

Based on experience: teaching and learning on the factory floor

Marilyn Kell University of Western Sydney

Abstract

Today's notion of multiskilling demands that workers are proficient in a range of workplace tasks. Skills are taught either in work-based classes or in the work site. Trained teachers teach generic skills such as the use of office technology, crane operation or forklift driving. However, as Dymock and Gerber (1999) demonstrate, the interpretation of these skills varies depending on the specific workplace context. Specialist operators on site teach the use of specialist heavy machinery.

In a recently completed study of workers who self-report literacy difficulties (Author, 2005), two interesting cases of high quality workplace teaching emerged. In the first instance the teacher had neither completed high school nor gained any post school qualifications. The second was a case of a supervisor's determination to help a worker reach his workplace potential. This paper examines both cases, demonstrating how they extend Billett's (2001) concept of workplace affordances resulting in troublesome workers becoming highly productive and highly valued employees. In addition, it draws on these cases to illustrate how the constructivist concept of the zone of proximal development is expanded and functions in adult learning settings.

Introduction

This paper reports on part of the finding of a doctoral study (Kell 2005). It demonstrates how the values and importance placed on functional literacy, as indicated in workplace credentialing, does not always recognise workers' multiple literacies.

With the growth of "global capitalism" (Kell 1998, p. 5) Australia has seen debates about a link between literacy levels and work skills. McIntyre and Solomon (2000) argue that significant changes to the value and importance of literacy, most recently adult and workplace literacy, that impact on social, economic and cultural institutions have occurred in Australia in response to the forces of globalisation. These forces were the drivers of documents such as the *National Policy on Languages* (1987) and *Australia's Language: The Australian Language and Literacy Policy* (1991). The latter, exemplifies human capital theory which explicitly connects "improvement in literacy skills to enhanced employment prospects" (Falk 2001, p. 207).

This theory measures human beings in terms of their monetary value. It proposes that "human capital acquired through formal education has measurable value in terms of economic and social outcomes" (OECD/Statistics Canada 1997, p. 31). That is the skills learned in formal education settings impact on economic and social performance.

The Australian context

As Australia has moved from a resource to a manufacturing and then an information technology economy, the debate around literacy as an indicator of human capital has gained momentum (Lo Bianco 2001). In response, workplace literacy has evolved, relatively recently, from the field of adult literacy as a result of “the coupling of new discourses about work and workers’ skills with the functional literacy discourse” (Castleton 1999, p. 17). In this dominant discourse on the role of literacy at work, the workplace is seen as the canvas on which actions are depicted. Inherent in this is a notion that workplace literacy can be taught as a set of decontextualised skills designed to enhance productivity (Gowen 2001). Such an approach “focuses only on job-related tasks developed by management and outside experts” (Folinsbee 1995, p. 64) that assume a universal set of skills applying across jobs, people and social structures (Gowen 1992: 130). In Australia these assumptions became policy with the introduction of competency-based training (CBT), the framework for workplace training programs.

Embedded in the competencies, literacy is regarded as a set of individual, stand-alone, linear and sequential skills “necessary to complete particular tasks” (Castleton, 1999, p. 11) and demonstrate capability. Adult literacy teaching models, such as this are, characteristically, often “based upon classroom strategies initially designed for children” (McHugh, Nevard & Taylor 2001, p. 183; see also Falk & Millar 2001). The use of school-like techniques which have little regard for the “multiplicity of literacies for different purposes in different contexts” (Watson, Nicholson and Sharplin 2001, p. 16) that are characteristic of the workplace is the basis for a major criticism of workplace literacy teaching in a CBT model.

Folinsbee (1995 p. 64) argues that reductionist models do not reflect the needs of individuals or “the complex ways in which people perform work”. (Kell (2000 p. 3) contends that workplace training programs serve only to reduce “broader notions of literacy, focussing on individual improvement”. This view is supported by Brown (2000 5), who describes vocational education in Australia as “too narrowly conceived, instrumental, derived from technicist notions of work, corporate in a number of senses, hegemonic and undemocratic”. The result is that workplace teaching has become typified by the use of increased levels of text-based material in decontextualised settings and learning has been “defined as the ability to recognise the appropriate information and copy this into the appropriate space on the assessment sheet” (Brown 1992, p. 41). In short, workplace knowledge has been reduced to mastery of a narrow and specific set of decontextualised skills that need to be demonstrated to obtain the next ‘ticket’ and generate further status and recognition.

