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CONSTRUCTING IDENTITIES - DEVELOPING SKILLS: CASES OF WORKERS WITH POOR LITERACY SKILLS

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Abstract

The Vygotskian concept of a Zone of Proximal Development (ZPD) has been explored extensively in school education settings as a means of determining cognitive change. Evidenced in settings characterised by social activity ZPDs are present in the cognitive process that occur when humans interact in and with their natural or man made environments.

While most research around ZPDs concerns classrooms, particularly in the early years, this paper reports on a study of nine workers who self-report literacy difficulties. The study investigated whether the artefacts of as well as the human interactions that take place in the workplace merged in ZPDs to enhance the cognitive process.

Results demonstrate a quite particular set of human and man made factors that result in new skills in solving novel problems in the workplace. Further the study illustrates how cognitive skills develop into adulthood and result in enhanced concepts of identity. Implicit in this process is recognition of a range of multiple literacies. The study concludes that Vygotsky's notion deserves reconceptualisation for learning settings that Vygotsky did not consider.

Introduction

My Story

I grew up in the mid-twentieth century in a large Australian city where my father (and his father before him) owned a timber mill. As a youngster I used to 'help out' during school holidays and grew to know some of the men who worked for my father. Sometimes all the families joined together for social events. Over the years I became aware that some of these men could not read or write. My father was at pains to teach his children that ability to read and write did not define these men. Their value was in their craftsmanship, work skills, knowledge of the industry and loyalty to the company. Office staff assisted these men with literacy on the job. I remember the accountant, for example, sitting down with one man to explain leave loading and salary deductions.

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Teaching a cohort of high school students to read in the 1990s brought these men to mind. How would they have coped in an era of electronic banking, multi-skilling and digital messaging? What does it take for an employee not only to become proficient in one or more tasks but also to talk about, explain about and teach about those tasks? In the early 21st century how do employees learn the literacy of the skills my father valued in his workers? Are these skills valued as literacies at the beginning of a new century? I wondered if sociocultural theory could explain the subtleties of learning on-the-job in a range of worksites. Pondering these questions led to a central question that became the focal point for a research study.

What are the issues of identity and social interaction that allow men who self-report literacy difficulties to access and engage in a range of workplace literacies?

Why Workers' Literacy?

Since the 1970s successive Australian governments attempted to address issues of literacy in the workforce (Lo Bianco, 2001). By the 1990s government policy focused on raising the literacy rates of school leavers and job seekers to internationally competitive levels. Reports such as *Australia's language: The Australian language and literacy policy* (DEET, 1991), *Young people's participation in post compulsory education* (Finn, 1991), *Employment related key competencies for post compulsory education and training* (Mayer, 1992) and *Youth employment: A working solution* (House of Representatives Standing Committee on Employment, Education & Training, 1997) served to refocus on literacy in the school years. Resulting policy initiatives were based on the principle that in a "modern democratic society, high levels of literacy are crucial to the quality of civic, cultural and economic activity" (DEETYA, 1999, Section 1.2) and are derived directly through increased skills and knowledge gained at school. This human capital position was driven by the increasing globalisation of international commerce and trade, as noted by McIntyre and Solomon (2000). In an attempt to counteract their effect on the Australian economy, policies explicitly aimed at improving national economic productivity through demonstration of mandated levels of literacy were devised and implemented. For example, job seekers were required to demonstrate a specified level of literacy to enter the workforce. This was exemplified in the concept of *Mutual Obligations* introduced in 1998 compelling young people 'who fail basic literacy and numeracy test' (Howard, 1999) and who obtain unemployment benefits to attend remedial literacy and numeracy classes.

The notions inherent in this official position were contested. Hollenbeck (1993) and Levin (1998), for example, found no reliable link between literacy training and enterprise (or national) productivity. Others argued that "there is substantial evidence to suggest that inadequate skills in English language, literacy and numeracy can be a major barrier to gaining employment" (DETYA, 2001: 4) and that literacy competence was a powerful factor in determining an individual's prospects in life (OECD, 2000). To confuse the issue other reports illustrated that employers were often not able to articulate a desirable entry-level literacy standard (ABS, 1997; Australian Parliament, 1997) for job seekers.

Debates around issues of workplace literacy demonised those with inadequate literacy and polarised the general, political and academic communities with regard to defining literacy. In

essence this came down to a functional-economic discourse couched in terms of basic skills of reading and writing or a social practices discourse (Watson, Nicholson & Sharplin, 2001). The emphasis was on literacy as a product of social activity represented as ways of practising both basic skills and a range of literacies.

A Niche in the Debate

The functional-economic discourse that informed policy on workplace literacy training in Australia defined literacy “as a set of identifiable skills that can be measured and related to specific job tasks” (Castleton, 2002: 178). As a consequence, workplace literacy training revolved around the basic or lower level skills that enabled a worker to answer a set of questions to gain a new skills-based qualification (Brown, 1992), such as gas watching, traffic management or crane lifting. Reflecting deficit notions of learning, this approach assumed that literacy was a sequential set of skills that was best taught in school-like settings.

