Title: Dietetics students' construction of competence through assessment and placement experiences.

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Authorship
All authors conceptualised the study, designed the research questions and completed the data collection. All authors completed analysis of at least one transcript and CP and JD completed analysis of all data. CP drafted the manuscript with input from JD and AB. All authors reviewed manuscript and approved its final contents.

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Abstract

Background
Competency standards are widely adopted as a framework to describe standards of performance required in the workplace. Little is known however, about how students construct competence. This qualitative study aimed to explore how dietetics students ready to graduate construct the concept of competence and the role of assessment in developing professional competence.

Methods
Qualitative description was used to gather data from a convenience sample of students ready to graduate from universities with accredited dietetics programs across Australia (10 out of 15 at the time of the study). Eleven focus groups were conducted to explore perspectives of competence and experiences of 'competency-based' assessment. Data were audio recorded, transcribed and analysed using a thematic analysis approach.

Results
Eighty-one (n=81) participants across 10 universities representing 22% of total students participated in the focus groups. Themes revealed that: (i) there is no shared understanding of competence; (ii) current work placement experiences may not reflect current standards or workforce needs; (iii) assessment approaches may not fully support the development of competence; and (iv) competent performance of supervising dietitians/clinical educators in the workplace influences the construction of competence.

Conclusions
There is a need to work towards a shared understanding of dietetic entry-level competence in the profession. 'Work-based' learning experiences may need to be modified to ensure students meet current competency standards. Practitioners involved in student supervision need to acknowledge the influential role they have in the development of the future workforce.
K**eywords**: dietetics; students; competence; qualitative research

Introduction

Nearly fifteen years ago Epstein and Hundert completed a landmark literature review on how competence was defined and assessed in medicine.[1] Competence, was defined as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community being served".[1] This work has been instrumental in constructing competence as a concept for all health professions and in shaping the training and assessment of health professionals. Little is known, however, about how students construct and define competence.

Competency standards provide a framework to define required performance for all health professionals, including dietetics internationally[2-6]. While standards have been criticised for hindering the advancement of professional practice and not being able to fully capture the complexity of practice[7], they have been used to provide a template for the development of curricula and assessment to prepare health professionals for practice. In dietetics, the Australian National Competency Standards have recently been revised.[8] Previous versions of the standards were criticised as driving a reductionist, or 'tick box' approach to competency development, and assessment having a focus only on entry-level practice rather than ongoing competence.[9] The accompanying revised accreditation standards specify 800 hours of 'work-based' placement.[10] Australian Universities predominately use 'hospital-based' settings for placement as 10 weeks of direct patient care experience is mandated by the Australian Dietetics Council to fulfil accreditation requirements.[10, 11] Students are stated as key stakeholders in the application of competency standards,[6] however little is known about how students engage with the concepts of competence and whether they see competency standards as relevant to them through assessment as they engage in learning to become dietitians.[12, 13]

In dietetics, the evidence that exists suggests that students see the role of assessment in preparing them for employment and in providing valuable, effective feedback in the development of their competence.[12, 13] In addition, students have reported a desire to be involved in assessment decisions to drive their own learning plans and reduce subjectivity implicit in assessment.[12, 13] There is a need to further explore how students develop an understanding of the concept of professional competence and the factors, including assessments, which facilitate their ability to do this. Understanding these phenomena will support the development of curricula and assessment that equip students to work in complex, dynamic and ever changing health care environments.
This study aimed to qualitatively explore how dietetic students, ready to graduate and enter the workforce, construct the concept of professional competence and the role of assessment in developing professional competence.

Methods

The research was informed by qualitative description[14] whereby researchers sought to describe the concept of competence from the perspectives of students ready to graduate and interpret this description to assist in understanding approaches to assessment. This work was undertaken just after the release of the revised National Competency Standards (2015)[6] which were a significant shift from previous standards, having moved from nine domains of competence with 166 performance indicators to four domains and 70 performance indicators.[8] Ethics approval was obtained from the primary university ethics committee (approval number CF/2288 – 2015000923) and then all other participating researchers' university human ethics committees.

