Currently in a number of western economies there is a focus on workplaces as environments in which individuals can acquire the skilful knowledge required for work. This paper discusses the potential role for vocational educators in organising workplace learning experiences. It commences by proposing a focus on learning, rather than teaching as being sympathetic to the increasingly accepted constructivist views of how individuals learn through engagement in social practice. Drawing upon a series of studies into workplace learning, which identified some of the strengths and weaknesses of workplaces as learning environments a model of workplace learning is identified - the learning curriculum. A role for vocational educators in organising and assisting with the development of the learning curriculum in workplaces is then advanced. Furthermore, this role necessarily causes aspects of vocational educators’ role to be reappraised and reconceptualised as it places the vocational educator as an organiser of experiences rather than an instructor. Through such a reappraisal vocational educators may be able to play a constructive role in the development of workplaces as learning environments and, in doing so, review vocational education practice within the taught curriculum in other settings.

Introduction

Workplaces are currently being promoted as being an environment in which to develop vocational skills. However, this idea is far from new. The apprenticeship of tradespersons, internship of doctors and indenture of lawyers as articled clerks are all based on the acquisition of knowledge in settings where that knowledge is to be applied - in other words, workplaces The value of these experiences have been recognised outside of formal professional preparation. For example, in Japanese corporations, the development of vocational knowledge is undertaken mainly as part of everyday work practice, with supervisors being responsible for the training of subordinates (Dore & Sako, 1988). The current Australian interest in using workplaces for the development of skilful knowledge appears to founded on four factors. Firstly, many industries do not have a history of vocational

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1 this paper is an extended version of the article The Role of Vocational Educators in Developing Workplace Learning Curriculum, which appeared in Volume 3 (1) of the Australian Vocational Educational Review.
education (e.g sugar, secondary processing, coal mining, manufacturing). Consequently, vocational education systems lack the expertise and infrastructure required to directly develop skills for these industries (Billett, 1992). Secondly, many workers in these industries are disadvantaged by the lack of formal recognition of their skills. This situation is becoming increasingly intolerable in restructured industrial agreements where movement through pay levels is premised on the formal acknowledgment of skill. Thirdly, there is an increasing specialisation in industries such as manufacturing and secondary processing. This results in the expertise required for skill development most likely being found within the particular enterprises. Fourthly, with the advent of enterprise bargaining and the erosion of existing industry-based delineation of vocational activities, an increasing number of enterprises are likely to be seeking skill development arrangements which mirror their unique industrial agreements. Therefore, skill development for these enterprises may best be addressed in the circumstances where those skills are to be utilised. Hence, for these reasons, workplaces are increasingly being used as places to develop the skilful vocational knowledge required for work activities. Coinciding with these pragmatic and practical concerns is also a growing interest by learning theorists in situated cognition, the authenticity of learning experiences and also the role of guidance, rather than instruction, in the learning process. These emerging areas of inquiry are used in this paper to understand more about the organisation and approach to learning in situations where the knowledge to be acquired is being deployed - workplaces.

The interest in workplace learning raises questions about how vocational educators can best assist with this provision of vocational skill development. Much of the current interaction between these practitioners and workplace-based learning focuses on the development of group instructional techniques, assessment skills and the generation of text-based learning guides. While these activities are useful, there is another and perhaps more important role that these educators can play in the establishment, development, maintenance and evaluation of workplace learning arrangements that are able to develop the skilful knowledge required for work. This paper outlines an approach by which these educators can assist the development of workplace learning environments through delineating the learning curriculum. It focuses on the role of vocational educators in the development of arrangements for learning in the workplace. In addressing this task it is necessary to emphasise teachers’ role as curriculum developers and organisers of experiences for learning, rather than their role as instructors. It is held that, in developing workplaces as learning environments, teachers may need to reconceptualise their role in assisting individuals to learn through ongoing everyday experiences in the workplace, rather than through didactic approaches to instruction. In particular, it may necessitate a de-emphasis of those instructional approaches which are so valued in educational
institutions such as TAFE colleges. The paper is structured as follows. Firstly, a focus on learning, rather than teaching is advanced, followed by a discussion about the appropriation of knowledge in particular situations. A model of the learning curriculum is then advanced.