A social discourse approach, on the other hand, assumes that learning occurs in all settings - formal or informal. Further, learners demonstrate a range of skills across the spectrum from lower to higher order thinking. Workplace studies of skill acquisition in the coal industry (Billet, 1999), Information Technology industry (Tuomi, 1998) and office practices (Dymock & Gerber, 1999; Kaur & Thiyagarajah, 2003) took a sociocultural perspective, focusing on developing knowledge in regard to new processes and procedures. The first two of these studies focussed directly on learning particular new skills or programs. The third study focussed on participants’ confidence in using English language where their first language was not English and motivations to improve their English language skills. All participants in this study held middle-level jobs in enterprises used by English speaking tourists. None of these studies, however, examined the development of higher order literacy competence in the course of a worker’s everyday tasks.

Learning by Experience

Aim

Sociocultural principles guided the research, seeking to examine the complex interrelationship of people, places, objects and events that lead to higher mental functioning. For example, it explored the notion of tools and signs, in particular “the process of development” (Van der Veer & Valsiner, 1991: 391) that occurs when physical tools become psychological tools.

This paper reports on one aspect of the findings – the role of the Zone of Proximal Development (ZPD) in the development of a range of on-the-job literacy skills.

Working from a sociocultural position this qualitative study documented the workplace literacy experiences of individuals who self-reported literacy difficulties. The study challenged

the nexus between the functional-economic discourse and workplace productivity in relation to literacy. The research questions driving this study were;

- What are the cultural, historical and social factors which impact on development of literacy competence in the course of everyday work activities?
- How do these factors relate to theories of cognitive development in the adult years?

Study Design

The study reported here 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: 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 is 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).

Data for the study consisted of a series of audio-taped, open-ended interviews, 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 open-ended interviews. Respondents in this aspect of the data collection were nominated by the principal participants in a snowballing fashion (Lincoln & Guba, 1985; Morton-Williams, 1993; Patton, 1980, 1987).

Participants were each interviewed five times and eight of them nominated one or more individuals who were each interviewed once for triangulation purposes. The principal interviews reflect the views of each participant in response to a series of open-ended questions. For the most part these views were substantiated in the triangulating interviews. The major categorical discrepancy here was the importance ‘being literate’ had for participants and their colleagues, friends or families.

Data analysis examined the role psychological tools and signs, particularly speech—play in transforming knowledge from the inter- to the intrapersonal. No worksite is devoid of speech and work-based social interaction itself takes several forms. Testing the proposition underpinning the study required an analytical schema that located the basis of workplace literacy and language competence in the interaction of “performance and knowledge” (Cope, Kalantzis, Luke, McCormack, Morgan, Slade, Solomon & Veal, 1995: 90) in social contexts, recognising the sociocultural generation of knowledge and skills. *Communication, collaboration and culture: The National Framework of Adult English Language, Literacy and Numeracy Competence* (1995)(the Framework) was selected as an appropriate instrument.

Grounded in sociocultural concepts and written for use in Australia, the Framework (Cope *and associates*, 1997) allows a demonstration of changes in literacy competence over time. It identifies six interlinked aspects of competence—“task, technology, identity, group, organization and community” (Cope *and associates*, 1995: 15)—derived from the sociocultural concept of learning as a form of social activity involving the manipulation of physical or symbolic tools and signs. As such it can be used to analyse the data collected for this study.

For the purposes of the study psychological signs consisted of memos, icons, verbal messages, colours, shapes, maps and plans. Psychological tools consisted of physical aids to literacy such as whiteboards, pens, dictionaries and spell checkers as well as individual strategies for determining meaning in text based literacy. In an example of the complexities of Vygotsky's concept, literacy, including oral and written modes, was considered to be both a tool and a sign, whose mediation resulted in enhanced literacy activity. This was exemplified when the notes a person took as a result of the discussion at a meeting culminated in restructuring thinking and reformulating actions at a future date.

Limitations of the Study

One limitation to the study related to the types of data collected. Methodology theorists (Creswell, 1998; Lincoln & Guba, 1985; Merriam, 1990; Yin, 1994) recommend multiple data sources, including available documents. The majority of the participants in this study had never revealed their literacy difficulties to their respective employer. This being the case the act of the researcher seeking copies of documents (such as leave forms or meeting notes) from employers involved unacceptable and unwarranted risk to participants. Some participants chose to provide examples of their own written texts and one provided copies of school reports. All participants carried out four set literacy tasks as part of the interview process. Supporting documentary evidence consisted of these samples and the researcher's field notes.

Context of the Study

The nine men whose stories were reported are real people telling real stories and providing ‘hard’ evidence” (Valsiner, 1996: 297) of literacy skills learned over time. Most of the participants had never been the subject of research and the majority had never discussed literacy difficulties with a stranger. For some I was the first person, apart from their spouse, who had talked about the impact of poor literacy on their working lives. They were courageous, courteous and enthusiastic and this encouraged me to be respectful of my task and guard against any unnecessary intrusion into their lives.

