in Australia and a systematic program of research to validate this assessment tool. Findings relevant to understanding the nature and development of speech-language pathology competency are described. The domains of competence considered important for practice were found to extend beyond specific processes of professional practice to include generic competencies of Reasoning, Communication, Lifelong Learning, and Professionalism. The achievement of competency was identified as developmental, and clinical educators were found to validly and reliably identify seven levels of competency development. Competency may transfer across the scope of practice and marginal students’ performances were characterised by a high degree of variability. These findings are discussed in relation to the profession’s understanding of competency and speech-language pathology education, professional development and further research.
Introduction

People accessing speech-language pathology services have the right to expect that these services are provided by competent speech-language pathologists. Ensuring that speech-language pathologists graduate as competent practitioners and have the capacity to maintain their ability to competently practice is core to meeting service users’ needs. This paper explores what has been learnt about speech-language pathology competency during the development of a competency-based assessment tool. These new insights will be discussed in relation to international debates regarding competency in health professional practice including the nature and development of competence, whether competence transfers across the scope of practice and how to identify those having difficulty developing competency.

The Australian speech-language pathology community is in the unique position of having collaborated nationally over the past nine years on a series of research and teaching projects to improve competency based assessment and teaching. This activity commenced in 2001 with the primary aim of developing and validating a competency based assessment tool. This resulted in the successful development and national implementation of a validated assessment format – COMPASS®: Competency Assessment in Speech Pathology (McAllister, Lincoln, Ferguson, & McAllister, 2006) – for assessment of students’ performance during practicum.

The process of developing and validating an assessment tool involved collection and integration of evidence from a range of sources including research and theory to support an appropriate evaluative judgement of validity (Messick, 1996). The methodology undertaken to collect and integrate evidence to inform the development and validation of COMPASS® and the underlying conceptual framework is described
in more detail elsewhere (McAllister, 2006; McAllister, Lincoln, Ferguson, & McAllister, 2010). This paper reflects on and synthesises the evidence yielded during this process from a different perspective - an examination of the nature of speech-language pathology competency and its development.

The paper is written in three parts. The first provides background for the reader on speech-language pathology competency frameworks in Australia and the validation process undertaken during the development of COMPASS®. Drawing on the results of several studies, the second part integrates and discusses the evidence that contributes to an understanding of the nature and development of speech-language pathology competency. Finally, the implications of this understanding for education and research are discussed.

**Part 1. Background**

*Speech-language pathology competency frameworks*

To assess competency it is necessary to understand and define it. At the commencement of this research program a competency based framework was in place for speech-language pathology in Australia. A competency based approach to certifying entry to the profession was adopted in response to government reform agendas in the early 1990s (Guthrie, 2009). Competency based occupational standards (Competency Based Occupational Standards for Speech Pathology – Entry Level [SPAA, 2001]; commonly referred to as the CBOS) for the profession were collaboratively developed and established (Dawson, 1993a, 1993b;).

Speech-language pathology, in common with other allied health professions in Australia such as physiotherapy (APC, 2006), have adopted a competency framework
where by competencies are focussed on the ‘doing’ or practical problem solving of health professional work and arise from the integration of underlying attributes (e.g., knowledge, skills, attitudes/values). This is a different approach to the more common reductionist competency paradigm in health that seeks to dissect professional practice into atomistic competencies or tasks that are then assessed (Albanese, Mejicano, Anderson, & Gruppen, 2008). The integrated approach to competency taken in the CBOS for speech-language pathology describes broad areas of professional activity or ‘what we do’ as interrelated processes of professional practice. Within each of these areas or units of professional competency, specific activities or elements of competency are identified as processes that interrelate to create the overall competency. Performance criteria and cues identify relevant knowledge bases, practical and contextual considerations, skills or actions and attitudes that are evidence that performance criteria have been achieved. The knowledge and specific skills are exemplars that, in combination with underlying professional attributes, result in competent professional action. See Table I for an example of this framework.

The CBOS framework describes competencies that speech-language pathologists should be able to demonstrate at an appropriate level prior to graduating (known as “Entry-Level”) across the full scope of speech-language pathology practice. This includes providing services to clients across the life span that are experiencing difficulties in the functional domains of speech, language, voice, fluency and swallowing. It does not specify particular sets of competencies or knowledge/skills/attitudes for particular areas of practice or client groups – this
specification occurs during university education. Speech-language pathologists in Australia enter the profession from either accredited four year undergraduate or two year graduate entry programs and are expected to be ‘work ready’. However, it is not expected that entry-level (i.e., newly graduated) speech-language pathologists will be competent in all areas of practice without profession-specific supervision and support from a senior speech-language pathologist as well as managerial supervision. Fully independent practice is not expected when working with clients or in workplaces where a number of features combine to create complexity (SPAA, 2001).

