Expertise and the representation of knowledge in Training Packages

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Abstract

An assumption of Australia's competency-based vocational education and training (VET) system is that experienced practitioners from industry will, by virtue of their expertise, be well-placed to read, analyse and interpret units of competency that relate to their industry. This paper draws on research that challenges this assumption. Interviews with 30 VET practitioners about how they interpret units of competency revealed that those with extensive industry experience did not always recognise their industry in the texts. Theories of expertise and workplace knowledge offer one way to account for these counter-intuitive findings. According to these theories, higher levels of expertise are characterised by reliance on tacit knowledge and an intuitive grasp of workplace situations and challenges and little reliance on explicit, formal work-related rules and procedures. It will be argued that the explicit, formal approach to representing occupational knowledge found in units of competency does not necessarily serve to represent competent practice in the eyes of industry experts.

Introduction

It is a general assumption of Australian Vocational Education and Training (VET) stakeholders that trainers and teachers in the system will possess relevant and current expertise in the occupation about which they are training or teaching. This expectation has a formal basis as well. The National Skills Standards Council (NSSC) *Determination for trainer and assessor competencies* published in 2013 stipulates that that trainers and assessors, including those working under supervision, must be able to 'demonstrate

vocational competencies at least to the level being delivered and assessed; and be able to demonstrate how they are continuing to develop their VET knowledge and skills as well as maintaining their industry currency and trainer/assessor competence.' With this Determination, the NSSC continues the practice of national training authorities to mandate occupational expertise in trainers and assessors working in the system.

But these requirements are not what they are simply in order for trainers and assessors to pass on what they know. Rather, these practitioners are supposed to base their instruction and assessment on competency standards which are determined by industry representatives and identify those tasks, skills and knowledge deemed necessary for current occupational roles. Competency standards are gathered into 'Training Packages' which include rules for combining the standards to create whole qualifications as well as industry-specific assessment advice. Given that the initial training practitioners receive to operate in Australia's competency-based system is at an elementary level (Robertson, 2008), it may be presumed that occupational expertise is at least in part required to inform the process of interpreting competency standards for the purpose of designing training and assessment. However, recent research into the use of competency standards by practitioners suggests that even highly experienced practitioners with demonstrated industry expertise have difficulty decoding the texts of competency standards. It is tempting to attribute such difficulty to the relatively low level of initial training for VET practitioners in Australia, particularly since for most of the participants in the research the entry-level *Certificate IV in Training and Assessment* was their highest teaching qualification. But the participants had issues with competency standards that suggested initial training was not the source, or not the only source, of the problem. Rather, participants revealed a disconnect between the occupation as they understood it and the representation of the occupation in the competency standards.

One possible explanation for this situation is that competency standards are themselves somehow a flawed means for representing occupations. An extensive literature has developed that posits and explores formal limitations inherent in the format and conceptualisation of competency standards (e.g. Ashworth & Saxton 1990, Hyland 1993, 1997, Collins 1993, Brown 1994, Blunden 1997, Cornford 1997, Chappell, Gonczi & Hager 2000, Wheelahan 2004, Darwin 2007, Buchanan et al 2009). Notwithstanding the potent critiques of the competency approach that have been made, an alternative (and in many ways complementary) explanation is possible. This is that there are qualities of expertise itself that render the use of competency standards in the VET context problematic. This paper addresses the broad question of the relationship between occupational expertise of VET practitioners and the representation of occupational knowledge in competency standards.

The first part of the paper surveys expectations regarding the expertise of VET trainers and assessors before moving on to a discussion of the representation of occupational knowledge in Australian VET. The research that supports the argument of the paper is summarised next. The finding that industry experts do not necessarily relate to competency standards prompts a closer look at the nature of expertise. Accounts of expertise suggest that it is associated with intuitive action founded on tacit knowledge of occupational practices and that formal, codified representations of these practices may be incompatible with the exercise of expertise. Theory of expertise offers a plausible explanation of the findings of the research that challenges the assumption that expertise somehow facilitates interpretation of the formal, codified representation of occupations met in competency standards.