Context

All the men lived and worked in two major Australian cities across five different industries. Interviews with the men took place in homes, offices, worksites and even in a hotel. Worksites ranged from professional offices to meeting rooms within a heavy industrial site (known as Firebrand). These were located in two cities in two states of south eastern Australia. Participants chose the site in which they felt most comfortable.

Participants

All of the nine participants were male and each chose a pseudonym for purposes of confidentiality. As table 1 indicates four participants worked or had worked at Firebrand. None was aware that any of the others was participating in the study.

<i>Participant</i>	<i>Occupation</i>
Charles	Meat Worker
James	Heavy Machinery Operator (Firebrand)
Stalin	Heavy Machinery Operator (Firebrand)(retrenched)
Robert	Industrial Officer
John	Heavy Machinery Operator (Firebrand)(retrenched)
George	Heavy Machinery Operator (Firebrand)(retrenched)
Dasher	Plumber
Sam	Kitchen Installer (carpenter)
Peter	Plumber

Table 1: Occupation of participants at time of recruitment

Over the data collection period men changed jobs, moved houses, became fathers and developed new understandings of themselves as people and learners. Charles and Dasher were unemployed for brief periods (1 week and 6 weeks respectively); Sam took a new role within the same enterprise; James gained two promotions; Stalin attended post retrenchment training and George attended literacy classes.

Recruitment, Selection and Assessment

Recruitment of the nine primary participants took approximately three months. This was a time-consuming process as it involved contacting and negotiating with gatekeepers (Creswell, 2003), i.e., people such as trade unions officials, family members and adult education agencies who could identify possible primary participants. Often this process took several telephone calls over a period of weeks to identify a single participant.

Purposive sampling with set objective criteria (Bouma, 2000) was used to select primary participants for the study. These criteria included: entering the workforce with literacy skills that

they considered insufficient for the job they were doing; holding full-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. These criteria were given to the gatekeepers and the primary participants self-nominated as a result of contacts made with these gatekeepers.

Importantly, none of the participants was required to undergo any form of standardised literacy assessment. As such the study relied on each man's subjective and personal responses to the literacy demands he had encountered throughout his life. This approach indicated the researcher's confidence in the participants' judgement, particularly as subjecting the participants to a norm-referenced assessment procedure would have created an atmosphere of distrust.

Age and Employment Histories

In his late twenties, Sam was the youngest participant, while George, in his late fifties was the oldest. Apart from Dasher all the participants had worked for many years (more than 20 in George's case) for the same employer. Charles, for example, commenced work when he was 13 and had worked at two different abattoirs over 27 years interspersed with a brief period as an interstate truck driver. Dasher had his work life interrupted by a life threatening condition and several lengthy periods of unemployment. At the time of recruitment he had held a steady job for more than two years.

Although these men may be considered to be 'unskilled', none was actually 'unskilled'. All of the men are skilled and in some cases considered national experts, in specific aspects of their everyday occupations. None of them has been immune to the dramatic changes that have engulfed all sectors of the Australian economy over the last twenty years, even though some were young enough to have worked for fewer than ten years, nor were they oblivious to or unaffected by negative community perceptions of 'illiterates'.

Educational Backgrounds

Apart from the belief that their school education had failed them, no two individuals reported the same experiences, although some had similarities and parallels. Eight of the nine had not completed secondary education, yet some were able to recall individual teachers who they felt had taken a special interest in them. Importantly, their definitions of literacy and perceptions of their individual competence and difficulties varied dramatically.

Several of the participants had gained post-school qualifications all as a result of apprenticeships. Sam was a carpenter, Dasher and Peter were plumbers and Robert held a qualification in horticulture. James, Charles, George, Stalin and John did not have any formal post-school qualifications although each had gained industry specific vocational certificates, for example forklift operation, gas measuring and crane driving while at work.

Data Gathering

Primary participants engaged in five, one-on-one, audio-taped reflective interviews over a period of fifteen months, from April 2000 to July 2001. Minimum interview time was twenty minutes but stretched to forty minutes when participants were very forthcoming. Interviews were arranged, where possible, at times and locations that best suited each participant. Often, at the participant's request, interviews were conducted in a "white room" situation (Werner and Schoepfle, 1987: 315), away from the actual site where their work duties were performed. This technique was employed to minimise risk to the participants if others in the (work) environment became aware of the nature of the research.

The interview questions were semi-structured and open-ended, designed to allow participants to elaborate on specific themes. The researcher initially nominated the first of these which sought background information to place the participants in historical and social contexts. An example of this theme was asking participants to recall their school experiences. Other questions were generated as a result of the researcher drawing on related research literature so as to make "connections with other domains of inquiry" (Freebody, 2003: 26).