The study

Impetus for the study arose from two sources. The first was my earlier work with a group of adolescents who struggled with literacy (Kell 1997). The second was a media and political campaign in the late 1990s about a decline in literacy standards and its effect on employment and national productivity. Spending time around my father’s timber mill as

a child I became aware of the numbers of workers with poor literacy. I wondered how they survived in the workforce at a time when literacy and workplace productivity were explicitly linked.

Workers who are deemed to have inadequate literacy skills have a difficult time advancing in the workplace under a CBT system, particularly one in which literacy achievement is embedded. This is because they are considered to have limited ability to generate and reproduce texts as assessed by the National Reporting System (NRS) framework. Working from a sociocultural perspective I investigated the uses of literacy by nine men who self-report literacy difficulties. The cases of two men, James and Stalin¹, demonstrated workplace teaching that went beyond a focus on qualifications and documentation. The training offered by or to them relied heavily on the socially and culturally interactive processes inherent in their particular work sites.

Methodology

This was a qualitative study. Essentially, it developed an in-depth analysis of multiple cases, drawing extensively on the narratives of nine primary participants over several sites. In exploring “the meanings of behavior, language and interactions” (Creswell 1998, p. 58) of individuals in social situations, the methodological approach of this study also appropriated some elements of the ethnographic tradition. In addition, the use of interpretive analysis of the narrative data was typical of the biographical tradition, allowing the researcher to use interview data to isolate and analyse particular critical moments in a person’s life to explain individual trajectories (Creswell 1998). The lens through which this data was analysed was *Communication, collaboration and culture: The national framework of adult English language, literacy and numeracy competence* (Cope and associates 1995). This framework was selected as an appropriate analytical instrument because of its emphasis on text and task (p. 58) as opposed to the NRS focus on text. Through an iterative three-stage process the individual cases were reduced to a single statement.

Data for the study consisted of a series of audio-taped, open-ended interviews with each of the primary participants (45 interviews in all) resulting in narratives of workplace learning experiences, which were initially analysed on an individual case basis and then across cases. Supporting evidence for triangulation of these narratives was also in the form of eleven open-ended interviews. Snowball (Lincoln and Guba 1985; Morton-Williams 1993; Patton 1980 & 1987; Robson 2002) or “chain sampling” (Miles and Huberman 1994 p. 28) enabled primary participants to recruit secondary participants for this aspect of the data collection.

Participants for the study came from two cities in two states in eastern Australia. Gatekeepers, who were asked to seek out individuals who matched specific criteria, recruited the primary participants. These criteria included: entering the workforce with literacy skills that they considered insufficient for the job they were doing; holding full-

¹ All names are pseudonyms chosen by the participants.

time employment for a sustained period (at least two years) at the date of recruitment; being over the age of eighteen; and being a native speaker of English.

The occupations of the primary participants ranged from assembly line to clerical. None had completed high school, although four had left school prior to year 12 to take up apprenticeships. The others had no formal post school qualifications. In age they ranged from early 30s to late 50s.

James and Stalin worked in different sections of Firebrand, a large heavy machining complex. At the commencement of data collection in April, 2000 James had been employed by Firebrand for 17 years. Stalin had been made redundant from Firebrand after 21 years. The next section will briefly introduce James and Stalin.

James - background

In a single sentence James' supervisor, Mick, encapsulated his working life experiences:

We've taken a bloke who was fairly destructive to our business to being very, very constructive for our business (Mick², Lines 141-143).

James' working experiences were shaped by events in his school years. He was placed in a class for students with lower abilities because of his poor literacy skills. In his estimation all but one of his teachers "didn't have a lot of patience if you couldn't keep up ... they just let you go" (James Interview 13 April 2001, Lines 18-20). He resented being put in the low ability class which allowed him to be identified, labelled and stigmatised him.