Trainer skills in Australian VET

That VET trainers and assessors should be expert in their field and maintain that expertise is mandated in the Australian system. This mandate reflects of a broader set of assumptions

3

about teachers in general and VET practitioners in particular. The expertise of teachers is a major concern throughout the world and has been for many decades. Shulman (1987) made a highly influential attempt to identify the 'bases' of teacher expertise, and the first base was 'content knowledge'. With school teachers in mind, Schulman explains that,

> Teaching is, essentially, a learned profession. A teacher is a member of a scholarly community. He or she must understand the structures of subject matter, the principles of conceptual organization, and the principles of inquiry that help answer two kinds of questions in each field: What are the important ideas and skills in this domain? and How are new ideas added and deficient ones dropped by those who produce knowledge in this area?....The teacher has special responsibilities in relation to content knowledge, serving as the primary source of student understanding of subject matter. (1987, p. 9)

In VET, content knowledge equates with occupational knowledge and in studies of VET practitioner expertise, content knowledge is considered an essential attribute. For example, in Corben and Thomson (2001) identified 'technical knowledge and currency' as one of the 'attributes of excellence' in VET teaching. Summarising their findings on this topic, they say 'Thorough knowledge of subject area and maintenance of technical expertise were mentioned as critical attributes by virtually all participants' (2001, p. 28). Later work by Palmieri (2004) and Robertson (2008) underscores this point. According to Palmieri, 'Vocational teachers were (and still are) expected to have a background in their industry field, and to keep their knowledge of the industry up to date' (2004, p. 11). Robertson explains that, 'Given that vocational teachers are usually required to have a number of years of industrial experience before entering the VET teacher workforce it is assumed that they will have a strong knowledge base in their primary vocational discipline' (2008, p. 11).

Regulation of VET in Australia is consistent with the conclusions of this literature. As the NSSC (2013) determination regarding VET practitioners cited above demonstrates, relevant, current industry competence is mandated for practitioners. The industry expertise of VET practitioners is not just what students, employers and the literature expect, it is law.

Representation of knowledge in Australian VET

To this content or occupational knowledge base VET practitioners must add at least a *Certificate IV in Training and Assessment* (or specific 'skills sets' from the qualification for those with limited practitioner roles) to be officially eligible to teach and assess in the Australian VET system. The *Certificate IV* qualification, regarded as an 'entry level' credential, is designed to give practitioners basic skills in teaching and assessment as well as an induction into the requirements of the system.

This latter component of the qualification is crucially important as practitioners are required to make very specific use of competency standards documents for targeting their instruction and assessment work. Competency standards, commonly referred to as units of competency or simply 'competencies', each specify 'a discrete workplace requirement' (DEEWR, 2012), typically a job role.

Competencies have a number of components each with a defined purpose:

1. Unit descriptor

2. Application of the unit

3. Licensing/Regulatory information

4. Unit pre-requisites

5. Employability skills information

6. Elements and performance criteria

7. Required skills and knowledge

8. Evidence guide

9. Range statement

10. Unit sector(s)

11. Competency field

12. Co-requisite units

Competencies constitute a detailed analysis of the discrete workplace requirement that is the focus of the text. The way the analysis is undertaken and expressed is influenced by the theory of behavioural objectives, an approach to writing learning outcomes that strives for objective and unambiguous formulation. An influential advocate of behavioural objectives explained that,

> a usefully stated objective is one that succeeds in communicating an intended instructional result to the reader. It is useful to the extent that it conveys to others a picture of what a successful learner will be able to do that is identical to the picture the objective writer had in mind…. What you are searching for is that group of words or symbols that will communicate your intent exactly as YOU understand it. (Mager 1962, p. 19)

According to the behavioural objectives model the most effective way of transmitting instructional intentions is to clearly describe behaviours or performances ('what a learner is expected to do'), the criteria of behaviours ('how well the learner must perform in order to be considered acceptable') and conditions ('the important conditions (if any) under which the performance is to occur') (Mager 1962, p. 21). These components of a behavioural objective are reflected in the Elements, Performance Criteria and Range Statements (respectively) of competency standards.

Other substantial components of competencies include the Required Skills and Knowledge and Evidence Guide. The Required Skills and Knowledge component is supposed to identify abilities and understandings that enable competent performances and it often takes the form of a list of abilities, theories and concepts. The Evidence Guide is intended to guide the development of assessment tasks and include descriptions of minimum performances that will count for the demonstration of competence. Other components such as descriptors and pre-requisites provide usually brief statements that help to provide system-level context.