Triangulation was achieved by conducting interviews with up to two family members, friends or work colleagues nominated by each of the participants. In all a total of 56 interviews were conducted.

Each of the nine cases stands independently as a set of five to seven interviews (primary plus secondary participants). As multiple cases the interview data are interdependent, linked through the use of common interview themes (Table 2). The process of interlacing and layering of data created a mesh, a process that may be called *mesh interviewing*.

..1.1.1.1.1 Theme	Interview				
	1	2	3	4	5
Define literacy problem	×				
Recall school experiences	×				
Recount job history (briefly)	×				
Ease of entering workforce	×				
Literacy in the workplace - examples		×			
Literacy in the workplace - strategies for coping		×			
Workplace tasks/role		×			
Pictures as a form of recall		×			
Defining literacy		×			
New worker learning social literacy		×			
Reading task - department store catalogue			×		
Recognising literacy difficulties in new worker				×	
Response literacy crisis headlines				×	
Reading & comprehension task - street directory				×	
Reasons for participation in research					×

Benefits of research to self	×
Reaction to interview process	×
Writing or reading task	×

TABLE 2: **Common Interview Themes**

Schedule of common interview themes demonstrating how particular themes were introduced across the data collection period.

Data Analysis

In qualitative research, data collection and data analysis are a simultaneous processes initially involving identifying and describing “patterns and themes from the perspective of the participants” (Creswell, 2003: 20). The three-phase iterative data analysis process employed used an “unordered meta-matrix” (Miles & Huberman, 1984: 151). This matrix is suited to studies of several individual people, each constituting a case. As a type of “pattern-matching” (Yin, 2003: 116) it consists of three phases—data reduction, data display and conclusion and verification (Table 4.7). The second phase, data display, consists of three steps (Miles & Huberman, 1984), each moving the analysis from nine individual or multiple cases (Yin, 1994) towards producing a single study. As an iterative process analysis consisted of continually reviewing increasing numbers of data as more interviews were recorded and repeatedly categorising and coding the major ideas that emerged in terms of sociocultural theory.

A key theoretical tool chosen to analyse the data in a three-stage process was *Communication, collaboration and culture: the national framework of adult English language, literacy and numeracy competence* (Cope and associates, 1995) (herein called the Framework) as it is premised on the sociocultural notion that all human activity involves the use of physical or psychological tools and emphasises the role of cultural and social contexts in learning. Attention in the Framework focuses on the interaction of “performance and knowledge” (Cope and associates, 1995: 90) in social contexts as the basis of competence. It stresses the way people act on the basis of knowledge gained through previous experiences and how that knowledge and individual identity are transformed through performance in specific social and cultural contexts.

Theoretical Framework Underpinning the Study

Lev Vygotsky (1978), one of the originators of sociocultural theory, proposed that learning is a culturally and historically constructed practice. That is, learning is a product of individual and cultural history. He argued that learning or cognitive development is the process of transmitting culturally and historically determined psychological tools and signs from experts to novices. This transmission needs to take place in a social context of overt or covert instruction. When novices need assistance, they indicate that they have not mastered the particular skill required to complete a task. When novices can complete the task successfully and independently,

they are demonstrating the transmission of new knowledge that they are able to appropriate for their own purposes.

By 1930 Vygotsky's thinking had shifted in some respects from his earlier hypotheses. In considering speech as a psychological tool he began to recognise the value of word meaning as a unit of analysis of behaviour. From this position he found that word meanings change as humans mature and according to the context in which they were used. This convinced him that transmission of cultural tools was much more complex than he had initially thought. He tried to demonstrate how thinking processes change from childhood to adolescence, focusing on formal (scientific) and informal (spontaneous) learning. He claimed that young children think in a series of complexes that evolve into concepts as the child matures.

At the same time when education had a high priority in the Soviet Union, emphasis was placed on allocating millions of children with diverse social and educational backgrounds to the best possible educational setting. Thorndyke and Binet had developed assessment instruments (IQ tests) that measured mental capacity. IQ tests seemed to be the solution to the problems faced by the Soviet Union. After the years he had spent working with disabled children, Vygotsky was convinced IQ tests were inappropriate instruments to measure learning potential. This juncture in his own thinking and the pressure to assess millions of children appear to be the catalyst for Vygotsky to introduce the notion of the ZPD “to deal with two practical problems in educational psychology: the assessment of children’s intellectual ability and the evaluation of instructional processes” (Vygotsky, 1978: 86). He believed that educational testing “focused too heavily on intrapsychological accomplishments and failed to address the issue of predicting future development” (Vygotsky, 1978: 86). He proposed the zone of proximal development, defining it 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: 86, emphasis in original)

As a fresh approach to teaching and assessment, the ZPD fits neatly into socio-historical theory. First, it demonstrates one of his general laws of the development of higher mental functions, namely that learning proceeds and enhances development. Second, the notion of children and teacher, or novice and expert, working together to solve problems collaboratively matched Vygotsky's notion of the transmission of cultural knowledge through social interaction. Instruction within this zone always involves social interaction and the transmission of cultural symbols through the mediation of psychological tools and signs, particularly speech. When instruction is proceeding in a ZPD, it is essential that the learner “must be able to use words and other artefacts in ways that extend beyond their current understanding of them, thereby coordinating with possible future forms of action” (Cole & Wertsch, 1996: 245).