**Focusing on learning**

Learning is now being conceptualised as the process and outcome of ongoing participating in everyday activities within a particular social practice. Referred to as appropriation (Rogoff, 1995) this process is viewed as being active, reciprocal, constructive and associated with engagement in socially determined activities. The focus of learning is therefore associated with activity (Leontyev, 1981) and the forms of guidance provided by both situation and social partnerships, which are themselves premised on historical, social and cultural factors (Wertsch, 1993). Consistent with this view is that engagement in routine and non-routine goal-directed activity is associated with learning, because these activities press learners into the transformational process of appropriation (problem-solving). It is held that while routine problem-solving reinforces existing knowledge non-routine problem-solving generates new cognitive structures. The situated nature of knowledge construction emphasises engagement in a particular community of practice which underpins concepts such as expertise, domains of knowledge and moment from novice status to full participation (expertise in a community of practice.

A community of practice is defined as a “set of relations among persons, activity and world, overtime and in relationship with other tangential and overlapping communities of practice” (Lave & Wenger, 1991:98). Workplaces are communities of practice, so are schools or parts of schools and TAFE institutions. Novices and experts are defined on the basis of their participation in the community of practice as being peripheral or full (Billett, 1995). That is, the degree by which they are able to engage in non-routine tasks, particularly those with high levels of accountability. If learning is associated with engaging in goal-directed activities (problem-solving) in particular social practice and that movement from being a peripheral participant to being a full participant is associated with becoming competent in increasingly complex or more accountable activities, then this sets out a basis for considering a conceptualisation of curriculum as a sequence of activities structured in such a way as to secure the goal of full participation. Hence, concepts such as competence or expertise are now being seen as being situational rather than generally applied. What may be expert in one setting may not be so in another. What may be routine in one setting may be non-routine in another. Taken together these views press for a
consideration of curriculum as something individually constructed, socially mediated and situated within a community of practice.

When considering the development of vocational expertise (full participation), from a constructivist perspective, curriculum needs to be conceptualised as something which is organised to permit and guide the construction of skilful knowledge by individuals through participation in goal-directed activities. In the case of vocational education, the development of vocational expertise, a goal for curriculum, can be viewed as guided participation in authentic vocational activities that will result in the appropriation of the knowledge required for expertise. This orientation acknowledges the individual as an interpretative and active participant in the transformative process of constructing knowledge. Structuring the experiences, and hence the activities for the learner provides a way of thinking about curriculum from this perspective.

In developing arrangements for workplace learning, it is necessary to identify and establish conditions which maximise workers' acquisition of vocational knowledge through guided engagement in authentic activities - the everyday activities of the work practice (see Brown, Collins & Duguid 1989). Because problem-solving is undertaken in authentic activities which develop the knowledge most likely to transfer to that setting. Hence, this approach to learning is favoured over the use of substitute activities and settings such as those occurring in classrooms and training rooms. Consequently, training programs which do not reflect authentic participation of everyday work practice are not strongly advocated, unless aimed at developing understandings which cannot be accessed in the workplace itself. Instead, the approach here focuses on structuring and guiding participation in everyday work activities as a means of securing effective learning experiences. It is through participation in authentic work activities (which includes the solving of routine and non-routine problems in everyday work practice) that opportunities to construct robust vocational knowledge are made available (Billett 1993a; 1993b; 1994a). The aim for vocational educators is to establish and develop a learning curriculum rather than a teaching curriculum, in workplaces, with an emphasis on learning activities, rather than teaching activities. It is held that individuals' construction of knowledge is through ongoing participation in the changing everyday activities of social practice, in this case work activities (Lave 1993). However, in order to realise the potential of workplaces as learning environments, certain conditions need to be meet and certain limitations must be addressed.