Sample - Convenience sampling was used to recruit students who had recently completed their final coursework and all assessment requirements of their degree, against the Dietitians' Association of Australia National Competency Standards (2009), to be credentialed to work as dietitians in Australia (hereafter referred to as participants). Participants were recruited nationally from 11 of the 15 accredited dietetics programs at the time of the study. One university was excluded from the study as it had recently redesigned their assessment against the new competency standards while all others assessed students against the 2009 standards. A flyer was distributed to all students by course administrators via their online learning system (e.g. Moodle/Blackboard) inviting them to participate in the study. Participant consent was gained from those who volunteered to participate.

Approach - Focus groups were chosen for data collection as the interaction between participants and any consensus of opinions as well as opposing perspectives were sought.[15] The focus groups were conducted face-to-face in a convenient university location using a structured format whereby a protocol was created and researchers briefed on the approach to ensure consistency.[15] Questions aimed to describe the participants' perspectives of competence, their experience of 'competency-based' assessment and particular assessment approaches that are most appropriate and acceptable from their perspective. The questions were developed based on a review of the literature on the complexity of competence as a concept[7] and on programmatic approaches to assessment (Table 1).[16]

Data collection - The focus groups were facilitated by the researchers, who were academics from the participating universities with experience in conducting focus groups. The two researchers with no experience in focus groups were supported by an experienced facilitator from the research team or someone independent from their own university with facilitation skills. Given the lack of funding, national representation and the geographic spread of the sample, this was undertaken for convenience. Using academics familiar to participants was purposefully chosen as the researchers proposed that having facilitators who had adequate knowledge of the subject, a deep understanding of learning experiences and assessment approaches and good communication skills, would enable a deeper exploration of the issues under investigation, which is often prioritised over potential risk of bias in qualitative research approaches.[17, 18] In addition, the researchers believed participants would be more comfortable discussing these concepts with people with whom they were familiar which is recommended in medical education to explore issues associated with hidden curricula.[19] The ability of the facilitator to understand elements of the experiences the students reported from an insider perspective, was deemed to outweigh the potential for the facilitator to influence responses, as has been used in other dietetics education research.[20] As the participants had completed all required coursework with no pending assessment and were deemed competent this also contributed to the decision to use a known facilitator. In addition, the facilitator was accompanied, with another of the researchers or other independent facilitator, to aid consistency of approaches and assist interpretation. Where this was not possible transcripts were sent to participants for confirmation of discussion. In addition to further reduce the potential influence of the researchers' perspectives on the responses, after two focus groups were conducted a summary from these discussions was presented to other facilitators and the potential influence of facilitators in the data discussed as part of a reflexive process.

The focus groups were undertaken between October 2015 and June 2016. This varied because the undertaking of placement was different across the country. Focus groups ran for 60-90 minutes, were conducted face-to-face where possible or via *Zoom Video Communications, Inc* (2017) which has shown to be just as effective as face-to-face focus groups when

facilitators are trained in the use of the technology,[21] audio recorded and transcribed verbatim (average 25 pages single space text). Researchers probed participants until there was data saturation of the concepts within the focus group. Where possible (n=2 focus groups), transcripts were returned to the participants for verification, in all other instances (n=8) transcripts were verified against recordings for accuracy.