The Zone of Proximal Development

Vygotsky discussed the ZPD in at least eight published articles (Chaiklin, 2003) although it was not central to the theory. Seventy years after Vygotsky's death the ZPD is “probably one of the most widely recognized” (Chaiklin, 2003; 40), selectively borrowed (Valsiner, 2003) and cited (Gallimore & Tharp, 1990; Newman, Griffith & Cole, 1989; Wertsch, 1984) of Vygotsky's concepts in English speaking countries. The ZPD is taught in undergraduate programs and is “considered to be one of the major contributions of Vygotsky to the social educational psychology” (Valsiner, 2003: unpaginated).

The difficulty with implementing the ZPD is its untested quality. At the time Vygotsky introduced it, he was coming under increasing scrutiny from political ideologues. Hence he “never tried to operationalize” it (Valsiner & Van der Veer, 2000: 340) or check the prognostic claims he made about it. Within a few years he was dead and his work banned. His concept of collaborative interactions aimed at assisting learners to reach their potential was not revealed to Western educators until thirty years later.

The claim that “at this moment in history, the concept, [of the ZPD] *at least in a somewhat simplified form*, is reasonably well known among educationally oriented researchers” (Chaiklin, 2003: 40, emphasis added) suggests that some contemporary researchers fail to comprehend Vygotsky's complex concept. There is recognition that “to understand the complexity of the ZPD it is necessary to take into account concepts” including tool mediation and social mediation (Verenikina, 2003: unpaginated).

One danger of misrepresenting or misinterpreting the notion of the ZPD is reducing Vygotsky's notion to a unidirectional learning process. That is, “development proceeds in the direction of current adult models” (Tudge, 1990: 155). Although Vygotsky proposed that learning is in part a function of social interaction, unidirectional models privilege the teacher's or more expert other's knowledge. Interaction actually means instruction. Teachers who work from a unidirectional model are said to construct ZPDs in which to teach. This position does not recognise Vygotsky's argument that *learning* (not teaching) creates the ZPD (Vygotsky, 1978).

This argument lends some tension to the reasoning behind the ZPD. If learning creates the ZPD, why was Vygotsky proposing that the ZPD could determine what program or learning individual children need to undertake? Contemporary dynamic assessment procedures that have emerged over the last 25 years claim to derive from the notion of a ZPD. All of these systems of assessment are united by the

introduction of the learning phase into the assessment situation. Instead of studying the child's individual performance, dynamic assessment focuses on the difference between performance before and that after the learning or assistance phase. (Kozulin, Gindis, Ageyev & Miller, 2003: 16)

In effect this means that dynamic assessment examines what the child has learned rather than how the child learns. For dynamic assessment to represent a ZPD accurately, programming should focus on the difference between assisted and unassisted performance.

Analysing the men's literacy experiences from a sociocultural perspective allowed an examination of a teaching/mastery/appropriation process that is characteristic of socially situated learning. Implicit in this process is the way human agency seeks to negotiate “the relational

interdependency of agent and worlds, activity, meaning, cognition, learning and knowing” (Lave & Wenger, 1996: 145). That is, this study investigated the ways adults with poor literacy negotiate, engage with or circumvent literacy requirements in the workplace. In addition it explored how workplaces construct workers and learning environments.

Applying Sociocultural Theory to Adult Learners

By focusing on stages of development, education research constructs a “schemata which allocate[s] more phases to the period up to adolescence than to the rest of the lifespan. The implication being that development tails off after early adulthood” (Schuller, 1992: 18). This schemata is reflected in much contemporary research utilising Vygotskian notions of cognitive development.

Vygotsky’s work was predominantly, but not entirely, concerned with children in the early years of school and children with disabilities. He wrote a text on adolescents (Vygotsky, 1931, *Pedologija podroska* [*Paedology of the adolescent*]) of which two chapters, in translation, are published in *The Vygotsky Reader* (Van der Veer & Valsiner, 1994). He and his co-researchers included adolescents and adults in many of their studies. It is apparent that Vygotsky envisaged cognitive development as extending beyond childhood. He details the process of concept formation and specifies the vital final stage of *thinking in concepts* as occurring at about the time of puberty, adding that:

even an adult does not always think in concepts. Quite commonly, his thinking is carried out on the [lesser] level of complexes and sometimes it even descends to more elementary and more primitive forms. (Vygotsky, 1931: 252)

Towards the end of his life and career Vygotsky “became increasingly interested [in] and knowledgeable of the domain of deviant adult behaviour” (Van der Veer & Valsiner, 1991: 75) as it related to his studies of development. This interest developed from studies of concept development in children and concept disintegration in schizophrenia.