The CBOS framework is used by the national professional body (Speech Pathology Australia) to accredit speech-language pathology programs. This has had a significant impact on curriculum design and delivery in speech-language pathology education (Ferguson, 2006). A prominent feature of the accreditation process is the use of an outcomes based approach that evaluates the assessment processes used by programs to ensure students have met the CBOS competency standards. This is different to accreditation approaches that mandate and evaluate ‘inputs’ such as the specification of what should be taught in the university curricula and measures such as hours of teaching on specific topics or hours of clinical experience. Therefore, for Australian speech-language pathologists, ‘being competent’ is focused on performance and means being able to integrate and apply the processes involved in effective professional action across the scope of the profession (context and client needs) at a level sufficient for entry into the profession. These competencies and their integration are assumed to be the result of acquiring sufficient knowledge and skill in association with appropriate attitudes (e.g., client centeredness, integrity). Given the centrality of CBOS to accrediting graduates for practice, COMPASS® was designed
to assess student competency development against the competencies specified in CBOS at entry and developing levels.

Validation of COMPASS®

As mentioned in the introduction a national cross institutional collaboration was commenced in 2001 and aimed to develop a validated national competency based clinical education assessment tool. This process involved two major phases. First, the design phase used a reiterative action research process that integrated multiple sources of evidence to develop content and a process for the assessment tool. Multiple consultations to develop consensus with regard to assessment design decisions were carried out with experts in speech-language pathology education, students and clinical educators. Consultation methods included discussion and review of material developed over the design phase, semi-structured interviews and focus groups. Clinical educators and speech-language pathology academics also participated in a structured action research forum held at the Speech Pathology Association of Australia (SPAA) conference. Each consultation was informed by ongoing analysis of the literature on competency and assessment and thematic analysis of assessment protocols in use at the time and the CBOS (McAllister, 2006; McAllister, Lincoln, Ferguson, & McAllister, 2004, 2008). (See fig. 1).

Second, the resulting assessment format was validated through a national field trial over two university semesters. This yielded 301 analysable assessment events from 219 different students by 107 different clinical educators representing a wide range of placement types and clinical educator and student experiences (McAllister et al., 2010). These assessments were conducted by speech-language pathologists who were
either university employed or included students in their usual work places. Both
groups worked closely and continuously with their students co-managing a caseload.
Therefore the assessment was carried out in the context of the clinical educator having
multiple opportunities for quality observations and judgements about the students’
fitness to practice.

Two types of evidence were collected as a result of the field trial. Face validity of
COMPASS® was assessed using a questionnaire based evaluation of the tool by
clinical educators (N=68, 64% of participants) and students (N=88, 40% of
participants) (McAllister et al., 2004). Second, statistical validation of the COMPASS
was achieved through analysis of the rating scale and items, using a combination of
Rasch analysis (Rating Scale Model) (Bond & Fox, 2007; Wright, 1999) and
parametric statistics. Rasch analysis is a statistical technique that evaluates the
measurement quality of an assessment tool by comparing it to a model of what data a
valid assessment tool could be expected to generate. More detailed explanations
regarding its use in validating COMPASS® can be found in McAllister et al (2010). In
general terms, the model expects that an assessment tool should generate data that
illustrates the following: some competencies are more difficult to achieve a higher
rating on than others; students who are more competent will usually rate higher on all
the competencies than less competent students; and less competent students are more
likely be rated lower on more difficulty competencies (Bond & Fox, 2007; McAllister
et al, 2010; McAllister, 2008). Rasch analysis provides statistical information to guide
changes to an assessment if required to improve its validity (Bond & Fox, 2007). See
Appendix for information on the Rasch statistics referred to in this paper.
As indicated in the introduction, evidence collated across both phases was used to evaluate the validity of the assessment tool and resulted in the publication of COMPASS®. The second section of this paper will now evaluate this evidence in relation to what it reveals and questions it raises regarding the development of competency in the practice of speech-language pathology. For ease of understanding the evidence will be presented and interpreted in relation to five major themes identified by the research team in relation to competency: occupational and generic competencies, developmental continuum, transfer across scopes of practice, hierarchy of difficulty and performance of marginal students.

**Part 2. Nature of speech-language pathology competency**

*Competency involves integration of occupational and generic competencies*

A recurring theme during the design phase for all research participants – students, university clinical educators and field educators alike – was that not only the occupational competencies should be assessed but also other dimensions of professional practice. Interviews and consultations suggested that speech-language pathology practice was more than the simple carrying out of professional processes. Participants spoke about the need for integration across the occupational tasks of the profession and the translation of new learning into new action to allow for flexibility; similar to Schön's category of reflection in action (Schön, 1987). For example, responses to questions during focus groups and semi-structured interviews about important indicators of passing performance in practicum included (McAllister, 2006):

> ...ability to adapt, and be creative, their efficiency and time management.