James left school, aged fifteen, able to read "individual words but not sentences or anything like that" (James Interview 13 April 2001, Line 6). His "first job was a real bad experience" (James Interview 13 April 2001 Line 25) because he was teased about his poor literacy skills. On reflection he considered it was "lucky I could look after myself, really, 'cause they were real awful to me" (James Interview 13 April 2001, Lines 55-56). "Looking after myself" seems to be a euphemism for brawling or physical violence.

Having realised the power of physical violence during his short-lived apprenticeship, James continued this pattern in his next job at a glassworks. When the glassworks closed he became unemployed for approximately two years before commencing at Firebrand.

Stalin - background

This participant chose a distinctive pseudonym as a constant reminder that he was "someone that survived" (Stalin Interview 25 May 2001, Line 554) an inhumane (Stalinist) regime, that is school and school teachers. His memories of school are of "harassment [and] self-esteem problems" (Stalin Interview 26 July 2000, Line 5). Philosophically he recalled that he "got pretty wild and angry" (Stalin Interview 15 December 2000, Line 227) because he could not cope with being embarrassed when he

² Mick interviewed on 8 March, 2001.

was made to look foolish. His unruly behaviour resulted in punishments such as being removed to a storeroom or sitting in a corner with his back to the class (Stalin Interview 15 December 2000). This type of humiliation induced in Stalin a real fear of looking foolish or being embarrassed and a consequent timidity.

Stalin was the only participant in the study who received any formalised special tuition when he was at school. This resulted from his placement in a special facility for intellectually impaired high school students following many years of falling behind in the regular classrooms, although he has never been assessed as having an intellectual impairment. One legacy of the tuition was that he had good mechanical reading skills but lacked confidence in writing and comprehension (Stalin Interviews 26 July 2000 & 27 September 2000).

Stalin did not want to leave school, although he “didn’t like school very much” (Stalin Interview 26 July 2000, Line 26). He worked in two or three short-term jobs before he found work with Firebrand where his father worked. He remained with that employer for 21 years until he was made redundant in July 2000 and also remained living at home with his parents.

Learning at work

At Firebrand both James and Stalin continued the behaviours they had learned. James was teased and bullied at work and reacted accordingly. “When you had arguments or anything, you settled it. Like you just went out the back and settled it and no one was worried” (James Interview 15 December 2000, Lines 337-338). As a consequence “he had a history of disruption” (Mick, Line 113). Stalin was timid and compliant. As he was shifted from workshop to workshop he tried to maintain a low profile by engaging in low skilled tasks such as sweeping the floor. Both were anxious to hide their literacy difficulties from their colleagues because “you don’t want people to know that you didn’t read” (James Interview 10 March 2001, Line 334).

James – at work

Despite his propensity to settle arguments by fighting, over the years James became highly skilled in operating a machine that made barbed wire (the “barb machine”) and had, by default and not certification, become a senior operator.

However, around the end of the 1990s (fifteen years into his time at Firebrand) an incident occurred at work that changed the way James perceived his role in the workplace. He described this incident and his colleague, William, confirmed it, noting the “huge change” (William³, Line 65) it had made in James’ attitude and focus. In essence, despite their concerns about his disruptive behaviour, Firebrand management were forced to transfer James as the senior operator into a new area managed by Mick. Being new to the site Mick had not come in contact with James but knew him by his unfavourable reputation.

³ William interviewed on 8 March, 2001.

James - a teacher

As far as Mick was concerned transferring James to the new barb mill was an opportunity for a new start. The two had never worked together and Mick found that James' "behaviour was nothing like ... what people had said he was" (Mick, Line 121). Most importantly Mick felt he was able to manage James. By recognizing his senior operator skills and offering him opportunities to be responsible for and run the barb shop Mick found that he had a "very effective operator" (Mick, Line 120). One of the opportunities he was given was to teach novices how to operate the barb machine.

James described the following steps in his teaching process. First, he sits and chats with the learners to find out how committed they are, because: "if they're not real keen and that, well, you're going to have difficulties teaching" (James Interview 10 March 2001, Lines 15-16). He then shows them all the safety aspects of the machine. The next step is a demonstration of how to thread the wire followed by practice sessions.