Thus, despite a perception that sociocultural theory is about childhood cognitive development, it is also applicable to adolescents and adults. While some concepts are quite specifically concerned with childhood, others are more general and can be considered in any discussion of lifelong cognitive growth and development.

Current research findings that “there is no segment of the lifespan in which learning is completely absent” (Heymans, 1992: 50) advances this notion. Further, research demonstrating that “cognitive development continues apace in adulthood” (Pogson & Tennant, 1995: 27) suggests that many of the concepts and themes Vygotsky discussed are applicable to adult learners.

Scribner’s (1984) investigation of workers in a milk factory serves to highlight the difference between thinking in the adult and childhood years. In particular it demonstrated how adults’ ability to think in concepts enabled them to develop practical intelligence in the workplace. Her findings indicate that practical intelligence gained through experience “represents

the course of adult skill acquisition in commonplace tasks” (Scribner, 1984: 38), enabling workers to develop the cognitive skills to move from novice to expert. She also found that “skilled practical thinking is goal-directed and varies [,] adapting properties of problems and changing conditions in the task environment” (Scribner, 1984: 39). By asking workers to perform unfamiliar tasks she demonstrated that adults approach novel tasks from their own logical perspective. This finding illustrates Vygotsky's point that the act of remembering (which requires thinking) “is redirected to establishing and finding logical relations” (Vygotsky, 1978: 51). Behaviour, such as solving novel problems in this fashion, indicates cognitive development and the capacity to achieve higher mental functioning.

The study reported in paper takes the findings on the learning of generic workplace skills to another level. Proposing that adults who have not been able to achieve a level of “logicalization” (Vygotsky, 1978: 51) in the particular set of cognitive skills that are represented as orthodox literacy in their school years may do so while engaged in on-the-job work practices. In other words, where adults did not gain appropriate levels of literacy at school, they may learn literacy skills in the course of their daily work. This is achieved by focusing on the type of culturally-based transformations and the process of internalisation (if any) of those transformations that occur in the workplace.

Findings

In most of the cases in this study where a ZPD was evident, it manifested itself in changed relationships between individuals in the worksite. Frequently, the role of conversational intercourse for instructional, social, informative and assistance purposes demonstrated the development of higher mental functions in workplace settings. This was often as a result of the worker taking on a new role, one that he had not previously considered himself capable of performing. James, in his job as a trainer, stressed how important talking to and with the trainees was with comments such as, *before I even start showing em' how to do it, I sit 'em down and have a talk to 'em* (Interview 4, line 11). Even more important was the role of talk in preparing men to work on old, heavy, dirty and dangerous machines, *And a lot of them won't talk. You know, like you've got to make them talk and have jokes with 'em and get 'em to relax and comfortable* (Interview 4, Lines 59-60). It is interesting to reflect on the teaching and learning process that occurs whenever James teaches.

At a superficial level he is imparting his expertise to novices, a classic ZPD scenario. His comment ...

I can do it with me eyes shut. It's so simple. But when you're showing someone else how to do it, you just sit there and you shake your head and say to yourself, "Why is it so awkward for them?" (James, Interview 4, Lines 31-33)

... reflects Billett's (2001) notion of routine and non-routine problem-solving. That is, James is teaching skills that are routine and in some sense mundane to a novice for how the skills are new, complex and confusing. However, each teaching event is also a learning episode for

James. Over a period of time he has learnt a great deal about learning and learners. Some examples taken from his description of the teaching process in interview 4 include, patience, time, understanding motivation, the importance of learners' background, modelling, practice and more practice, praise, scaffolding, confidence and reassurance. He brings all of this knowledge to discussions about the trainees when he reports to his supervisor - a literacy skill that he did not possess when he commenced at Firebrand.

Participants demonstrated how speech acts mediated their behaviour and resulted in new ways of acting, responding, thinking and organising. For example, when Stalin commenced work at Firebrand he was afraid of being labelled as a *dunce* (Stalin, 5: 7), a *fool* [or an] *idiot* (Stalin, Interview 5, Lines 310-311). After seventeen years he gained a position in the reconditioning yard where Ray, his supervisor assessed him as being *scared* [and] *unsecure* [sic] (Ray, 376-378). On reflection Stalin felt that Ray's *expectations of me ... were far more than I thought I could do* (Interview 4, Line 255-256), another example of a ZPD.

Stalin made many mistakes on the machinery but Ray, with infinite patience, encouraged him to talk through the errors, in particular going step-by-step through the operating procedures. Importantly, he expected Stalin to demonstrate advanced thinking skills. *He used to say to me, "What do you think you've done wrong?"* (Interview 5, Line 291). Stalin believes that Ray worked on his *confidence* (Interview 4, Line 256) and pushed him into areas that he had never shown any interest.