Competency standards, then, embody the behavioural ideal of clear description and communication of those performances that are taken to be essential for competent work. Trainers and assessors must take these texts into account when they design programs, teach and assess in the Australian VET system. The expectations of practitioners in relation to competencies are made explicit in the units of competency that make up the *Certificate IV*. For example, Required Knowledge includes:

- how to interpret competency standards and other related assessment information to determine the evidence needed to demonstrate competence (TAEASS403B *Participate in assessment validation*)
- how to read and interpret the identified competency standards as the benchmarks for assessment (TAEASS401B *Plan assessment activities and processes*) (DEEWR, 2012)

Performance Criteria of the competency, TAEDES402A *Use training packages and accredited courses to meet client needs* include:

- Select individual unit or accredited module to meet client needs

- Read, analyse and interpret all parts of the unit or accredited module for application to client needs

- Analyse links between unit and/or accredited module to develop effective applications for the client

- Document analysis of unit or accredited module in a clear and accessible manner (DEEWR, 2012)

These and other examples of specification of expectations of practitioners in relation to the use of competencies reveal that they are meant to be able read and understand the texts fluently. It should be noted that the competency texts from which these quotes are drawn do not elaborate on the meanings of 'analysis' and 'interpretation'. It appears to be an assumption that the process of engaging with the texts is straightforward. Presumably, a person with the mandated industry background will be able to relate in a direct way to the content of the competency standards of their industry.

VET practitioner engagement with competency standards

The research drawn on in this paper was a qualitative project that involved semi-structured interviews (Merriam 1998) with 30 VET practitioners about their use of competency standards. The semi-structured format facilitated comparison of interview data, while allowing unexpected evidence to be collected. The interview schedule included questions about: industry background and number of years spent in industry; how the practitioners learned about the use of competency standards; what VET training and education qualifications they possess; what continuing education and training in the use of competency standards they accessed; the process(es) they use when interpreting competency standards; how they understand and explain the purpose and components of competency standards; and,

whether they needed to add anything to the content of the competency standards to give students adequate skills to perform the work they are training for.

The participants were recruited using a 'purposive' sampling strategy (Patton 2002), which involved securing participants who represented a wide range of industry areas and number of years as VET practitioners. The majority of them had been working with competencies for between 10 and 14 years, although some had more than 20 years' experience in the system. Fourteen of them held teaching or education qualifications at levels higher than the *Certificate IV in Training and Assessment*.

All of the participants had to read the competency standards more than once before they felt confident about using them. Twenty-six of the participants thought the language of competencies is not clear. Two responses sum up the feelings of the participants:

- I think that the language probably leaves a lot to be desired. Particularly if they're new to the industry the language would be difficult because it would use jargon and terminology that's relevant to that industry.
- I mean, I've seen some competencies that are written just appallingly, that are very vague and overlap. For example, sometimes the critical aspects of evidence in the evidence guide really just reinforce what's already been said. But I guess it gives a chance to see what the writers of the unit thought was really important. Then others that I find that are a little bit more clear and succinct, perhaps have less overlap, but there's a degree of overlap.

The participants were also asked to explain the purpose of competencies as such, and to explain the meaning of each of the components. Most participants struggled with one or more of the questions, and only three participants were able to answer all questions in this set in a

way that was consistent with official definitions of the components. In other words, just 10% of the research participants possessed comprehensive, formal knowledge of the structure of competencies.

The participants were asked whether they thought the competencies they worked with were limited in any way, and whether they 'added' to the content of competencies in order to teach learners what they took to be necessary for practice in the occupation. A number of participants thought that the competencies were not always written by people with direct knowledge of the occupation:

- Look, there's got to be some industry people, I reckon there's got to be industry people in there that are writing these but sometimes I can read and think, 'Oh, that hasn't been written by an industry person.'
- I find that - particularly with business type ones [competencies] in the ag[riculture] package or accounting type modules written in the ag[griculture] package, which I feel I'm an expert on - I feel they're, perhaps, not written by accounting people.

Some participants believed the competencies lagged behind industry developments:

- the industry is evolving much faster than the revision of the actual unit of competency itself, so in two or three years' time the unit of competency becomes out-dated because the business context has changed rapidly. Now you have immediate mismatch between the unit and real settings, so who keeps an eye on that? I don't know.

Most explained that they had to 'add' to the competencies to give learners the skills and knowledge they would need for industry:

- Absolutely. I do it all the time. There's a lot of things that aren't in the competencies that I think [the apprentices] need to know, that need to be added.