He needs to be very patient at this stage because he recognises that novices are going to be "all thumbs and hands" (James Interview 10 March 2001, Line 34). Their awkwardness means that they have to be watched constantly and that they need time to grow accustomed to the procedure. Most trainees "are scared of the machinery and scared of the barbed wire" (James Interview 10 March 2001, Lines 49-50). William commented that:

He's a good teacher... He teaches by showing. He's got a fair bit of patience. He doesn't mind going over things. I've seen him teach people. ... and he shows them how to do it. He'll pull something to bits. "This is how you fix it. This is how you fix it" again and again. "Now you fix it".
(William, 116-121)

After one week the trainees feel more comfortable around the machinery and have learned to handle the wire with a *soft touch* (James Interview 10 March 2001, Line 46). Probably the most important lesson of the first week is to be relaxed and comfortable around the machinery. James achieves this by being "very friendly ... [and] making them [the trainees] talk and have jokes" (James Interview 10 March 2001, Line 59-60). At the end of four weeks of training he reminds the new operators that he is always available to help them with a problem because "a lot of things don't happen in that four weeks" (James Interview 10 March 2001, Line 78). Finally, he praises his trainees when they learn a step of the procedure without expecting them to mimic or exactly copy his every action. This attitude, that demonstrates an understanding that there is no one correct method means that James is now valued for his teaching skills. In Mick's opinion:

His teaching skills are good. He sets a very high standard. He won't progress people through the process until they've learned each particular area of what he's trying to teach them to his satisfaction. (Mick, Lines 94-97)

Stalin – at work

After seventeen years at Firebrand Stalin was forced to find another job in the complex. He applied for and gained a position in the reconditioning yard where Ray was his supervisor. Stalin had maintained the habits he had brought with him to Firebrand and had developed a reputation of being slow to learn. It was his way of keeping out of trouble so that he was not bullied.

By the time Stalin arrived at the reconditioning yard his self-confidence was so low that, “he wanted to do nothing. ... He didn’t really want to get in there and do a real lot. Whatever was the simplest or easiest for him” (Ray⁴, Lines 349-351) would do, even sweeping the floor. Ray assessed him as being “scared [and] unsecure [sic]” (Ray, Lines 376-378). The imperative for Stalin to achieve was that Firebrand announced the closure of part of the plant, including the reconditioning yard. Redundancies were to be based on the level of training gained. Already aware that Stalin had problems learning, Ray decided to take “him under my wing because he seemed like a person that needed a bit of coaching” (Ray, Line 6). It was an important decision that had long-term implications for Stalin.

Ray - a teacher

Although he had no formal teacher training Ray, as a leading hand, had “done a lot of courses ... to be ... a foreman [or] a supervisor” (Ray, Lines 13-15). Ray’s philosophical stance, that with “a little bit of time and little bit of encouragement [most trainees] seemed to go a lot further than what they [had believed they could]” (Ray, Lines 59-60). He noted that over the years he had seen workers who reacted negatively to impatient supervisors. In his experience giving “them a little bit of time and little bit of encouragement” (Ray, Lines 59-60) resulted in better than expected outcomes.

However, Ray knew that, in an era of multiskilling, Stalin “had to start from the bottom and ... go from Level 1 to Level 3” (Ray, Lines 39-40). Achieving Level 3 entailed learning many new skills including the operation of heavy machines such as cranes and grinders. It would not be an easy task. Ray was to discover that with encouragement Stalin could learn new skills:

... but he always needed a little bit of help to get along. So therefore it wasn’t just necessarily just showing him once or twice. It was showing him quite a few times how to do things. And in some aspects of it tended to get like a little bit annoying, ... ’Cause you could actually show him things one day and the next day he was back asking the same questions. So you had to be ... fairly persistent ... with him because ... it could get annoying. It could get a bit frustrating. (Ray Lines 48-55)

He decided to set targets for Stalin which he “never thought that he couldn’t do” (Ray, Line 117) even if it took longer than other workers. From Stalin’s perspective Ray’s “expectations of me workwise were far more than I thought that I could do” (Stalin

⁴ Ray interviewed on 9 March, 2001.