Predominant amongst these areas was membership of the Transitional Steering Committee (TST), the collaborative team that informed and guided the shutdown and redundancy process for a large portion of Firebrand. Here, Stalin demonstrated higher mental functioning that enabled him to become an active and effective representative of the reconditioning yard. Literacy skills he used included, making presentations; solving novel problems; negotiating with workers, managers and administrators; and reporting to the workforce. In the process he learnt more *about how the company did it's business* (Interview 2, Line 280), *how management perceived the working place to be* (Interview 3, Line 154) and gained insight into other Firebrand employees. In terms of Cope and colleagues' (1995) Framework the skills Stalin demonstrated while working on the TST placed him at a collaborative level of Organisational competence as opposed to the assisted level with which he entered the reconditioning yard.

Stalin's contention that recognising potential and developing confidence were key factors is not an isolated example. James noted that Mick, his supervisor, saw untapped potential and believed that James was capable of more than he was demonstrating. Mick set tasks which James believed were unattainable, all of which James achieved. Many of those tasks required James to work actively on his literacy skills, demonstrating higher-level thinking and reasoning. He learned to negotiate, to listen and debate issues and to make and take notes—all literacy skills that were once unthinkable for him. Acknowledgement of James' expertise, his potential provided James with a platform to develop his stature in the company and demonstrate higher-level thinking. Instead of fighting his supervisor he strove to do and learn more. James regards Mick as a person who treated him right and gave him confidence. He is buoyed by reassurances such as, *"You can do it. You'll be right. Just go and do it. Fix it up."* (Interview 5, Line 286).

It could be argued that Mick did not ‘teach’ James anything in the traditional sense of a more expert other imparting knowledge. What he did was provide structures for James to develop more sophisticated thinking strategies through challenging practical activity, such as negotiating the settlement of disputes, teaching and organising work shifts. It could also be argued that James, owing to his expertise, came to the new barb mill with the capacity to think at a higher level about the machines so that they were tools of thinking. Mick’s mediation gave James the opportunity to use literacy skills to teach and talk about the machines and, in the process, develop the analytical thinking that allowed him to negotiate diverse personalities, backgrounds and motivations amongst the operators. Mick also recognised the informal training James received from fitters and turners over the years (Mick, Line 360). This enabled James to undertake maintenance on the barb machines that would normally be outside his job scope.

An aspect of the ZPD is the way workers constructed their own. Sam is an instance of this phenomenon. A carpenter by trade, *because it was hands on* (Interview 1, Line 30) and with some experience of using the Internet for sending and receiving email, Sam changed jobs. He voluntarily moved from the dusty, dead end of job of kitchen installer to the job of kitchen detailer. His new, office-based position required him to transform designer sketch drawings into detailed plans that could be used by the factory to prefabricate individual items, which could be seamlessly installed on site. The tools required were two complex computer aided design (CAD) programs. There were two additional requirements. First, he had to go on site and check extra details and occasionally tell purchasers that the site would not accommodate one or more aspects of their dream kitchen. Second he had to write detailed instruction for the installer. Sam had approximately two weeks tuition on these and was then expected to work independently.

As a *really bad speller* (Interview 3, Line 153) Sam admitted that the job was demanding but did not shirk from those demands. Rather, his attitude was that bad spelling was part of his identity that should not preclude him from using his trade training and knowledge to produce excellent kitchens. Operating within a ZPD (of his making) Sam developed a set of physical and psychological tools and signs to assist him in his tasks, the most difficult of which was talking to customers. When I last spoke to Sam he had take the knowledge learnt in this job and moved to a newer, better paid position. It seems he met his ZPD goals and moved onto the next ZPD.

Discussion

Contemporary Criticism of Interpretations of the ZPD

Van der Veer and Valsiner (1991) and Valsiner (2003) are critical of Vygotsky's concept of the ZPD on three grounds that had important implications for this study. First, they comment that the examples Vygotsky provided “suggest that he conceived of the environment as a static background to the dynamically developing child” (Van der Veer & Valsiner, 1991: 343). This may be the result of empirical investigations that involved a tutor and learner in a closed experimental environment. Adult backgrounds are not static. Participants whose literacy engagement is reported in the study related to a range of people on a daily basis and functioned in

environments that required them to adapt to changing circumstances. They brought this background into any ZPD.

Second, as Veer and Valsiner (1991:343) note, “Vygotsky seemed to suggest that the independent performance of a child will have as its ‘ceiling’ the joint performance”. The implication of this is that the novice will never know more than the expert. Lantolf (2000) argues that this representation of the novice/expert relationship is unsustainable given that the key theme underpinning the ZPD is mediation. He contends that the relationship is generally one of co-construction, resulting in the emergence of expertise. Further, when experts and novices come together “novices do not merely copy the experts’ capabilities: rather they transform what the experts offer them as they appropriate it” (Lantolf, 2000: 17). Adults have many years of experience and practical skills that may be different from those of their tutors or mentors. Their practical intelligence may even give them a status of expertise in specific areas of performance. This working knowledge needs to be accounted for in constructing a ZPD in the workplace.