The research indicated that practitioners find it difficult to understand competencies, do not understand the structure and components of competencies, and feel that competencies are not always relevant to the occupations they teach. It is tempting to attribute their difficulties with and criticisms of competencies to their initial training in the use of competencies. Most described confusion during their *Certificate IV* studies:

- I remember my first ever course. I was completely confused, and luckily my sane sister in law… she came along with me, because she was curious…. I just thought, 'thank God', because I remember the trainer, I just felt like she was speaking in hieroglyphics. I kept looking over to my sister in law saying, 'what is she talking about?' [My sister-in-law] would pass me little Post-it notes under the table, saying there's three sections of this and she's talking about the first section. 'Okay, thank you.' So it certainly didn't happen in my first course.

The majority also did not have access to professional development, suggesting that practitioners are simply not being trained and developed properly for the task of interpreting competencies. A fuller account of the research project and additional findings are contained in Hodge (2014). It must be stressed that the project is very small-scale and that findings from it must be treated with caution. However, if treated as a pilot study, the research raises some provocative issues worthy of further research and material that prompts the theoretical analysis presented in the next section.

Accounting for the findings

Two accounts of these findings can already be sourced in the literature. First, there is the argument that training for VET practitioners is not adequate to the demands of their work. For example, Robertson's (2008) analysis of the skills developed through the *Certificate IV in Training and Assessment* indicates that practitioners are not prepared in the full range of knowledge and skills required by educators. However, since most of the participants in this research possessed education or training qualifications at levels higher than the *Certificate IV* and 22 of them had been VET practitioners for five years or more, possible inadequacy of initial VET practitioner training is unlikely to be solely responsible for the findings.

The other main account has to do with the adequacy of competency standards themselves to do the work expected of them. It was noted earlier that according to a sizable literature competency standards are limited means of capturing essential features of occupational knowledge for use in training and assessment. A typical criticism in this vein is that the behavioural categories of competencies that are designed to unambiguously 'transmit' desired performances for the purposes of instruction and assessment have the effect of 'narrowing' the subtle, holistic bases of competent performance (e.g. Chappell, Gonczi & Hager 2000).

However, an alternative or complementary explanation may be possible. An account of the apparent disconnect between the knowledge of experienced practitioners and the representation of occupational knowledge in competencies is suggested by research into expertise. Dreyfus and Dreyfus's (1988) influential research highlights the differences between newcomers to a skilled area and experienced practitioners. Their model was based on research into skill acquisition by pilots and chess players and was extended through research into the development of expertise in nursing and other professions. The 'Dreyfus and

Dreyfus Model' suggests that expertise is developed through five stages. They called the stages:

1. Novice

2. Advanced beginner

3. Competent

4. Proficient

5. Expert

They see the stages as building on each other. The relevant aspect of this model for the question of this paper is the role of explicit rules, standards and procedures in the development of expertise. The Novice and Advanced beginner stages are distinguished by the heavy reliance of learners on explicit rules, standards and procedures, which they tend to apply quite strictly to different situations. In contrast, at the Proficient and Expert levels, practitioners do not consciously apply explicit rules, standards and procedures to situations, but make intuitive, often rapid judgements based on a holistic grasp of situations. Their expertise does not conflict with relevant rules, standards and procedures, but it does not consist in the application of them. In addition, Dreyfus and Dreyfus (1988) point out that experts cannot necessarily articulate the rules, standards and procedures that *may* be used to specify their work. Many of us will be aware of this conundrum after working with experts who cannot effectively explain their expertise to others.

The general lack of comfort of practitioners with competencies suggested by the research presented above may be illuminated by the Dreyfus and Dreyfus (1988) model of expertise. The majority of the participants in my research could be regarded as experts with long experience in their occupational area. According to the model, their expertise would be of a tacit, intuitive, practical nature, rather than a matter of applying explicit rules, standards and

procedures. But competencies *are* collections of explicit rules, standards and procedures related to an occupational area. They are the result of efforts to break down competent performance into verbal, objective, overt formulations, and they are intended to be applied by learners in appropriate situations. In terms of the Dreyfus and Dreyfus (1986) model of expertise, the participants in my research as expert or proficient in their industry areas could not be expected to automatically understand their practice in terms of the explicit formulations of units of competency, even if the competencies faithfully capture relevant features of that practice. Some confirmation of this analysis of the findings from the research may be the relatively long periods practitioners reported to become confident using competencies.