2. Learning - appropriation of knowledge through participation in everyday activities
Dewey (1916) proposed that individuals grow up in a social medium, and that their actions gain meaning as they exist and act in a medium of meaning and values. In this way, he suggests that learning through engagement in real-life activities provides a rich basis for appropriating knowledge. Only through gaining access to a real-life standpoint are individuals able to act meaningfully and purposefully as “situations might be said to co-produce knowledge through activity” (Brown, et al., 1989:32). Effective learning is therefore held to take place through situated activity using the physical environment and the tasks it provides, the co-operative construction of knowledge among groups of workers undertaking common tasks, and the culture of a specific work community (Brown et al., 1989). It is therefore erroneous, to claim that formal learning institutions are ‘de-contextualised’ and hence the knowledge constructed in these settings is broadly transferable across settings. There is little evidence that this is the case. There is a wealth of evidence that transfer from formal instructional settings has the same limitations of other communities of practice. This type of community of practice have strong and pervasive cultures, with their activities being shaped by the requirements of the institution, which may thereby place limits on transfer to other settings (Billett, 1994b; Raizen, 1989, 1991; Rogoff & Lave, 1984). Views about situated learning challenges the separation of knowledge from how it is acquired and used, with situation and setting being seen as inseparable from learning and cognition. Circumstances are not viewed as being neutral; they are an integral part of what knowledge is constructed (Brown et al., 1989; Lave, 1993; Lave & Wenger, 1991; Wertsch, 1993). Cross-cultural studies have examined the nature and consequences of learning which might be described as being authentic, such as navigation in Puluwat (Hutchins, 1979, cited in Scribner, 1984), construction work (Carraher, 1986), tailoring (Lave, 1977; 1990) and weaving in Zinacanteco (Childs & Greenfield, 1980). In the study of weaving, the skills developed were seen as being at least as transferable as those developed in schooling (Childs & Greenfield, 1980). That is, the knowledge and skills acquired through "informal" learning experiences were as robust and transferable as those developed through schooling. Significantly, the skills acquired through engagement in culturally authentic activities are not peripheral; they are crucial to the survival of individuals and their cultures. So, there is little reason to believe that somehow the activities that learners participate in formal educational settings are inherently likely to generate knowledge that is robust and transferable. These settings need to be considered as another form of social practice, which may not privilege the development of transferable knowledge. Rather it is the quality of the activities that individuals engage in, and their engagement with those activities which are likely determinants of whether robust and transferable knowledge is secured. Importantly, for this paper the approaches used to facilitate learning in formal learning settings are likely to be quite
inappropriate for organising learning in workplace. This is because instructional strategies and 
techniques may well be a product of a particular socio-cultural practice (teaching) within 
particular types of communities of practice (e.g schools, TAFE colleges, universities).

Lave's (1977) study of Liberian tailors' apprentices is useful when conceptualising curriculum as 
participation in social practice. She demonstrates how authentic work activities mediate learning. 
The apprentices’ activities in tailors' workshops are structured in such a way as to represent a 
hierarchy of tailors' tasks which apprentices have to learn. The garments produced by tailors also 
reflect values within Liberian society, with simple garments (undergarments and children's 
garments) requiring fewer skills whereas ceremonial garments requiring more complex skills and 
greater exactitude. The tasks undertaken by apprentices are, therefore, a manifestation of a 
hierarchical social ordering and structuring of activities. These tasks provide the basis for the 
development of layers of understanding about the significance of tasks and conceptualisation of 
those tasks. This sequencing of activities is termed the learning curriculum by Lave (1990). For 
example, the first tasks undertaken by apprentices are finishing off and ironing completed 
garments. This permits apprentices to develop an understanding of what garment pieces look like 
as they are being ironed, and to observe the form and standard of the completed product. 
Apprentices also commence learning by assembling simple complete garments, such as under-
drawers and shirts, and gain skills in constructing garments in situations where mistakes are 
tolerable. The apprentices work through a hierarchy of successively more complex garments, 
which represents the social hierarchy of tailoring activities and which provides higher levels of 
accountability.

The authenticity of the tailoring learning curriculum is useful in other ways. The apprentices 
work on real garments assisted by an assortment of mentors, tailors and other apprentices in the 
workshop who provided guidance and modelling. Apprentices are able to monitor their own 
performance against that of other learners and enjoy the benefits of direct and indirect guidance 
(Lave, 1990). There are also environmental clues such as completed or incomplete garments on 
which to model their work. Apprentices are also able to view both the processes and products of 
the workshop, which is conducive to the development of conceptual models. Lave (1990) also 
oberves that little in the way of explicit teaching takes place. In these ways, her study 
emphasises the primacy of the authenticity of activities in which novices engage. These activities 
are organised in such a way as to provide movement from peripheral to more complex tasks; as 
well as access to observation, opportunities to develop mental models, and rehearsal on less
critical activities and guidance, most of which is indirect, from experts and other novices; and also clues from the physical environment. In addition, and perhaps in consideration of fully appropriating the values and norms of a tailor, apprentices live in master tailors' houses in a street full of tailors' workshops (Lave, 1977; 1990).