Interview 6 March 2001, Lines 255-256). Ray's approach to Stalin was: "If you can show me that you're interested and you've got the enthusiasm to do it, you've got all my time and I've got plenty of time to give you" (Ray, Lines 119-121).

Unsurprisingly, Stalin cited patience as Ray's strength. He was called on many times to exercise patience in the years that he worked with Stalin, who "seemed to lose things ... he could do it one day and then the next day he mightn't have been able to do it" (Ray, Lines 112-114). Despite this Ray responded relentlessly, sometimes twenty or more times in an effort to ensure that Stalin understood how to operate a particular machine. In addition he patiently tutored Stalin when there was a maintenance issue with a machine, as this extract illustrates:

Sometimes he'd just come back to you and say, "Look, I've done this. It's not workin'." ... and I'd go down and I'd say, "Well." He said, "Well, I can't understand why it's not going." And I'd say to him, "Look, we'll go and have a look around the machine," because that was part of your job to do it. And then we'd go and have a look at it. And I'd say, "But the grinder hasn't been filled." And he'd say, "But I did do it in the morning." And I know what he told me was true. But what he'd actually done would've been in the reverse. So he hasn't actually filled it ... because he hadn't done it properly. (Ray, 96-106)

It is important to note here that Ray did not undertake the repair for Stalin or tell him how to do it. He insisted that Stalin verbalise the problem solving process. One outcome was that Stalin began to take responsibility for his actions.

As Stalin progressed through Levels 1 and 2 Ray was always there. He kept convincing Stalin he could achieve at higher levels. He believed that Stalin was trainable and that when he achieved a goal he should be recognised, nor did he expect Stalin to thank him:

I said, "You've done it yourself." And to me that meant more to him and then when he come back in the next day or the next, he was ten times better than what he was [previously]. (Ray, Lines 541-543)

Stalin demonstrated to Ray that, once trained, he could "complete tasks independently ... find and access familiar and unfamiliar textual and other information sources as necessary and ... understand how [his] work activities fit[ted] into the overall goals and practices" (Cope and associates 1995, p. 49) of the reconditioning yard.

One of the issues Ray had to contend with was Stalin's timidity and fear, a legacy of his school years. "It'd only take that one person to put him down and his confidence dropped so quickly" (Ray, 543-544). Stalin had little conception of positive group dynamics, would not willingly attempt new tasks and was fearful that everyone in the reconditioning yard would ridicule him if he made a mistake. As Ray observed:

that sort of thing seemed to worry him. He thought that he was the only person in that yard that somebody was laughing at because he bugged up. But they weren't ... but he took it more personally, I think. (Ray, Lines 401-403 & 408)

On occasions Ray had to point out that other team members had made mistakes that others had laughed at. Understanding that mistakes were natural and normal helped Stalin to deal with this lack of confidence.

Gaining vocational certificates also built Stalin's confidence. The more certificates Stalin gained the more confident he became of his own ability:

He ... went from working just say basically on the floor, to grinders, to crane driver, to thermomatic operator, to inspector, to all these things he, sort of, as he kept going and he kept building on it his confidence built more and more all the time. (Ray, Lines 226-229)

As a result of his increased confidence Stalin began to demonstrate higher order skills of analysis and negotiation. This was evidenced in his work on the Transitional Steering Team (TST), the committee charged with establishing *infrastructure* (Stalin Interview 15 December 2001, Line 192) to facilitate an easy transition, managing the closure of the plant and the redundancy of the workers. Ray asked Stalin to attend TST meetings even though Stalin believed he had nothing to contribute. In order to gain the best redundancy conditions for himself and his colleagues he became a very active member of this committee. Stalin became so committed to the TST that eventually Ray handed over responsibility for the reconditioning yard on the committee to him.

These narratives have provided an outline of the teaching methods of two successful workers who do not have teaching qualifications. The next section analyses aspects of their teaching strategies that suggest why, from a sociocultural perspective their strategies work.