(Student)
Integration. The failing students just couldn’t integrate, they can’t integrate theory into practice and they can’t transfer from one client to another, they can’t transfer skills, they can’t generalise. (University Clinical Educator)

I think students that are good self evaluators, who know exactly where they are at, and what they need to improve on, you know they are going to be fine if they can do that. (Field Clinical Educator)

This idea of integrative competencies was investigated further through the action research cycle (Described in figure 1) and resulted in the development of a four way classification of generic competencies that was consistent with all sources of evidence and subsequently included in the assessment tool.

1. **Reasoning**: effective thinking skills, integrating collaborative and holistic viewpoints into professional reasoning, and sound professional reasoning to assist in planning management.
2. **Communication**: interpersonal communication skills for effective practice (e.g., therapeutic interventions), reporting (oral and written) and presentation skills and team work skills.
3. **Lifelong learning**: reflection on performance, structuring own learning, appropriate attitude to learning and the ability to change performance and transfer learning as a result of experience, feedback and knowledge.
4. **Professionalism**: organisational skills, professional behaviour, managing administrative responsibilities, professional attitude and ethical behaviour.

These generic competencies were present in the CBOS but embedded in the detail of the performance criteria and cues. Participants clearly identified the need for the generic competencies to be made more explicit for the purposes of assessment of
Clinical performance and saw them as being critical for the development of occupational competence. This included supporting the development of the occupational competencies and transferring competency across practice contexts and client groups (e.g., learning how to conduct formal psychometric assessments according to the manual). Thus, a preference was apparent for a holistic and integrative model for defining and assessing competence rather than one that identified separate components of competency that were assessed individually (e.g., a list of specific psychometric assessments a graduate should be able to perform) and assumed to add up to competent performance.

Evidence gathered during the phase 1 of tool development was highly congruent with the three domains of learning and evaluation theorised by Bloom (Bloom, Madaus, & Hastings, 1981). Competency was seen as arising from various combinations of knowledge including propositional, personal and craft knowledge (e.g., how to do therapy); skills including practical, cognitive (e.g., critical thinking), and emotional (e.g., empathy); and personal qualities including cognitive style (e.g., flexibility) and interpersonal style (e.g., integrity).

The assessment tool evaluated during the field trial included a resource manual with detailed specification of the generic competencies using the unit, element, performance criteria and cue structure used in the CBOS and common to Australian allied health competency frameworks. Exemplars of behaviours for each of the competencies (generic and occupational) were developed that provided indicators as to the types of knowledge, skills and personal qualities students would demonstrate in combination to create competent performance in each area of competency.

The field trial tested this model of competency in practice (McAllister, 2006; McAllister et al., 2004). Rasch analysis of the rating data generated by the tool
indicated that the four generic and seven CBOS competencies sampled a uni-dimensional construct of speech-language pathology competency. This was demonstrated by very strong item fit statistics with nine items within the conservative range 0.8 to 1.2, usual for high stakes written assessments. Two items fell just outside of this range (0.76 and 1.22) but still generated better data than expected for performances assessed by observer ratings (for more detail see McAllister, 2006). This uni-dimensionality indicated that the students’ assessment results were the result of their ability in combination with the relative difficulties of items and was strong evidence that the theoretical processes proposed (i.e., that occupational and generic competencies act in concert to create professional competency) were in fact being engaged (Fisher, 2004). This finding was supported by analysis of the questionnaire feedback from clinical educators and students. While feedback should be interpreted with some caution due to the response rates (Clinical Educators = 64% response rate and Students = 40% response rate), support was very strong for the inclusion of the generic competencies in addition to the occupational competencies. There was also strong agreement that the generic competencies represented valued knowledge, skills and attitudes (McAllister et al., 2004).

In summary, the results suggested that Australian speech-language pathologists understood professional competence as arising from the integration of performance across process-oriented occupational competencies by the means of generic competencies. Clinical educators in the sample were able to use an integrative understanding of competence to inform their rating judgements against each of the four generic and seven occupational competencies. These findings suggest that the categories of knowledge, skills and personal qualities embedded in competencies and used to develop performance descriptors were relevant to speech-language pathology
practice, but this requires more explicit consideration, as developed in the next section.