The informative nature of engagement in authentic activities is exemplified in a recent study. In a warehouse which services a large chain of supermarkets, a novice pallet-packer used the configurations of packed pallets which were all around him in the warehouse as a library of possible solutions whenever faced with a novel packing situation, to determine the most suitable option (Billett, 1993b). In this way, the physical environment proved to be informative in a way that textbook examples and declarative examples cannot be. In the next section, ways in which vocational educators can assist in the process of organising workplace learning experiences are suggested in order to maximise the potential of workplaces as learning environments.

Studies in workplace learning have furnished evidence about the strengths and limitations of learning in workplaces through everyday activity (Billett, 1993a, 1993b, 1994a, 1995). In particular, the potency of the outcomes of guided participation in everyday work practice is acknowledged in this work. They also indicated that knowledge that is hidden, which is increasingly becoming the case with the advent of technology and complex forms of work organisation (Berryman, 1993), need to be made accessible to learners. Moreover, there is knowledge which by its very nature is inaccessible yet needs to be understood (e.g. virus, bacteria for health workers, force factors for construction workers). It is an array of principles, propositions and facts which is required for expertise.

4. Dimensions of the learning curriculum

In order to formulate a framework for the learning curriculum it is necessary to draw on the work of Lave (1977, 1990) and some of the findings of the workplace learning studies (Billett, 1993a, 1993b, 1994a, 1995). From this work it held that, the organisation of the learning curriculum needs to be linked to: (i) movement from peripheral to full participation in workplace activities; (ii) access to the product (goals) of workplace activities; (iii) proximal guidance from more expert others; and (iv) distal guidance provided by the physical as well as the social environment (see Figure 1).

4.1 movement from peripheral to full participation in workplace activities
It is necessary to identify a pathway of vocational tasks and activities which workplace learners need to access and move through to become competent (full participant in the workplace). Delineating this learning pathway is used to determine how workplace learners can move from the work activities undertaken by novices to those of experts. This pathway is founded on movement from peripheral activities to full participation in work activities - that is, from those activities which are less accountable and complex, to those which are usually more complex and may carry greater accountability (see Lave & Wenger, 1991). The development and sequencing of this pathway of activities need to accommodate two general requirements. The first is the sequencing of workplace activities that are of increasing complexity. This permits the learner to participate in incrementally more complex, and hence more accountable, tasks and goals in the movement from peripheral to full participation in workplace activities. This necessarily involves engagement in routine and non-routine activities. Secondly, the pathway has to afford learners the opportunity to access the procedures and processes, and importantly the products, of workplace activities. This planning these activities means that, early in these activities, opportunities must exist for learners to access and understand the outcomes of their work activities. This access enables the development of understanding about the goals and standards of those activities.

This means identifying the tasks which need to be delineated and sequenced as well as making judgments about how best these two characteristics of the learning curriculum can be ascertained. The procedure of identifying the learning pathway might be as simple as determining the sequence in which experts believed they acquired their skills and comparing this with the experiences of recent trainees. An analysis of this data can be used, refined and ratified by experts in order to generate an approach learning activity pathway. This pathway includes the structuring of these activities and provides the access to both the process (means of securing workplace goals) and the product (what those goals are). The identified pathway can be used to manage the sequencing of tasks which novices will have to access in their own journey towards expertise. It is quite likely that such structures will already exist in workplaces.

So, the sequencing of workplace activities that are of increasing complexity permits the learner to engage in more complex tasks incrementally and goals in the movement from peripheral to full participation in the community of practice. Such a pathway does not need to be a fixed sequence of activities to be undertaken in a step-by-step fashion. Rather a grouping of activities which can be accessed and undertaken by learners as opportunities arise in everyday work practice. Movement
through the pathway is likely to be premised on the ability of the novice to be able to successfully complete the tasks without the proximal guidance of the expert other.