Data analysis - The position of the researchers as educators of participants was acknowledged and reflexivity[15] related to this positioning was employed in this regard when collecting and analysing data. Reflexivity involved researchers considering why students may have provided a certain response. All researchers independently coded the transcript of the focus group that they conducted based on guidelines developed by the first author (CP). A thematic analysis approach[22] was applied whereby the text was labelled as an open code and then once the transcript was coded, all codes were grouped into categories of similar concepts. All researchers met face-to-face to discuss the preliminary analysis, critique each other's interpretations, and agree on key ideas emerging from the data and their interpretations. After this initial data analysis process, the first author, returned to the original unmarked transcripts and analysed all focus groups with the assistance of QSR-Nvivo 10 (V10.0.138.0 (64bit), QSR, Australia) using the same thematic analysis approach. The codes and categories were then analysed whereby the first author moved between categories, the existing literature on the development of competence in the health professions[1, 23, 24] and across the different universities to develop themes. This inductive thematic analysis approach was deemed most able to interrogate transcripts, interpret meaning behind dialogue, allowed for patterns to emerge clearly from the data and account for the different focus group facilitators[25]. The difference between initial concepts and first author analysis was the degree of depth to the interpretations and resolved through discussions with all researchers. Analysis of difference in students' perspectives of undergraduate versus post-graduate (student) courses was applied. In line with qualitative description[25], the researcher interpreted the themes to assist in understanding approaches to competency development and assessment and presented the themes and a conceptual framework of interpretation to other researchers for verification and agreement.

Results

A total of 81 students across ten Australian universities attended the 11 focus groups with between four and 10 participants per focus group and between four and 19 participants from each university. This sample represented approximately 22% of all students eligible to graduate in Australia at the time of the study. Seventy-six (94%) of the participating students had completed placement in the allocated timeframes and had not failed or required additional time to achieve competence, five students (6%), from two universities required additional placement time. All focus groups were conducted face-to-face, except for one which was conducted via videoconference for convenience, for four participants located in rural areas, facilitated by the first author who was experienced in *Zoom* technology. All students were enrolled in an accredited dietetics course at either Bachelor (n=43, 53%) or Master level (n=38, 47%) level with a mean age 26 ± 5 years. Four students were enrolled as international students, seven reported English as their second language, 77 were female (95%) and 4 male (5%).

A conceptual model of students' construction of competence is described based on the themes that emerged from the data (Figure 1). Four major themes were derived from the data (Table 2) and described below. There was no difference between undergraduate or post-graduate participants.