Analysis

The narratives of and about Stalin's teacher, Ray, and James teaching have several similarities even though they are told from different perspectives. The commonalities are an awareness of the student (in terms of background and needs), time, patience, recognition that everyone makes mistakes, belief in their students' ability to learn, and an imperative for students to take responsibility for their actions. The last of these, the importance of students learning to take responsibility for their actions is an indicator that teaching and learning in these two instances was built on a sociocultural rather than a behaviourist paradigm.

Learning from a sociocultural perspective

Sociocultural theories of learning are premised on the recognition of "human cognition and learning as [being] social and cultural rather than an individual phenomena" (Kozulin, Gindis, Ageyev and Miller 2003, p. 1). Both James' trainees and Stalin were learning more than how to operate complex, heavy machinery—more than memorise routines and procedures. They were learning "machine knowledge" (James Interview 14/15 December 2000, Line 214)—to understand the machines and the cultural of the work setting. The latter was difficult for James who explained that the culture in the new barb shop required "the blokes to do just everything. ... work twice as many machines

and do everything until they dropped” (James Interview 14/15 December 2000, Lines 248 – 250). He failed one trainee because “I had a great feeling that he didn’t want to do it [work eight machines simultaneously]” (James Interview 10 March 2001, Lines 129-130).

Learning, from a sociocultural perspective, is “not simply the internalisation of knowledge and skills by an isolated mind” (Erickson 1996, p. 29). Research about the experiences of office practices graduates indicates that off-site learning of procedural skills may not be sufficient for the individual to function efficiently in the workplace. Learning from a sociocultural perspective involves complex social and semiotic interactions that are apparent in learning in the office and on the factory floor. Sociocultural theory is now widely used in educational research and pedagogy. Examples include second language learning (Donato 2000; Ohta 2000), learning disabilities (Gintis 2001), Authentic Pedagogy (Newmann and associates 1996); Productive Pedagogy (Education Queensland 2001; Lingard, Hayes, Martin and Christie 2003) and Effective Pedagogy (NSW Department of Education and Training 2003).

One of the early proponents of a sociocultural theory of development was Lev Vygotsky. Development, Vygotsky (1978) argued, has its basis in the social nature of the evolution and transmission of cultural traditions and symbols (tools and signs). Lower (elementary) mental functions are transformed into higher mental functions through the mediation of tools and meaningful signs (semiotics) in conjunction with social interaction. Learning, then, is a process of the individual moving from lower to higher mental functioning by means of the mediation of culturally constructed psychological tools and signs in social contexts (Vygotsky 1978). Borrowing from Pierre Janet (Valsiner 2000), Vygotsky demonstrated that mediation occurs twice. First, it is largely an oral and interpersonal process, involving small groups (usually dyads or pairs) (Valsiner and Van der Veer 2000). This aspect is apparent in the cases of James and Stalin where the teachers worked for varying amounts of time with the learner. Second, as the individual acquires greater mastery and control of new skills, a process of mediation enables those skills to be internalised and appropriated. Skilled use of social and cultural tools and signs thus becomes an intrapersonal process. When James knew that his novices could operate eight machines competently he was satisfied that training was complete because the learner had internalised the processes that varied between machines. Likewise when Ray knew that Stalin could solve problems that occurred when operating specific machines he was satisfied that he had become a skilled operator.

Towards the end of his life Vygotsky demonstrated the practical application of this two-step mediation process when he discussed the zone of proximal development (ZPD). Although not central to his theory the ZPD is “probably one of the most widely recognized” (Chaiklin 2003, p. 40), selectively borrowed (Valsiner 2003) and cited (Daniels 1996; Gallimore & Tharp 1994; Newman, Griffith & Cole 1989) of Vygotsky’s concepts. To some it is “considered to be one of the major contributions of Vygotsky to the social educational psychology” (Valsiner 2003).