4.2 access to the product (goals) of workplace activities
Secondly, the pathway has to afford learners the opportunity to access both the product and the process of the workplace activities. This means that within the learning pathway there has to be opportunities for learners to access and understand the outcomes of their work activities. This access permits the development of understanding about what their activities are contributing towards and set standards associated with those activities. For example, in one of the earlier studies (Billett, 1993b) it was reported that, as part of their training, warehouse workers were taken in a delivery truck to supermarkets to see the goods they had packed onto pallets being delivered. This experience allowed these workers to appreciate the importance of care and thoroughness in packing the pallets to withstand the rigours of long road journeys and the importance of arriving in a presentable condition. Making the goal accessible provides important goals for vocational practice, which become goals for learners. Hence, ideas about the basis for performance might be appraisable.
Constructing the Learning Curriculum
Adapted from Lave, 1977, 1990)

Distal Guidance
(physical setting, observation, listening)
4.3 Proximal guidance from more expert others

The investigations into workplace learning, referred to above, emphasised the importance of learners' interaction with expert others in the development of skilful knowledge. Consistently, in the three studies, access to experts was consistently valued highly. However, the workers that were learning decided who possessed expertise. Those workers who were acknowledged by others as being experts were seen as credible sources of knowledge. There would be no guarantee that someone entitled ‘the trainer’ or nominated workplace mentor would be granted this status by workplace learners. As knowledge is socially sourced interpersonally (interpsychologically), the guided support provided by more expert others is highly influential. A model of guided learning which can be used by workplace experts, is cognitive apprenticeships (Collins, Brown & Newman, 1989). This approach to guided learning, seems particularly applicable for use by expert others to make potent their proximal guidance of workplace learners. The cognitive apprenticeship model aids the development of learners' self-monitoring and self-correction skills, and the integration of the skills and conceptual knowledge required for expertise. This approach to guiding learning, which comprises (i) modelling, (ii) coaching, (iii) scaffolding and (iv) fading, is described in Appendix A. This approach has the ability to make accessible conceptual knowledge which is remote and provides a basis for the development of procedures which permit goals to be secured in the workplace.

4.4 Distal guidance provided by the physical as well as the social environment

The on-going everyday vocational activity which engages workplace learners in both routine and non-routine problem-solving is the basis for the development of vocational knowledge. This ongoing experience is essential for the development of robust vocational knowledge. Indirect guidance is part of this experience which includes learners listening to and observing other workers. Models of practice, and standards by which learners can measure their progress against, are provided by this indirect form of guidance (Lave, 1990). Equally, the structuring of experience by the community of practice and the cues and clues provided by the physical environment provide another form of distal guidance. However, it is within this area that a key limitation of workplace learning can be found. There may well be a reluctance for some experts to share their knowledge and also barriers for learners seeking to accessing the learning pathway. In Japanese corporations supervisors pass on their knowledge to subordinates, confident in the knowledge that as promotion is based on seniority there is little prospect of their being displaced by those to whom they have assisted (Dore & Sako, 1989). In the studies mentioned above, it was evident that the sharing of knowledge within organisations varied. Those organisations in which...
workers enjoyed broader discretionary roles and had limited barriers to work practice appeared to offer richer learning environments.

These four dimensions of the learning curriculum provide a basis for vocational educators to develop workplaces as learning environments able to secure the knowledge required for full participation.

5. Conclusion: constructing the learning curriculum

This paper has proposed a curriculum development role in workplace learning for TAFE teachers which draws upon their professional knowledge in ways which may be different from how they engage in educational practice in VET institutions. It has proposed that arrangements for learning must be privileged rather than arrangements for teaching. This is not a trite distinction. It has been proposed that TAFE teachers need to capitalise upon the many contributions to learning which are provided in the workplace and also attempt to inhibit the shortcomings evident in recent research. Some of the tasks associated with developing the learning curriculum may not be complex. Necessarily, they need to reflect the requirements of particular settings. For example, the procedure to delineate the learning pathway might be as simple as determining the sequence in which experts believed they acquired their skills and compared this with the experiences of recent learners. An analysis of this data might then be used and refined in order to generate the most effective learning activity pathway, and the structuring of the opportunities so that the pathway provides the access to both the process (means of securing goals) and the product (what those goals might be). The identified pathway can be used to manage the sequencing of tasks which novices will have to access. An approach to constructing the learning curricula is likely to follow a pathway which seeks to determine: (i) what it means to be a full participant in a particular practice (what defines an individual who is expert in the practice); (ii) what are the areas of knowledge to be acquired by novices; (iii) what is the sequence in which this knowledge has to be acquired; (iv) what areas are difficult to learn about (complex, opaque) to focus proximal guidance) and what goals for performance need to be acquired on the pathway.