*Competency has a developmental continuum*

Competency is generally conceptualised as a ‘present/absent’ phenomenon where the performance meets a set criteria or not. As described earlier in this paper, the competency framework for speech-language pathology (CBOS) identifies a single level of performance that is sufficient to enter the profession. However, evidence developed over the tool development phase strongly confirmed that speech-language pathologists understand competence as developmental and wanted a performance rating system that reflected this development in students. This preference aligned with universities’ desire for a tool that allowed both the educators and students to track students’ developing competency over the pre-professional preparation program and identify when performances representative of entry-level competence have been achieved. Both preferences were closely linked with an understanding of the need to support quality judgement of performance and to provide feedback on learning (McAllister, 2006). The following comments from clinical educators and students illustrate their developmental understanding of competence:

- Continuums are good – box or line, illustrates where to aim for and visually show students this. (Field Clinical Educator).
- I am happy to comment and indicate that instead of like a tick the box reached competency, have not reached competency, more of an emerging scale of where they are at. (University Clinical Educator).
- Well, for me, having that rating scale broadened and more defined and that way you have a better understanding of exactly where you are placing within
it and whether you have actually made progress or whether it has just been a tiny little shift. (Student).

In keeping with this, students and clinical educators (field and university) generally expressed a preference for performance ratings to be made on a visual analogue scale with clear descriptors rather than a categorical scale (McAllister, 2006; McAllister et al., 2008).

However, developmental ratings of performance do not usually meet this criteria as scales commonly use undefined numbers or descriptors, e.g., ‘poor’, ‘adequate’, ‘good’ or ‘excellent’ ratings (e.g., Wilkinson & Frampton, 2004). No consensus was found in current practice, theory, research, or opinion on how professional competency develops and how this continuum could be described. A framework that drew upon three paradigms was developed for describing the continuum for testing during the field trial (McAllister et al., 2010). The first two are influential in higher education assessment and describe a developing ability to manage complexity (Biggs & Collis, 1982) and transformation of knowledge into practice through experience (Benner, 1984; Benner, Tanner, & Chesla, 1996; Dreyfus & Dreyfus, 1996). The third paradigm has been very influential in performance assessment in Australian speech-language pathology programs and describes a continuum of support/guidance students require to perform competently with clients (Anderson, 1988; Brasseur, 1989). These were integrated to develop descriptors for three levels of performance (novice, intermediate and entry-level) along a visual analogue rating scale and exemplars for each level of performance for each of the competencies to guide rating judgements (for more detail see McAllister et al., 2010). These descriptors were then used by clinical educators to guide their recording of global judgements of student performance on each of the competencies, based on
multiple observations made while working with the student and clients over the whole of the placement.

Data from the field trial of the tool confirmed that clinical educators were able to assess students’ performances on each item of competency according to a continuum of competency development using the rating scale and behavioural descriptors. A Rasch analysis (Rating Scale Model) of the ratings on the visual analogue scale revealed that these ratings could be organised with confidence into seven categories of performance representing equal and increasing amounts of competence. A high item reliability statistic of 0.97 (McAllister, 2006) indicated that the seven rating categories in combination with the items of competency provide a good description and hierarchy of competence (Bond & Fox, 2007; Linacre & Wright, 2003). The high person reliability statistic of 0.98 predicted that each student’s place on the continuum of competency was highly likely to remain the same if rated on similar items of competency – further confirming the continuum of competence model (McAllister, 2006). Thus clinical educators engaged in the rating task in the manner predicted by the Rasch model and in a consistent predictable pattern. This confirmed that the behavioural descriptors related well to their understanding of how competency develops. Furthermore, person measures (student scores) ranged from –14.2 to 13.1 (a spread of 27.3 logits) which indicated a large spread of ability and clear hierarchy of development on the competencies (for more detail see McAllister, 2006).

The concept of competence existing on a developmental continuum was also evident in the finding that increasing levels of performance (person scores) related to increasing levels of experience. This phenomenon was found both cross-sectionally and longitudinally within the data (McAllister, 2006). Cross-sectionally hours of experience (estimated and actual) were strongly correlated with the performance score
that the students received (Pearson correlation = 0.823, p=0.000). The mean score was highest for the group with the most hours and lowest for the group with the least hours. An ANOVA for the three groups of experience (novice, intermediate and entry-level) identified that these means were significantly different (p=0.000). This confirmed that competency develops with experience, and presumably in association with the teaching and learning that occurs on placement and at university. This finding also suggested that the behavioural descriptors described the developmental trajectory appropriately. However, it was also clear that experience was not the only pre-requisite for competency, since some students had accrued large amounts of experience compared to their peers and they were yet to reach competency.

The development and validation of the assessment tool indicated that not only did speech-language pathologists see competency as existing on a developmental continuum, they had a clear and shared understanding of how this progress was demonstrated across all of the items of competency and could identify it in a predictable manner that allowed for quality measurement of performance. The behavioural descriptors developed to guide ratings on the competency appeared to accurately reflect this understanding and supported assessment of a continuum of performance across the competencies. However, the behavioural descriptors only described three levels of performance and clinical educators were actually able to identify seven interval levels of performance, suggesting that there was scope to further describe this continuum.

