CHAPTER 5

EDUCATION AND TRAINING IN THE MINING SECTOR

5.1 Introduction

Scope and purpose

This chapter reviews the available information on education and training in the local mining sector, especially with regard to H&S. It also includes information on related topics, such as adult basic education and training (ABET), the connection between education and safety, and approaches used in H&S programmes. The chapter aims to identify main trends and useful research which could facilitate the H&S efficacy of South African mineworkers or contribute to such a training approach. Specific features of the context, such as language use, are also considered in order to validate the grounding of this study.

5.2 Current legislation and policy

MHSA

As stated before, Section 10 of the MHSA focuses on training and full compliance would ideally translate into a comprehensive H&S training system. The onus is on managers, rather than employers, to provide H&S training to all employees, without the employees being made to pay for such training.[28]

[28](1) As far as is reasonably practicable, every manager must:

(a) provide employees with any information, instruction, training or supervision that is necessary to enable them to perform their work safely and without risk to health; and
(b) ensure that every employee becomes familiar with work-related hazards and risks and the measures that must be taken to eliminate, control and minimize those hazards and risks.

(2) As far as is reasonably practicable, every manager must ensure that every employee is properly trained:

(a) to deal with every risk to the employee's health or safety that (i) is associated with any work that the employee has to perform; and (ii) has been recorded in terms of section 11;
(b) in the measures necessary to eliminate, control and minimize those risks to health or safety;
(c) in the procedures to be followed to perform that employee's work; and
(d) in relevant emergency procedures.

According to amendments passed in 2008, employers must keep a record of all training provided, and all mines must submit a workplace skills plan and annual training reports to the MQA.

Logic of H&S training

The current legislation, policy and H&S education and training approaches have been influenced by the long history of mining in South African and by H&S developments across the whole mining world. Smith and Mulder (2004) summarize the eras of mine H&S management in South Africa in the following table:

Table 13: The eras of mine safety management in South Africa

1900	Focus on design and physical clean-up
1931	Workplace accidents, illnesses due to unsafe acts (88%) & unsafe conditions (10%)*
1950	Safety management systems
1960	Training and development of personnel started
1970	OHS Act and Minerals Act
1980	Psychology of safety (Behaviour-based safety)
	Human Factors Approach
	Risk management procedures
1990	Organizational culture
	Mine Health and Safety Act (MHSA)
	Hazard identification and risk assessment (HIRA)
2000	Self assessment
	Risk Based Safety

* Based on conclusions of Herbert William Heinrich, an American industrial safety pioneer, that 88% of all workplace accidents, injuries, illnesses are caused by 'man-failure' (Wikipedia, 2011).

(Source: Adapted from Smith & Mulder, 2004: slide 5)

The table is useful in understanding the origins of current policy and approaches.

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(3) In respect of every employee, the provisions of subsection (2) must be complied with:

(a) before that employee first starts work;
(b) at intervals determined by the manager after consulting the health and safety committee;
(c) before significant changes are introduced to procedures, mining and ventilation layouts, mining methods, plant or equipment and material; and
(d) before significant changes are made to the nature of that employee's occupation or work.

(Source: MHSA, Chapter 2, Section 10)

Smith and Mulder (2004) go on to suggest that the eras of mine safety can be defined by three main trends: 'Firstly engineers tried to create a foolproof mine design; then engineers developed and improved operational procedures and processes and trainers developed skills; and finally psychologists tried to shape the behaviour of people (ibid: slide 6).[29] This comment may be a little flippant but does indicate the uncertain role and status of training or preparing workers for workplace hazards in any approach or indeed in the total H&S system. The logic behind mine H&S training is not explained in the literature sourced, but I attempt to identify main ideas and trends.