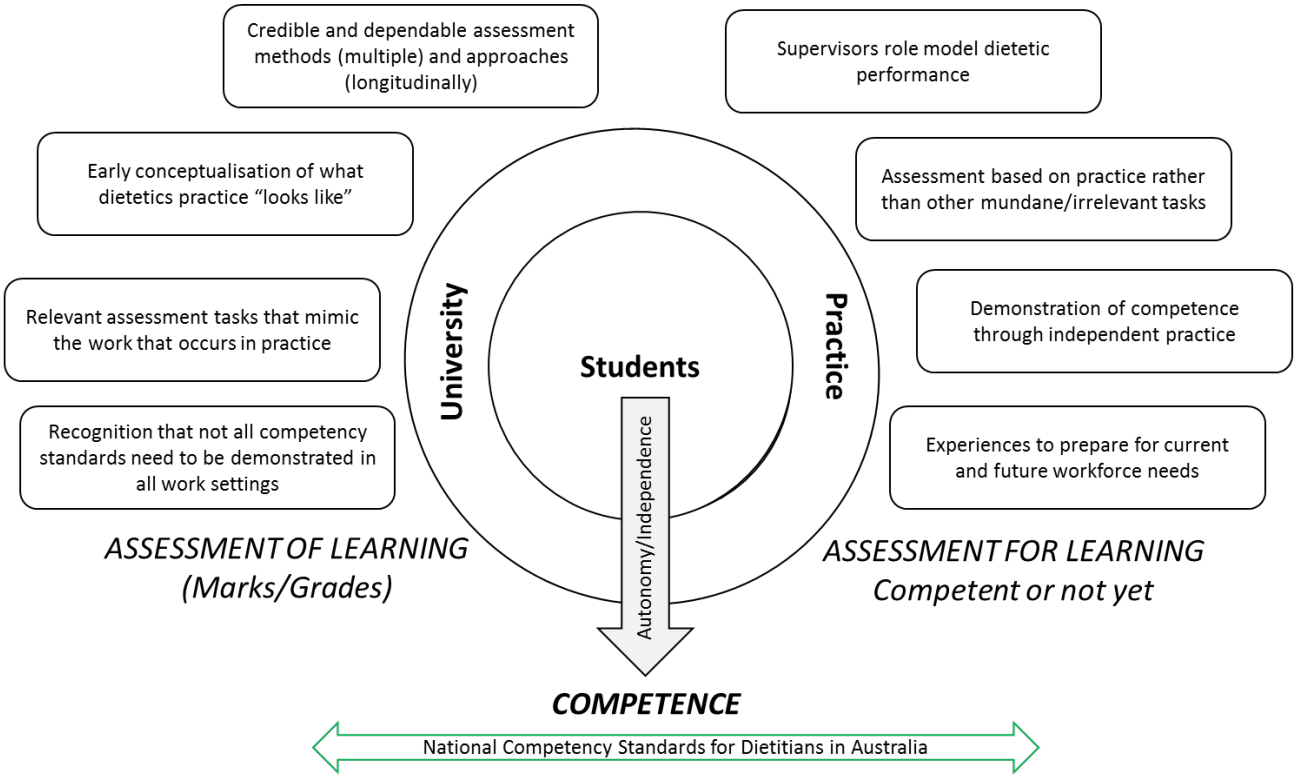

Figure 1. Conceptual model, derived from the data, of students' construction of competence.

A shared understanding of competence is needed. Participants constructed competence as being "safe to practice" or acknowledging limitations and boundaries, being flexible, having emotional intelligence, leadership and working independently. When asked specifically about the term competence the majority of the participants explained that this was "being professional". The participants also described other elements of dietetics practice as competence, including employing evidence-based practice and having an impact on nutritional health. Some key skills were identified by some students, including performing malnutrition screening, counselling for behaviour change and advocacy. The breadth and depth of the participants' descriptions of the role of a dietitian were linked to the work of a dietitian in a hospital.

"…. if you're going to be a practising dietitian …. then you need to be able to show leadership, you need to be able to discuss exactly what you want done in terms of food services and in terms of nurses." (Focus group 9)

Participants acknowledged that assessment of competence is subjective and reported that there were inconsistencies between supervisors' judgements and this did not help their ability to construct competent performance. Assessment was reported to be a source of anxiety and confusion which was challenging for some participants. Variation and inconsistency in supervisor feedback, interpretation of competencies and approaches to assessment were highlighted as some of the challenges for participants in negotiating and managing their progress and development towards competency.

"hard to figure what exactly they [supervisor] wanted." (Focus group 7)

Given the trust placed by learners on supervisor judgement in the placement environment, feeling safe in the assessment process was highly valued. Many participants reported wanting more input into assessment decisions and felt as learners they needed to take more responsibility. Participants reported having a voice in the assessment process but highlighted that there needs to be an appropriate balance between student-led and supervisor-led assessment on placement. They recognised the role of multiple pieces of evidence from a range of sources shaping judgements of competence but reported incidences where competency decisions were made on single performances or pieces of evidence. The participants reported the value in being able to show progress towards the achievement of competence and that the concepts of milestones were useful, however they implied that these are not clearly defined among supervisors or universities.

"…all placement sites are different so it's hard to make everyone equal." (Focus group 8)

***Current work placement experiences may not reflect current standards of competence*.** The participants reported different placement experiences provided them with the opportunity to demonstrate different competencies. They explained that depending on their placement experience, some of the 2009 competency statements were difficult to demonstrate as dietetics practice is diverse and placements are not standardised.

Participants associated competency development more with the placement elements of their programs than university-based learning. They reported that placement was essential for developing competence to work as a dietitian across multiple settings. However, case-based learning, simulated patients and hypothetical practice scenarios discussed in class were reported to be valuable preparation for placement. The participants emphasised early assessment tasks that were simulated to mimic the work of a dietitian in practice supported their preparation for placement and construction of what it meant to be competent. While some focus group discussions did not emphasise the value of the development of competence at university, most students still reported that being adequately prepared for placement and feeling confident about entering that setting was fundamental for any chance of successfully developing competence. Some students reported that university assessments were not adequately linked to tasks or skills they would need to perform in the workplace.