**Competency transfers across the scope of practice**

As described previously, the competency framework used in the assessment tool does not aim to exhaustively specify competencies for practice with client groups or in
particular contexts. The four generic competencies developed during the design phase identify behaviours that support development and integration of performance across occupational competencies and enable transfer of learning across areas of practice and over time. Student scores on the assessment tool provided further evidence that competency does develop in this manner (McAllister, 2006). Of the 219 different students represented in the assessment pool, 20 students had two or more assessments submitted for different and consecutive placements over the two university semesters. Of these, 17 had steadily increasing competence scores with subsequent placements. Two of the remaining three students who did not show a steady increase in competence across placements did demonstrate increased competence from the first to the third placements, and the remaining student had a drop in performance from the first to the second placement with no data submitted for the third placement. Overall, there was a significant positive difference in scores across consecutive placements (ANOVA, p=0.01) demonstrating that students were maintaining and improving on competency levels over time (McAllister, 2006). Given the placements were entirely different in nature (workplace and client group) this would indicate that students were transferring competencies across scopes of practice and client/patient communication and/or swallowing disabilities and building on these competencies on the next practicum.

Further evidence of transferability of these competencies was found in the 33 assessment events for students placed at two different placement sites with two different clinical educators at the same time. These students’ (n=33) assessment scores, yielded from independent ratings from two clinical educators from two different placement sites, were found to be very similar (intra class correlation = 0.82, p=0.000). This finding was made despite these placement sites being as diverse as
supporting literacy development of children in a classroom one day and providing rehabilitation to adults with acquired communication disabilities on another (McAllister, 2006).

Thus it would appear that the generic and occupational competency framework for speech-language pathology describes competencies that develop in a transferable manner across the scope of speech-language pathology practice both simultaneously (across two different placement sites) and successively.

Some competencies are harder to achieve than others
Rasch analysis makes it possible to distinguish items for which higher ratings may be harder or easier to obtain (Bond & Fox, 2007). Ratings from the field trial indicated that there was a hierarchy of difficulty among the competencies (McAllister, 2006). Table II lists the 11 competencies in order of difficulty and it can be seen from the error ranges that there was some overlap in this ordering. It should also be noted that opportunities to practise each competency were likely to have had an effect on the acquisition of competency. However, it will come as no surprise to experienced clinical educators that the harder competencies required the exercise of complex cognitive skills such as analysis of quantitative and qualitative data about a client and interpretation of the meaning of this data for the individual and their significant relationships. Competencies that were easier to acquire were those that could be characterised as involving behaviours that were more easily articulated (e.g., professional behaviour) and/or likely to be more frequently practised on practicum (e.g., speech-language pathology intervention). The generic and occupational competencies were represented in combination across this hierarchy of difficulty, further confirming their integration to create competent performance.
Marginal students have variable competency development

The Rasch model generates a number of values that assisted with evaluating the validity of the assessment tool content and processes. One of these values, the Infit Mean Squares (IMS) identifies when the score a person has achieved has been derived from a highly variable pattern of ratings. The Rasch model allows for some variation in ratings on the assumption that students’ performances are inherently variable. However, if the performance becomes too variable it suggests that the requirements of the model are not being met and the items are not able to identify a good measure of that student’s level of competency. Only 20 students in the field trial had IMS values greater than 2.0. When a more rigorous measurement protocol was applied based on a standardisation sample, 37 students with high IMS scores were identified (McAllister, 2006). Patterns in their rating strings compared to their experience levels identified that some students had unexpectedly high ratings on some competencies given their limited level of experience. Other students were clearly rated as being highly variable in their performance or had one or two ratings that were unexpectedly low for their experience level. Identifying the causes of these ratings patterns was beyond the scope of the research. However, of the 12 students who were identified as failing or at risk of failing (via a tick box on the assessment tool), 10 had performances with IMS values greater than 2.0 when the more rigorous measurement protocol was applied. IMS values greater than 2.0 indicate that the score or measure is based on a pattern of highly variable ratings and may therefore not represent the students’ actual level of competency. Five of these 10 marginal students had very high IMS values above 5.0,
compared to only one of the 27 students who had high IMS values but were not identified as at risk of failing. Of the remaining two ‘at risk’ students, one was clearly underperforming compared to students of similar levels of experience and it was not clear from the data available as to why the second student was identified as at risk of failing. This finding suggests that marginal students’ performances tended to be rated in a highly variable pattern by clinical educators across the competencies that contribute to competent performance. This provides some evidence to support observations in the literature that marginal students are frequently inconsistent in their performances (Robertson, Rosenthal, & Dawson, 1997).