The training logic of the Leon commission and the current MHSA involves three main facets or approaches to H&S training provision. Firstly, workers should be trained to execute *particular operations* in ways that combine self-protection with the avoidance of risks to fellow workers and others who may be affected, including the general public (Leon et al., 1994:71; MQA, 2011:31; MHSA, 1996[30]). Secondly, induction and refresher training should be designed for all ranks of mine officials, focussing on the problems that represent the greatest risk to health and safety (Leon et al., 1994: 168-169; MHSA, 1996[31]). Thirdly, *adult education or ABET*, is a primary intervention for H&S in the mining industry (Leon et al., 1994:168; Reichardt, 2010:62; MQA, 2011:31). This chapter reviews evidence of the logic of H&S training and evidence of implementation to address all three facets or approaches. Apart from the MHSA, negotiations and agreements are ongoing among the tripartite partners in the sector, including the H&S milestones and targets of the 2008 Tripartite Action Plan on H&S mentioned in Chapter 2.

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[29] Despite numerous attempts to contact the authors of this presentation and their parent company for a written paper, I never received a reply. I could not find similar information in another source.

[30]MHSA, Chapter 2, Section 10:
(1) As far as is reasonably practicable, every manager must -
(a) provide employees with any information, instruction, training or supervision that is necessary to enable them to perform their work safely and without risk to health.

[31](2) As far as is reasonably practicable, every manager must ensure that every employee is properly trained -
(a) to deal with every risk to the employee's health or safety
(b) in the measures necessary to eliminate, control and minimize those risks to health or safety.

The Tripartite Action Plan has elements that relate to training of workers, such as the intention to train 40 000 H&S representatives over the next five years, and the promotion of learning from best mining practices (COM, 2010:129).

Mining Qualifications Authority (MQA)

The MQA is the sector education and training authority (SETA) for the mining and minerals sector. The MQA was established in 1998 under the auspices of the Department of Labour. Since November 2009, the MQA and other SETAs in South Africa report to the newly-established Department of Higher Education and Training (Presidential Proclamations 44 and 531 of 2009). The Skills Development Act 97 of 1998 provides for a levy-grant scheme, whereby training levies are paid by employers in order to fund SETAs. These authorities then administer funds, manage the skills development process within the sector, and disburse funds to employers and other vendors of education and training. During the 2009/10 financial year, MQA revenue was R576 million; of this, following a surplus the previous year, R566 million was disbursed to mandatory and discretionary projects (MQA, 2010:86). One of the discretionary allocations of the MQA, made during the year, was R24 million for its occupational H&S programme (ibid:87). Furthermore, each year, mining employers are compelled to spend a percentage of their wage bill (apart from the skills levy) on skills development, the target rising from 3% in 2010 to 5% in 2014 (MQA, 2011:34). The MQA oversees and accredits nationally recognized qualifications, skills programmes and short courses.[32] H&S is a stated policy priority:

> The MQA was established in order to improve health and safety standards through education and training in the mining sector. …The legislative arrangements impose on the MQA a legislated responsibility to place health and safety at the centre of its focus and skills development activities (MQA, 2011: xvii).

[32]A *skills programme* is a registered, occupationally-directed programme designed to constitute credits towards full qualifications, ensure competence in compliance with legislation, provide employable skills, and address identified skills needs of the industry.

A *short course* is a short learning programme through which a learner may or may not be awarded credits. Short course providers can qualify for skills levy grants, as long as the provision is properly documented in workplace skills plans and submissions.
(Source: SAQA, 2011:n.p.)

Competing policies and priorities

The work of the MQA is subject to compliance with legislation and policies additional to the MHSA. These include the Mining Charter (the Charter), the National Skills Development Strategy III (NSDS), the Government's Medium Term Strategic Framework policy objectives, and the Presidential Outcomes for the Minister of Mineral Resources and the Minister of Higher Education and Training (MQA, 2011:124-126).