Vygotsky argued that teaching and assessment should focus on future development, not past achievements. He explained the ZPD as:

the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult collaboration or with more capable peers. (Vygotsky 1978, p. 86)

Sociocultural theory on the factory floor

Both James and Ray used techniques that helped them to establish the actual development level of the novices they worked with. James made a point of discussing the task with each new trainee in order to determine his readiness to learn. In difficult cases Mick relied on James's judgement as to whether a man would *be teachable or not* (Mick, Line 475). Through observation of a trainee's *interest ... [and] the way they handle the machinery* (James, Interview 10 March 2001, Lines 275-276) he instinctively knew if the training would be successful. Ray observed that Stalin was insecure and had a tendency to *run away from things* (Ray, Line 180) that he thought were too difficult or dangerous. Additionally he noted that Stalin lacked confidence, often commenting "*I can't do it.*" (Ray, Lines 73, 80, 234, & 353) when asked to tackle a new task. Both Ray and James worked from the principle that when workers felt confident and competent with a particular machine they would be able to deal appropriately with problems that arose with the operation of that machine.

For James there were two goals of training. The first was the safe and efficient operation of a minimum of eight machines, running continuously. The second was working co-operatively and collaboratively with other workers in the context of a small shift team of three operators. He would not consider that the training program was complete until these two goals were achieved or he came to the conclusion that the man was not trainable. As noted previously he valued for the thoroughness of the training he provides.

One of the major decisions James had to make was the degree of collaboration or assistance he needed to provide. He determined this on an individual basis, one reason why he did not have a strictly time-based program. This aspect of James' personality intrigued Mick. Despite possessing *a fairly short fuse James ... seems to have some patience for teaching people* (Mick, Lines 473-474). It is one of the strengths of his teaching technique.

As has already been noted Ray found that Stalin rarely learned anything at first teaching. Frustrating as this was, the need to reteach was not significant to Ray. His focus was on helping Stalin to achieve a good redundancy payout. However, an unexpected outcome was that the more Stalin learned, the more confident he became.

Discussion

ZPDs operated in the barb shop and the reconditioning mill. An essential element of any ZPD is assessment of the novice's knowledge and skills with and without assistance. The data demonstrated that both James and Ray assessed their trainees, albeit in an informal

fashion. Mostly assessment in the work site was observational and/or oral and assessed attitude, knowledge and commitment rather than knowledge of a structured set of skills.

Teaching in the barb shop and the reconditioning mill illustrated many of the concepts that underlie the ZPD such as learning preceding development and expert others guiding learning. However, it also demonstrated one of the criticisms of the ZPD that are currently emerging in the literature. Van der Veer and Valsiner (1991 p. 343) for example, “suggest that [Vygotsky] conceived of the environment as a static background to the dynamically developing child”. Adult backgrounds are not static and the data demonstrated that the dynamic backgrounds of James and Stalin were vital for the development that occurred at work.

Analysed on the framework developed by Cope and associates (1995) and modified to include a nil competence level James advanced his levels of competence across all six aspects of literacy (Table 1). While his ability to teach effectively may be regarded as “machine knowledge” teaching required him to be consultative and collaborative, to work constructively in a team, to understand and promote the occupational health and safety aspects underlying the training, and to comprehend the goals of Firebrand in respect to changing workplace standards. Analysis of James story, of which teaching is only one aspect, demonstrate that he gained and demonstrated much more than “machine knowledge” without any major advance in functional literacy skills.

James explained that his approach to teaching derived from his school experiences. He felt disadvantaged because his teachers “relied on, like, what you could read and do things. They didn’t explain a lot and you never picked anything up. You always missed parts” (Interview 4, 157-159). Literacy skills also impacted on his teaching techniques. Since he could not read the training manuals he taught using oral instructions and demonstration. He was confident that that his technique was superior to the training manual because he believed that it was not possible to read how to operate a complex machine (James Interview 19 March 2001).

Table 1: Comparison of James’ stages of competence over time

	Task	Technology	Organisation	Identity	Group	Community
Collaborative	λ	λ	λ	λ		
Independent	λ λ	λ λ w		λ	λ	λ
Assisted	λ c λ		λ	λ	λ	
Nil				λ c	λ c	λ

Key: c = communication

w = writing

λ = prior to working at Firebrand

λ = working at the new barb mill

(Kell 2005, p. 256)

For Stalin to make the progress Ray expected, the focus had to be on the behaviours Stalin had learned at school — timidity, fear of ridicule and escaping from difficult tasks, rather than on the procedural skills of operating specific machines. Working in the principle that Stalin needed time and practice especially as “he was willing to have a go” (Ray, Line 126) when he found himself in a supportive environment, Ray became the

mentor to whom Stalin turned. That Ray accepted this role instead of rejecting Stalin as a waste of time was also important in Stalin's development.