The current placement programs were reported to be focussed on individual patient care skills in an acute hospital environment and that this was at odds with future workforce needs. Participants recognised that the future work of a dietitian would be in managing food services in nursing homes, providing chronic disease self-management in ambulatory care settings, private practice or working with food industry. They felt there was an overemphasis on placement in hospital settings despite limited employment opportunities in this setting upon graduation. The placement experiences in food service or community/public health nutrition settings were regarded as inferior. They perceived that the profession believed that they were not settings in which a full picture of professional competence could be demonstrated. A culture of considering acute 'hospital-based' learning as being the only suitable preparation for practice was reported by participants to be the views of their supervisors and thus imparted to them. Participants reported wanting to embrace the diverse placement opportunities to enrich learning and prepare them for work, now and into the future.

"I'm not saying there shouldn't be so much focus on clinical but if there's such a small number of clinical jobs and small numbers going into it…" (Focus group 1)

Participants also explained that they felt the different placement settings were siloed and not connected to their development of competence as a whole and that their work placement experiences were "*pigeon-holing dietitians into clinical domains and food service domains.*" (Focus group 6). Some reported feeling like their food service and community/public health nutrition placement was not considered in their final assessment of competence.

Participants reported that being provided opportunity to undertake independent work, especially food service and community/public health nutrition contexts, supported the development of competence and construction of competent performance as a dietitian. The development of competence was also motivated and supported by participants understanding that they were making a meaningful contribution to the workplace in which they were based.

"…given a bit more independence, … I was given basically as much rope as I wanted to and it was so relieving, because I felt like I'm running this … and …. I'm being believed in that I can do this. Comparative to clinical where you had someone standing right next to you the entire time." (Focus group 6)

Assessment may not fully support the development of competence. When shown the revised National Competency Standards for Dietitians in Australia (2015) participants acknowledged that the standards provide a basis or framework for the work of dietitians but not the daily practice of a dietitian - *"[they don't describe] how to be a dietitian"* (Focus group 2). The simpler structure to the 2015 standards and focus on outcomes were reported to be beneficial in making it clear as to what needed to be achieved to be able to enter the workforce. The participants explained that the 2009 Competency Standards were being used as a checklist for assessment whereby competence was viewed as a list of skills to be obtained rather than considering how these skills were put into practice across different situations and varying degrees of complexity. Participants revealed that some supervisors were focussed on checking them off against elements in a form rather than holding a broader view of competency and assessment.

The assessment requirements on placement, for example, completing written reflections or long written nutrition care plans, were reported by some students to distract them from learning or the development of competence. Participants' suggested that the type of assessment on placement should include a range of different tasks aligned to what is actually done in practice, rather than assessment for assessment sake.

"When you're on prac[tical placement] you don't want to be thinking about doing assessment." (Focus group 5)

Participants reported that they believed the assessment approaches at university (grades) were at odds with competency assessment (competent or not). Descriptive rubrics were thought to be more aligned with 'competency-based' assessment to describe a continuum of performance. The participants explained that they are conditioned to be focused on marks and grades due to a range of factors. The highly competitive nature of gaining entry into dietetics programs together with a university culture of assessment based on grades were reported to influence the participants' philosophies of assessment.

"I liked it being on placement and it not being a graded part of the placement because I felt like, 'okay, I can really focus on learning from this and okay if I go in there and do absolutely terribly I'm going to learn quite a bit from it,' so that took away the stress. I wasn't stressed

going into it because it was more, 'okay I've got an opportunity to really learn here." (Focus group 10)

The role of formative assessment was valued. The opportunity for feedback was reported to play an important role in assessment. Participants reported valuing focussed and regular feedback that allowed them to make plans for and improve their performance from supervisors, peers, patients and other health professionals. Participants reported wanting feedback from academics as well as practice educators to be considered as part of competency assessment decisions.