Such an analysis will generate rich information about vocational tasks, their relationship to a particular community of practice and also how a learning curriculum might best be established. In doing so, it advocates curriculum intent, formulates a set of experiences to achieve these intents and provides a means to determine if such a goal can be achieved. It is likely that some assistance will be required to assist expert others in the workplace implement approaches to guided
participation such as that outlined in Appendix A. The concern is that experts in the workplace may easily slip into the familiar didactic mode of instruction which they may have witnessed and experienced during either their compulsory schooling or tertiary education.

In sum, this paper has advocated a view of curriculum associated with engaging in social practice. This view situates the development of curricula within a particular practice and through guided participation in that social practice. Drawing on constructivist views it is advocated that the construction of knowledge is an individual process, albeit embedded in and extricably associated with a community of practice. That association includes a reciprocal relationship between the individual and the environment in which to engage in activities. In establishing a pathway of experiences, a learning curriculum is advanced which takes account of both direct and indirect guidance and the engagement in activities which are potentially generative of robust knowledge. The ideas in this paper are drawn from a review of the literature and studies of workplace learning. More research is needed to refine the ideas presented in this paper. More importantly, these ideas need to be trialed in workplaces to determine their worth and in what ways they need to be transformed. It is through such endeavours that TAFE teachers will be able to extend their professional knowledge to develop effective learning arrangements in the workplace.

References


Appendix A - Model of proximal guidance

**Modelling** is the process whereby the expert executes a task with learners observing and building a conceptual model of what is being demonstrated which assists learners to successfully accomplish the task. However, it may require the externalisation of the internal (cognitive) procedures that experts deploy when utilising their procedural and conceptual knowledge. Experts may need be instructed to verbalise their thinking to assist learners, eg. - "the reason you place the pin in first is to .." "if the gauge comes up too quickly it means that... "what I am considering at this point is...” Observation allows learners to observe task completion and be offered an account of how the expert went about the activity. An important quality of effective modelling is to make accessible any knowledge which is opaque. Therefore, experts may need to use analogies, explanations, diagrams or probing questions to make accessible to the learner that knowledge which is not accessible by visual means.

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<th>Modelling →</th>
<th>Coaching →</th>
<th>Scaffolding →</th>
<th>Fading</th>
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**Coaching** is the process of observation and monitoring by the expert as learners carry out activities. Experts will offer hints, feedback, clues and demonstrate tricks of the trade to assist learners achieve desired outcomes. Coaching may also involve repeated demonstrations of a task, or part of the task. Supportive comments are also part of the coaching phase. Asking learners to consider where else they can use a particular procedure or suggest changes in approach given the different application of a procedure or process "If you were packing a pallet with a new type of box what would you need to do?". Coaching may also serve to direct learners’ attention to aspects of the task that is known, but temporarily overlooked. Coaching interaction is usually immediately related to specific events or problems that arise as learners attempt to achieve the target task. The intended outcome of the coaching process is to guide learners' performance to become closer to that of the expert so that learners approximation of tasks becomes increasingly mature (Gott, 1989).

The on-going support that experts provide is referred to as **Scaffolding**. This support takes the form of providing learners with opportunities to acquire knowledge and skills that are within the scope of the learners' ability. Additional suggestions or help, take the form of supports such as general reminders which might comprise scaffolding  "always start at the centre back and measure down from there and then move down from the chest to the waist and hips". Scaffolding may require the expert to carry out a part of the overall task that the learner cannot yet manage.
Scaffolding offers a co-operative basis to problem-solving between the expert and the learner in which the express intention is for the learner to take as much of the responsibility for the activity as possible. A requisite for such scaffolding is an accurate appraisal, by the expert, of the learner's current skill level and the difficulty of the task. Finally, Fading consists of gradual removal of support until learners are able to conduct the task autonomously. This more distant support might lead to decisions about providing opportunities to engage in a range of more complex tasks. The development of experts' ability to use the strategies associated with cognitive apprenticeships, some of which they are probably using intuitively, is a useful undertaking.