**Summary of findings**

Speech-language pathologists in Australia have conceptualised competency as being able to demonstrate an adequate level of performance in undertaking the *processes* of the profession, e.g., occupational competencies such as assessment, analysis and interpretation, planning and intervention (SPAA, 2001). Evidence generated during the development and validation of COMPASS® identified and confirmed that speech-language pathologists also saw competency as arising from four generic competencies that integrate with and enable the development of competent performance with the seven occupational competencies described by the original competency framework (CBOS). All 11 competencies were seen to arise from an integration of relevant knowledge, skills and personal qualities. However speech-language pathologists recognised competent performance as not being solely the demonstration of specific knowledge, skills or attitudes. Rather, competence was conceptualised as arising from a dynamic integration of the knowledge, skills and processes required to perform these competencies to an appropriate level. Furthermore, the generic competencies
facilitate the development of occupational competencies, and integration of the occupational competencies into holistic professional practice. This competency was also conceptualised as developing along a continuum that passed through seven levels of performance which could be further described in future research. This shared conceptualisation of competency was likely to have contributed to the finding that clinical educators could rate student performance across the competencies in a predictable manner. Evidence generated during the tool development process identified that the competencies described could be applied across the scope of practice and transferred across successive field experiences, with some data suggesting they also transferred simultaneously (across two different but concurrent placement sites). As would be expected, some competencies were found to be harder to acquire than others. This might have occurred relative to opportunity but might also be related to the complexity of particular competencies and how explicitly they could be demonstrated (e.g., reasoning as compared to professionalism). Finally, data suggested that marginal students could be characterised by performances that were not consistent across the full range of occupational and generic competencies, or that were consistently lower than their peers.

Part 3. Implications of findings

These findings suggest that the conceptualisation of competency presented in this paper is an accurate description of the speech-language pathology profession’s understanding of the process of developing professional competence and may have application to other health professions’ understanding of competence. A process-oriented approach including occupational and generic competencies is not foreign to other allied health professional groups. For example, Australian physiotherapy
professional standards include ‘communicate effectively’ (one of four standards that could be characterised as generic competencies) along with occupational competencies similar to those of speech-language pathology (e.g., standards that include the professional processes of assessment, interpretation and analysis, planning (APC, 2006). This process-oriented approach has promise for identifying competencies that we may have in common and illuminating differences in how professions apply these in service of patients.

However, the process-oriented approach to the conceptualisation of competency is very different to the approach taken by other health professional groups such as nursing and other influential paradigms in medicine such as CanMeds (Frank, 2005) that has 200 or more competencies that are assumed to add up to create a competent professional (Reeves, Fox, & Hodges, 2009). These more atomistic approaches to describing competency direct attention to narrowly specified exemplars of competent behaviour and risk failing to capture the critical holistic and integrative nature of professional practice (Hodges, 2006). Furthermore, such frameworks are unable to flexibly respond to the dynamic and developing nature of professional practice, risking freezing it in time (Reeves et al., 2009).

The process-oriented competencies of the Australian speech-language pathology framework facilitate a clear understanding of how competency frameworks can inform curriculum. This enables educational and professional development programs to develop curricula that reflect the current knowledge, skills and practices required to perform the competencies at an appropriate level (Ferguson, 2006). The profession’s understanding of competence as being integrative and involving both occupational and generic competencies has implication for educational programs. From this perspective, speech-language pathology students are best supported in their
transition to professional practice through curricula that will facilitate their acquisition and integration of specific professional knowledge, skills and attitudes within processes of professional practice rather than dividing competency into separate items that are learnt and assessed independent of each other. Situating learning within processes required for professional practice can include teaching and assessment strategies such as student negotiated assessment, reflective journaling, problem based learning, case based learning, standardised patients and simulations (e.g., Edwards, Franke, & McGuiness, 1995; L. McAllister & Lincoln, 2004; L. McAllister, Lincoln, McLeod, & Maloney, 1997; Rose & Best, 2005). Practicum will continue to be a critical arena for integration and application of university based learning to practice, and should be capitalised upon as a rich and powerful source of learning. Students also need opportunities to develop an understanding of and acquire the ‘other’ dimensions of professional practice: reasoning, communication, lifelong learning and professionalism. This requires educational programs to make explicit the relevant knowledge, skills and personal qualities required for these competencies and provide students with guided practice and feedback through assessment. These competencies align well with the current move by Australian universities towards identifying desired graduate qualities in recognition that a university education should be about more than acquiring knowledge (Barrie, 2006). Similarly they meet the need generally expressed by employers for graduates to have generic ‘work ready’ competencies such as the ability to communicate effectively, work in teams and be lifelong learners (Biesma et al., 2008; Hager, Holland, & Beckett, 2002).

The evidence presented in this paper also suggests that variability characterises the performance of marginal students, and comments by clinical educators in focus groups suggested that this may be related to poor integration and
transfer of competencies across clients and scopes of practice. Future research within this important area is needed to assist in confidently identifying ‘at risk’ students and in remediating failing students.