"You get feedback…I had almost the whole [patients] family personally thanking me and it was like, that was just, blew anything out of the water that any mark could give me." (Focus group 2)

Some participants believed that they should lead feedback discussions. Being supported in self-assessment and reflective practice was also highlighted.

"I've very often taken away learning experiences from assessment that I've done worse on…I've learnt more from those than ones where I did well." (Focus group 2)

Exposure to competent performance influences construction of competence. The concept of competence was found to be developed by participants more robustly in latter stages of their training programs, due to the focus on 'work-based' learning or placements in the final years of undergraduate degrees and the final semesters of masters programs. Learning in real work settings supported the understanding of what it meant to function as a dietitian and through this understanding built confidence in what needed to be achieved. Placement or 'work-based' assessment was viewed as "real" and participants reported that this setting motivated them to develop skills needed for practice.

"…developing that clinical judgment that we always get told about. I don't really know what that ever means when I'm sitting in a lecture, but when you go into practice and you go, 'oh, I get what that actually means now'." (Focus group 6)

Early introduction to the competency standards and linking this to course content, assessment and 'university-based' learning more explicitly was recommended to assist in the construction of competence earlier. Participants from one university that had a professional practice subject in the first semester of the program reported understanding what was expected of professional practice (for example, empathy, reflexive practice, and cultural competency) early in their studies. Competency development was highlighted as needing to allow for flexibility in approaches to learning and progress.

The relationship with placement supervisors influenced the participants' development of competence in the placement setting. Competence was conceptualised based on placement supervisors' role modelling, their perception of the role of a dietitian and the supervisors' perception of competency and 'competency-based' assessment. The role of a dietitian in a hospital was constructed as "competence" by participants. They reported a hierarchical stance on their hospital placement experiences explaining that it is the component of practice that prepares them for work as a dietitian in the health care team. *"Clinical is what sets us apart from a nutritionist."* (Focus group 9)

Discussion

This qualitative study aimed to explore how students construct and define the concept of professional competence and the role of assessment in developing professional competence. It found that there is a need for a shared understanding of competence between learners and supervisors with greater acknowledgement of competence outside of a hospital setting and appreciation by supervisors on the need for multiple different pieces of evidence to inform competency judgements. Currently students' construction of competence is predominately based on the exposures they experience in the placement settings and influenced by supervisors' interpretations of competence. These findings are significant given the current dominance of work experience in the acute hospital environment which may not reflect emerging work practice.

To the researchers' knowledge, this is the first study to explore how students construct competence in the profession of dietetics. Strengths of this research include the transferability or results to students nationally in that 67% of universities were sampled, reflecting a diversity of educational approaches, and the 81 focus group participants were highly representative of the new student dietetic workforce nationally.[26] The findings may be limited to the views students were comfortable expressing with known academics, however the depth of data obtained suggests students expressed themselves freely. The voice of international students and the perspectives of students who needed additional time to achieve competence may have further strengthened the results.

The development of competence is known to be dependent on the socio-cultural context of the work place.[27] The literature also suggests that there is a 'hidden curriculum' during clinical placements where students feel forced to replicate the practices of their supervisors.[28] Our findings also raise questions about the profession's current approach to 'competency-based' assessment which suggest reductionist assessment practices and a focus on hospital placements[11], rather than a more holistic programmatic approach to assessing competence, potentially driven by the 2009 competency standards. While students recognised the role of multiple pieces of evidence to inform assessment of competence, their perspectives suggest that supervisors involved in assessment decisions do not share this holistic picture. There is a need for universities to build the capacity of supervisors, educators and students in programmatic approaches to assessment. Our findings also suggest that there is a need for more authentic assessments or assessment that represents the 'real' or actual work requirements, a greater emphasis on formative assessment and enhanced feedback where students are more at the centre of the assessment involved in a two way dialogue about their performance and plans for development. This is in line with other literature suggesting reflections being valued by learners when they are undertaken in the context of critical incidents or lifelong learning.[29]

The key role of dietitians as supervisors in supporting the development of learners is well recognised.[30, 31] This study not only shows the imperative role supervisors play in learning, but highlights students' perception of their role in promoting and role modelling current and future work practice. Dietitians need to recognise the powerful role they have in shaping the profession and the aspirations of future professionals. There is a need for shared understanding of what constitutes entry-level competence which may be assisted in the development of milestones and entrustable professional activities for dietetics as has been undertaken in medicine.[32] However the success of these are dependent on assessors understanding the concept of programmatic approaches to assessment and the concept of

entrustment. This study suggests the profession needs development in this area to improve assessment practice and change assessment philosophies.