The contrast between the forms of knowledge at each end of Dreyfus and Dreyfus's (1988) continuum of expertise is echoed in other models of knowledge that address the difference between the kind of embodied, practical knowledge that is at play when someone applies a skill and another kind of knowledge that is formal, conscious and readily communicated. Ryle's (1949) critique of rationalist theories of knowledge – theories that assume practice can be reduced to pure, codifiable knowledge – involved distinguishing between what he called 'knowing that' and 'knowing how'. For Ryle, knowing how – revealed in skilled practice – is not simply the forgetting of rules that originally informed practice, but is rather a qualitatively different mode of knowledge. A related distinction was made by Polanyi (1974) who argued that 'tacit knowledge' is the foundation of skilled practice rather than application of explicit knowledge. Schön (1987) critiqued the 'technical-rational' understanding of professional practice – the view that professionals apply previously acquired theory to practical situations in the course of making skilled decisions. For Schön, professional work is characterised by the processes of 'knowing-in-action' and 'reflection-on-action', neither of which rely directly on formal theory. These distinctions are summarised in Table 1.

Table 1. Forms of knowledge in accounts of skilled activity

Author	Formal knowledge	Practical Knowledge
Gilbert Ryle (1949)	Knowing that	Knowing how
Michael Polanyi (1974)	Explicit knowledge	Tacit knowledge
Donald Schön (1987)	Rules, procedures, protocols	Knowing-in-action / Reflection-in-action

These analyses of forms of knowledge are consistent with the implication of the Dreyfus and Dreyfus (1988) model of expertise that the representation of knowledge in competency standards does not accord with the deployment of expert knowledge in skilled practice. In each of these analyses, skilled practice involves a kind of knowledge that is qualitatively different to abstract, formal knowledge. These analyses reject the notion that the two are related through conscious application of formal knowledge to practical situations.

Conclusion

The epistemologies of practice developed by Ryle (1949), Polanyi (1974) and Schön (1987) along with the Dreyfus and Dreyfus (1988) model of expertise together challenge the assumption of Australian VET that skilled practitioners are inherently equipped, insofar as they possess industry expertise, to read and interpret competency standards. Australian competencies are developed by analysing work roles, breaking them down, and representing the result in formal categories. Competencies thus have the potential to confront experts with what is in effect a translation of skilled work into the form of 'knowing that', 'explicit knowledge' or rules, procedures and protocols. But this kind of representation of an occupation would be, in terms of the theories surveyed above, divorced from expert practice or even alienating for practitioners.

The findings of the research discussed in this paper are consistent with this conclusion. The expert practitioners did not find it easy to interpret competency standards. The texts did not make intuitive sense to them. These practitioners, labouring under the preconception that competencies were supposed to be transparent to them, suggested that there was something wrong with the language in which the competencies were expressed or thought that people from outside their occupation were involved in writing them. Many believed that it was necessary to augment the content of the competencies by resorting to their personal expertise in the area addressed by the competencies.

It is clear that some of the evidence provided by the research is also consistent with criticisms of the format and conceptualisation of competency standards. If the competency standards constitute limited representations of the complex realities of skilled work, then we might anticipate that occupational experts would fail to relate fluently to the texts. The finding that many of the research participants believed they needed to 'add' to the content of the competencies if they were to properly equip learners for jobs is a strong indication that at a practical level the competency standards are perceived to be 'narrow' representations of job roles. But other findings from the research more directly suggest alienation from rather than criticism of the content of competency standards as the basis for the research participant's views about the standards. Declarations that the language of the standards is difficult to follow indicate that the texts appear disconnected from occupational realities. Again, misunderstanding of the formal structure of competencies suggests that the categorisation of knowledge in the texts does not make intuitive sense to practitioners. These latter findings and interpretations support the case for the representation of content as much as the content itself is what is problematic to practitioners.

More research is required to cement a case for a disconnect between the representation of occupational knowledge in competency standards and the nature of expertise. In particular, a

methodology that can distinguish between practitioner criticism on the basis of the misrepresentation or under-representation of occupational knowledge from a basis in alienation arising from the representation itself would be required to help settle the account. Given the critical role of competency standards in the functioning of Australian VET such research would be well-justified. It would also be crucial to deciding what options are open to address the challenges that stem from one problem or the other. If there is a problem and it lies on the side of the adequacy of competencies, then the value of the competency-based approach is in question. If, on the other hand, the problem is to do with the assumption that industry experts have automatic insight into the content of competencies, then the case is strengthened for more rigorous training in the interpretation of competency standards to overcome the alienation to be expected when experts are confronted by formal representations of their expertise.

Acknowledgement

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