Although other statutes apply, the following discussion is restricted to the Charter and the NSDS III.[33] In October 2002, a Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry (the Charter) was accepted by stakeholders from state, labour and business. The Charter advocates a range of transformation commitments for the sector, but a recent assessment by the Department of Minerals Resources (DMR) revealed 'a number of shortcomings in the manner in which the mining industry has implemented various elements of the Charter' (DMR, 2010:i). Consequently, the Charter was updated in 2009 and certain commitments prioritized, mainly with regard to structural changes in the sector.[34] The MQA has responded to the Charter in its priorities and programme planning (MQA, 2011:33-35).

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[33] According to the MQA annual report, its legislative mandate includes:

Mine Health and Safety Act (No. 29 of 1996);
Skills Development Act (No. 97 of 1998);
South African Qualifications Authority Act (No. 58 of 1995);
Minerals and Petroleum Resources Development Act (Act 28 of 2002)
(Source: MQA, 2010:4).

[34] The main Mining Charter commitments are:

- transfer of ownership of mine assets to historically disadvantaged South Africans (HDSA);
- procurement of goods and services from BEE entities;
- employment equity in terms of management appointments;
- beneficiation of minerals;
- human resource development, which requires investment by mining companies of a percentage of the annual payroll in skills development (excluding the mandatory skills levy);
- mine community development;
- housing and living conditions of mineworkers

(Source: DMR, 2010:1-4).

MQA commitments in relation to the Charter are stated as: skills audits across the sector; ownership of mines; employment equity of managers; the investment by mining companies of a percentage of the annual payroll in skills development (excluding the mandatory skills levy); and sustainable development and growth of the mining industry (ibid: 33-35). These commitments do not overtly prioritize H&S, although 'Charter requirements underscore the importance of health and safety in the skills development agenda' (MQA, 2011:35).

The NSDS III was produced by the Department of Higher Education and Training (DHET) in 2010 and finalized in 2011. The overall purpose of NSDS III is outlined below:

> The key driving force of this strategy is improving the effectiveness and efficiency of the skills development system. This strategy represents an explicit commitment to encouraging the linking of skills development to career paths, career development and promoting sustainable employment and in-work progression (DHET, 2011:5).

The consequent skills development priorities of the MQA for the current planning period are listed as:

- Support transformation of the sector through skills development;
- Support objective decision making for skills development through research in the sector;
- Enhance information management for skills development in the sector;
- Facilitate and support the development and implementation of core skills development programmes aligned with the sector qualifications framework; and
- Enhance the monitoring, evaluation and review of the delivery capacity and quality of skills development in the sector (MQA, 2011:129).

Such skills development priorities may align with the overall purpose of NSDS III, that of effectiveness and efficiency of training, but again do not place precedence on H&S. Clearly, the priorities of the sector have been supplemented since the MHSA was drafted in 1996.

Where there is evidence of prioritization in relevant documents, this appears to be in chapters devoted to compliance with the Mining Charter (MQA, 2011:104-113) and the NSDS III (ibid:113-123), with H&S often embodied as an underlying value, rather than an overt programming objective. The situation is reminiscent of the politics of school reform, where implementation of reforms suffers under 'policy churn'. Problems and targets are identified and agreed upon by stakeholders and more policies are formulated, but in essence the stakeholders have really only agreed on the problems, rather than on plans for implementation (Marschall & Shah, 2005:172). In a situation where officials are placed under tremendous pressure to produce short-term results, a policy is better than nothing (Hess, 1999:7). Without widespread access to mines or to restricted data bases, it is not possible to assess what training actually happens. The public documentation of the sector suggests that the H&S priority may have been weakened by agencies being required to comply with many diverse policies, with the menu of policies enabling a bias towards those who are amenable to demonstrating compliance; there may also be a bias in the structure of reports.