The tool validated through the development and integration of evidence described in this paper has subsequently been published by Speech Pathology Australia as COMPASS®: Competency Assessment in Speech Pathology (McAllister et al., 2006) and is currently used by all Australian and New Zealand speech-language pathology programs and the programs in Singapore and Hong Kong. The national and international adoption (Ferguson, McAllister, Lincoln, & McAllister, 2008) of this approach to student assessment has significant implications for the ongoing process of program evaluation and benchmarking within the speech-language pathology sector (Lincoln, McAllister, McAllister, & Ferguson, 2008). Further research is ongoing in relation to the development of ways to collect, manage, and interpret pooled and benchmarked data for the purposes of assuring and improving the quality of education in speech-language pathology.

The process-based developmental competency model described may also provide a framework for understanding how professionals continue to develop competence after completing their formal professional education programs. The findings suggest that health professionals may apply key generic competencies to enable them to transfer the practice of occupational competencies to new client groups, new arenas of practice and to capitalise on developing knowledge bases and new technologies available for practice. Given the current move towards credentialing Australian speech language pathologists (SPAA, 2008) for practice in specific areas (e.g., dysphagia, SPAA, 2004) and with specific technologies (e.g., for endoscopic investigations, SPAA, 2007) it would be useful to evaluate this framework as a
strategy to effectively describe and contextualise the acquisition and application of these specific skills to professional practice. Further investigation of the transferability of competencies would also be useful in addition to developing an understanding of the learning pathway beyond ‘entry-level’ through to expert so that professional development could be vertically integrated across speech language pathologists’ professional lives.

From the theoretical discussion and empirical findings presented in this paper, it is suggested that the nature of competence is developmental across a lifetime of learning, from student learning experience through professional practice. It is also suggested that it is possible to closely describe and evaluate this pathway of development within the natural context in which it occurs (i.e., the workplace), without reducing the essential integrative nature of complex knowledge, skills and attitudes.

**Acknowledgements**

Dr David Curtis, Senior Research Fellow, National Centre for Vocational Education Research, provided invaluable advice in guiding us regarding the application and interpretation of the Rasch measurement model. Professor Paul Hagler, University of Alberta, provided important conceptual insights during the design phase. Lincoln, Ferguson, and McAllister (L) obtained funding support from the Australian Research Council and the Speech Pathology Association of Australia, this funding provided scholarship support for McAllister (S) over the period of this research.
References


Nature of SLP competency - 27


Table I. Example of the Australian speech-language pathology competency framework (adapted from CBOS; SPAA, 2001, pages 4 - 6)

<table>
<thead>
<tr>
<th>Major units of competency</th>
<th>Examples of sub-elements</th>
<th>Examples of performance criteria</th>
<th>Examples of cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assessment</td>
<td>Competency 1, Assessment:</td>
<td>Element 1.2, Performance criteria b): Priorities for assessment are set in conjunction with the client. Referral to other agencies is made in accordance with the interpretation of the client’s needs, with due regard for the client’s priorities and circumstances.</td>
<td></td>
</tr>
<tr>
<td>2. Analysis and Interpretation</td>
<td>1.1 Establishes and documents the presenting communication and/or swallowing condition and issues; identifies the significant other people in the client’s life and collates information on the client.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Planning of Speech Pathology Intervention</td>
<td>1.2 Identifies the communication and/or swallowing conditions requiring investigation and the most suitable manner in which to do this.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Speech Pathology Intervention</td>
<td>1.3 Administers speech pathology assessment relevant to the communication and/or swallowing information required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Planning, Maintaining and Delivering Speech Pathology Services</td>
<td>1.4 Undertakes assessment within the ethical guidelines of the profession and all relevant legislation and legal constraints, including medico-legal responsibilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Professional, Group and Community Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Professional Development</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cue for Element 1.2, Performance Criteria b): The speech pathologist is able to justify the priorities with reference to:
  - the client’s communication and/or swallowing condition, cultural background and life circumstances
Table II. Eleven competencies, listed in order of difficulty