Third, Vygotsky's (1978) conceptualisation of the expert other is a benevolent teacher or peer. Valsiner (2003) claims this situation may not always be the case. For the novice to advance there should be mutual acceptance if not liking. The men cited in the investigation reported in this study, for example, have had experiences with authoritative figures who did not like, understand or show interest in them. Nor, argues Valsiner (2003), are all expert others benevolent. If experts believe that teaching or training a novice will have negative consequences, they are less willing to train properly if at all.

Despite these concerns, the ZPD is a powerful notion within sociocultural theory. It provides a structure for directing the learning of novices along a predetermined, yet achievable, path. In the workplace, for example, workers are able, with guidance and assistance, to learn new and difficult skills that they may not normally learn through discovery. The participants in this study provided instances of achieving in activities which they believed were difficult and, without assistance, unachievable.

Operation of ZPDs with adults has a different focus to that suggested for children that mostly take into consideration the criticism outlined above. Most importantly adult workers demonstrate a degree of agency, absent in childhood models. In all instance of successful literacy enhancement the workers created their own ZPDs as the result of particular contextual circumstances. As such construction of a ZPD represents a unique period in an individual's ontogenetic development when learning needs and opportunities coincide.

However, to achieve their goals certain conditions appear to be paramount. First, learner must perceive the moment as an opportunity for positive. This is particularly for individuals such as those in the study for who ‘formalised’ learning carried many negative connotations. Second the task must be purposeful. Much discussion in education today is about authentic tasks. The workplace provides numerous opportunities for authentic, valid tasks. However, for tasks to be seen as valid to the learner they must have a positive potential consequence.

Third, in response to the criticism of expert others, workers need mentors that they like and with who they feel comfortable. In general mentors should be exceptionally patient, treat the men as adults, not ridicule or humiliate them, spend time modelling and remodelling the tasks (sometimes many times over), firm but fair, give praise when it was owing and have some

empathy for the learners. Perhaps the most important element, is that mentors had a positive attitude and a determination to succeed despite negative reports that preceded individual workers. There is also strong evidence that vulnerable workers need time to build long-lasting relationships of trust and respect with their mentor. Part of this relationship is mutual recognition and respect. Participants reported that they were more likely to respond to the literacy demands of the workplace if they felt that their supervisors and work colleagues recognised and respected their skills, knowledge and abilities. If this was demonstrated the workers responded by recognising and respecting the qualities of their mentors.

Conclusion

Data from the study indicated that experts did not routinely construct ZPDs for the purpose of overt instruction to novices. Enhanced literacy competence occurred when workers were compelled, through a complex network of factors, to engage in literacy tasks. Evidence from this study indicated that the relationships among individuals, language, literacy and the environment were more complex than the expert-novice interaction Vygotsky predicted. This finding has more in common with the researchers who claim that the duality of the expert-novice relationship is too simplistic (Chaiklin, 2003; Lantolf, 2000; Valsiner, 2000). Little credence or recognition is given to people, like Sam, who create their own ZPDs.

Studies of workplace learning (Billett, 1999, 2001; Lave and Wenger, 1988, 1991, 1996; Rogers, 1999; Scribner, 1984) and more specifically adult (workplace) literacy (Hagell & Tudge, 1999; Hull, 2000; Tuomi, 1998) emerging from a sociocultural paradigm emphasise the intersection of social activity, psychological tools and signs and historically determined culture. These researchers have extended sociocultural concepts of development to the field of adult learning. Further, “modern refinements have helped make Vygotskian principles relevant to the framing of diverse social problems not apparent through Vygotsky's primarily laboratory experiments” (Lee & Smagoinisky, 2000: 3).

The workplace locates individuals in a social setting where literacy competence is meshed with activities that “involve people reading and writing, talking about texts, holding certain attitudes and values about them and interacting with others around them in particular ways” (Hull, 2000: 650). Sociocultural theory enables analysis of the particular ways individuals interact.

This study has shown that the malleable, flexible notion of a ZPD, proposed by Vygotsky takes on special characteristics in informal learning typical of workplace settings. The ZPDs uncovered in the study were operationalised to meet an immediate need most often when an individual struck difficulty in carrying out a specific task (Dymock & Gerber, 1999: 11). It should be noted, however, that, in general, these ZPDs lacked any form of the formal assessment envisaged by Vygotsky (1978). The resultant learning was purposeful, meaningful and authentic because it focused on the types of “ill-structured problems, where the problem solver is faced with multiple solutions that are contextually relative or even antithetical” (Lohman & Scheurman, 1992: 81), typical of post-adolescent functioning and frequently found in the workplace.

The variations that occurred in both performance and utilisation of the ZPD suggested the influence of human agency on the part of either one or both individuals involved. While this may

be considered problematic, this study proposes the evidence as a route for rethinking the implementation of ZPDs. In particular this should focus on the role of those involved in a ZPD, joint problem solving and consider who constructs ZPDs for adults.

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