Given the increasing need for dietitians to practice in settings outside the acute care hospital environment[26, 33] and develop innovations for new problems across different environments[11], this study provides further evidence to support diversifying placement experiences across multiple work contexts. Dietitians practice in different work contexts and work environments, and there are currently a range of non-traditional environments where dietitians could have a role; all of these should be explored for potential placement. With a refocussing of competencies from contexts to skills, a range of evidence and sites should be used to determine evidence of readiness to practice. A focus on placements that are in acute care and focus solely on medical nutrition therapy are limiting the future opportunities of the profession. This includes not only preparing students for practice in current work contexts but showing students the possibilities of what it could be and demonstrating a holistic understanding of the multiple perspectives dietitians need to take to improve nutrition outcomes. This will allow students to be able to effectively transform their learning across contexts. The profession needs to challenge the current practice hierarchy. In designing programs of 'competency-based' assessment, this study found that students support the use of multiple methods and approaches that closely align with requirements for practice. Literature in other disciplines[34] and some in dietetics[20, 35] suggests the integration of practice exposures help build context and motivate students for learning the theory and knowledge for practice.[36] Future research could explore if the new (2015) National Competency Standards are effective in supporting students to transform their learning across contexts.

This study explored the construct of professional competence from the perspectives of students ready to graduate and found that placement experiences, including role models in supervisors, powerfully influence how students perceive competent practice. There is also no shared understanding of what dietetics competence looks like and a dominance of acute care practice as preparation for the workplace. These findings suggest a need to consider alternative work placement experiences, such as private practice, nursing homes or food industry, in addition to hospital, community or population health and food service settings, to better prepare students for changing workforce needs. Practitioners involved in student supervision need to recognise the powerful influence they have in shaping students' construction of competence and not allow it to be limited to their area of practice, rather practice in a way so as to promote the progressive development of competence through a range of experiences, both in the university and placement setting.

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Table 1. Focus group questions.

Question	Question Logic
What the does the term professional competence or competency mean to you?	Conceptualisation of competence
In your opinion do the new competency standards define/describe the professional competence of a dietitian? If so why? If not, why not?	Competency standards connect to competence
Can you describe your experience of 'competency-based' assessment while studying to become a dietitian? In your opinion would these current assessment approaches demonstrate competence against the new competency standards? Why? Why not?	Experience of 'competency-based' assessment
If you could create a system of assessment that allows you to show how you demonstrate competence what would it look like?	Conceptualisation of 'competency-based' assessment

Table 2. Themes and summary descriptions identified from focus groups with 81 participants.

Theme	Description
A shared understanding of competence is needed	• Competence is being safe, working within scope and independently • Focused on the work dietitians do in hospitals • Competence is constructed based on assessment experiences which is subjective and controlled by supervisors who take a tick box or reductionist approach • Variation and diversity in interpreting competence • Multiple pieces of evidence were thought to be needed to demonstrate competence
Current work placement experiences may not reflect current standards of competence	• Work placement facilitates the development of competence • Preparation for 'work-based' learning supports transition to work-learning environment • Work placement focussed on the skills to work as a dietitian in a hospital • Appropriately timed independence supports the development of competence
Assessment may not fully support the development of competence	• Competency standards (2009) do not reflect current practice and are not used effectively in assessment • Some assessment may distract from the development of competence
Exposure to competent performance influences construction of competence	• Real world learning experiences supported the construction of competence • Competency standards assist in understanding competence • Supervisors are role models in students construction of competence