<table>
<thead>
<tr>
<th>Competency Name</th>
<th>Order of Difficulty</th>
<th>Rasch measure (logits)</th>
<th>Error (logits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBOS Unit 2, Analysis and Interpretation</td>
<td>1</td>
<td>1.32</td>
<td>.14</td>
</tr>
<tr>
<td>CBOS Unit 1, Assessment</td>
<td>2</td>
<td>.88</td>
<td>.14</td>
</tr>
<tr>
<td>CBOS Unit 6, Professional, Group and Community Education</td>
<td>3</td>
<td>.55</td>
<td>.13</td>
</tr>
<tr>
<td>GC Unit 1, Clinical Reasoning</td>
<td>4</td>
<td>.50</td>
<td>.13</td>
</tr>
<tr>
<td>CBOS Unit 3, Planning of Speech Pathology Intervention</td>
<td>5</td>
<td>.24</td>
<td>.13</td>
</tr>
<tr>
<td>GC Unit 2, Communication</td>
<td>6</td>
<td>-.22</td>
<td>.13</td>
</tr>
<tr>
<td>CBOS Unit 5, Planning, Maintaining, Delivering Speech Pathology Services</td>
<td>7</td>
<td>-.26</td>
<td>.13</td>
</tr>
<tr>
<td>CBOS Unit 7, Professional Development</td>
<td>8</td>
<td>-.30</td>
<td>.13</td>
</tr>
<tr>
<td>GC Unit 3, Lifelong Learning</td>
<td>9</td>
<td>-.37</td>
<td>.13</td>
</tr>
<tr>
<td>CBOS Unit 4, Speech Pathology Intervention</td>
<td>10</td>
<td>-1.04</td>
<td>.13</td>
</tr>
<tr>
<td>GC Unit 4, Professional Behaviour</td>
<td>11</td>
<td>-1.29</td>
<td>.13</td>
</tr>
</tbody>
</table>

Key: CBOS – Competency Based Occupational Standards for Speech Pathologists – Entry-Level (Revised) (SPAA, 2001); GC – Generic Competency (see COMPASS®; McAllister et al., 2006)
Figure 1. Phase 1: Assessment design process.
## Appendix

Table II Explanation of Rasch terms referred to in this paper (adapted from Bond and Fox, 2007)

<table>
<thead>
<tr>
<th>Rasch Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating Scale model</td>
<td>Version of the Rasch model used to analyse validity of assessments using rating scales that have the same number of response options (as per the COMPASS® assessment)</td>
</tr>
<tr>
<td>Items</td>
<td>Each of the assessment items i.e., the 11 competencies that are rated during a COMPASS® assessment</td>
</tr>
<tr>
<td>Persons</td>
<td>Each of the students whose performance is rated</td>
</tr>
<tr>
<td>Logits</td>
<td>Unit of measurement generated by a Rasch analysis that transforms raw scores based on ordinal data to log odds ratios on a common interval scale. Logit scales are based around a mean of 0.0, so scores range from negative to positive around this mean.</td>
</tr>
<tr>
<td>Person measures</td>
<td>Estimate of a student’s underlying competence based on his/her performance on the COMPASS® assessment items. Person measures are only reliable if the assessment items have been found to measure the underlying trait of competency (see uni-dimensional construct) and do not have high variability associated with them (see Mean Squares). A good assessment will have a wide range of person measures, generally &gt; 6 logits</td>
</tr>
<tr>
<td>Item difficulty</td>
<td>An estimate of how difficult the item (competency) is based on how all the students performed on that item. The Rasch model assumes that items will have a consistent level of difficulty.</td>
</tr>
<tr>
<td>Fit Statistics</td>
<td>Estimate how closely students’ ratings on the items fit the pattern predicted by the Rasch model. There are number of statistics that provide information on fit, including mean squares (see below)</td>
</tr>
<tr>
<td>Mean Squares</td>
<td>Provide information on whether the student’s rating is more variable than would be predicted by the model. Expected value is 1 and acceptable range for items depends on the type and consequences of the assessment. There are two types: Infit Mean Squares are sensitive to a pattern of variable ratings across all the competencies. Person measures associated with Infit Mean Squares above 2.0 are more likely to be based on unusually variable ratings and may not be accurate measures of the student's performance. Outfit Mean Squares are more likely to identify occasional ratings that are a long way from what would be expected for a student’s overall competency.</td>
</tr>
<tr>
<td>Uni-dimensionality</td>
<td>Evidence that an assessment is measuring one characteristic and not several at once, in this case speech-language pathology competency. This is a basic requirement for quality measurement and for assessments conforming to the Rasch model. Uni-dimensionality is indicated when the items have acceptable fit statistics, in particular, their Mean Squares values fall into an acceptable range.</td>
</tr>
<tr>
<td>Item reliability index</td>
<td>Provides information on how confident we can be that COMPASS® contains items of different degrees of difficulty so that it provides a good description and hierarchy of competence. It indicates the</td>
</tr>
<tr>
<td>Nature of SLP competency</td>
<td>Person reliability index</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>likelihood that another field trial with students of similar ability would result in the same estimates of item difficulty. Reliability indices above .80 are acceptable.</td>
<td>Provides information on how confident we can be that students in the field sample would be placed in the same place on the continuum of competency if they were rated against another set of items that measure speech-language pathology competency. Reliability indices above .80 are acceptable.</td>
</tr>
</tbody>
</table>