Table 2: Comparison of Stalin's stages of competence over time

	Task	Technology	Organisation	Identity	Group	Community
Collaborative	λ		λ	λ	λ	λ
Independent	λ	λ	λ		λ	
Assisted	λ	λ	λ	λ	λ	λ
Nil		λ co				λ

Key

co = comprehension

λ = before starting at Firebrand

λ = time in the reconditioning yard

(Kell 2005, p. 264)

Table 2 summarises the analysis of Stalin's story using a modified version of Cope and associates (1995) framework. Unlike James, Stalin had some functional literacy skills when he started at Firebrand. However, his time in the reconditioning yard under Ray's tutelage provided opportunities for Stalin to learn new skills and enhance others. Stalin also undertook classroom training, giving him the credentials to operate particular machines. As indicated by Ray, however, gaining the credential was only the first step for Stalin. As a consequence of the supportive culture in the reconditioning yard Stalin used the credentials to gain more expertise in the "doing" aspect of the task. So although Stalin was given a mark for the functional skills learnt in class, it was the contextual social and cultural ways of doing that allowed Stalin to demonstrate competence over a range of text-free aspects.

Recent research on sociocultural practices in the workplace has extended the notion of the ZPD. Billett (2001 p. 1), for example, described the intersection of the preparedness of workplaces to provide learning opportunities, individuals' uptake of those opportunities and the guidance and support available for learning as "workplace affordances". Although the term was used to describe successful formal workplace learning, the cases presented here indicate that workplace affordances may also be integral to successful informal factory floor learning. From the cases reported in this paper it is apparent that characteristics of both the setting and the trainers are vital in enculturating novices into the social and cultural mores of the setting. The challenge is to determine whether knowing about the setting, that is the social and cultural practices that exist in specific sites, is equally or more important than learning the procedures to operate machines.

Conclusion

This paper has described two instances of learning on the factory floor. Drawing on data on two participants from a study of men who self-report literacy difficulties it has described teaching strategies that are representative of a sociocultural approach to teaching and learning. Further it has demonstrated how these experiences conform to recent arguments about Vygotsky's concept of the zone of proximal development.

Successful as the teaching strategies were, it is important to recall that neither of the “teachers” had any professional training in teaching. Indeed one of them, James, had limited literacy skills to the extent that he could not read training manuals or write lesson notes. There is no doubt that both of these men were excellent teachers. Ray for example worked long, hard and determinedly with the sort of student that might be rejected by schools. James was fortunate that Mick, his new supervisor chose to ignore the negative behaviour and poor reputation and focus on his knowledge and ability.

While the barb machine was highly specialised and could only be taught on site various aspects of the machines that Stalin learned to use could be studied in a decontextualised setting. Analysis of Stalin’s story indicated that achieving NRS and CBT standards in the operation of a machine was insufficient for Stalin to reach the levels of higher order thinking that are indicative of internalised knowledge. Stalin only achieved this with the support of Ray.

Situations such as those described above have implications for the vocational education and training sector. First, how can the practical skills of workers with limited literacy skills, such as James, be formally recognised so that they are able to contribute to the productivity of their enterprises and the national economy. As long as functional literacy attainment is the measure of an employees worth and value, workers such as James who have so much to contribute will remain undervalued.

Second, how will the VET sector respond to the ongoing debate about the link between decontextualised, text-based workplace education and national productivity? Policy that links only functional literacy skills to productivity is blind to the uncertificated skills that are inherent on the factory floor. If Ray and James were not such instinctively good teachers Firebrand would have had to find other, possibly more expensive, training solutions. Surely it is time for the intuitive skills of talented workers to be recognised and the one-sided nexus between functional literacy skills and national productivity to be broken once and for all.

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