5.3 Public evidence of training

Challenges

The custodians of H&S training are diverse and non-standard, and in spite of legislation, practice is largely unregulated. 'Most interventions are at individual company level with advocacy and some projects at the tripartite and Chamber levels' (COM, 2010:103). Literature of a technical nature regarding the use of specific equipment for H&S can be found, but there is much less about training approaches and techniques. The restricted access and limited information are reported by other researchers, who explain that: 'Historically it was claimed that training was not really a contributing factor regarding accidents and that a lack of training was not one of the most common causes for accidents or health related incidents on mines' (Webber, Youngman & van Wyk, 2009:323). Mining companies are viewed as 'reluctant to share information that can impact on their place in the market' (Frankel, 2010: xv). The role of the state, as represented by the Department of Minerals and Energy (DME), is to monitor, audit and enforce compliance, but there is a dire shortage of the personnel needed to do so (DME, 2010:66).

Ultimately, the official body most responsible for H&S training in the sector is the Mining Qualifications Authority (MQA); hence the MQA publications are dealt with in detail.

Compliance with the MHSA

Compliance with training sections of the MHSA appears to be variable, but inadequate across the sector. Evidence reveals that very little of this training is done, and where it is done it is not documented (DME, 2008:37). There is even less evidence of training on small mines (ibid:64); less than 50% of small-scale mines surveyed had a structured training programme for employees (Dias et al., 2007:8). The main findings of the Presidential Audit on mine H&S training were:

- There was generally poor provision of occupational health and safety training.
- Some of the mines did not have accredited training providers.
- There was a lack of training on hazard identification and risk assessment.
- On-the-job training was not done by most of the mines (DME, 2008:63).

Independent research supports these observations: 'Far less training takes place than is anticipated by Section 10 of the MHSA. The quality of material provided by some in-house mining departments is also very poor when it comes to encouraging safe practices and the training staff are often poorly motivated' (Frankel, 2010: 44). An explanation for the policy-practice divide has been offered by legal analysts:

> The path-breaking provisions of the Mine Health and Safety Act set the standard for health and safety legislation in South Africa, but have proven difficult to implement. There is a huge gap between reactive, prescriptive and command-driven approaches to health and safety, and approaches which are proactive, best practice-seeking and inclusive (Masilo & Rautenbach, 2008:v).

Task- and operator-focused training

As stated above, one aspect of H&S training is to provide workers with training to execute particular operations in ways that enable them to work without risk to their own H&S, or that of others. This approach has shown the most evidence of progress in dealing with H&S limitations.

The MQA has facilitated the production of extensive qualifications and 140 skills programmes (MQA, 2011:87-88), and has assisted in the development of associated national unit standards. These are far too numerous to analyse here, but relate to the mining activities of many workers, such as explosives handlers, blasters, drillers, winch operators, drivers, and shaft sinkers. Many of the relevant unit standards on the MQA and South African Qualifications Authority (SAQA) websites contain assessment criteria relating to safe operations and a healthy environment. H&S components are also included in skills programmes designed for particular operators. In 2009, the MQA undertook a research project in which a selection of MQA qualifications was evaluated in terms of their coverage of the relevant health and safety issues (MQA, 2011:31).[35]

Induction and in-service training

The training of elementary workers, machinery operators and drivers is primarily the responsibility of employers, since these workers generally do not have adequate formal schooling to be eligible for accredited skills courses and qualifications at NQF Level 1, equivalent to about Grade 9. 'These categories of workers are typically trained for their specific positions after entering into employment contracts' (MQA, 2011:74).

> The scope and intensity of training for novice miners, refresher courses when mine workers return from periodic leave, and other programmes to maintain a focus on safety is far less substantial than the many months basic and continuous training, given to, for example, British miners' (Frankel, 2010:44).

Induction and refresher training are largely left to the discretion of employers who make use of their own training sections or contract providers. 'The quality and extent of training is left to be determined by each mine, mining group, or by mine management intent on making workers production able as soon as possible' (ibid:44).

[35] I requested this report (EE Focus Report) from the MQA on 21 June 2011, but it was not made available to me, as quoting from the document is not permitted.

The MQA does not provide employers with any guidelines regarding H&S training for the induction of new recruits to mining, or any other underground workers (de Leeuw, 2011: Personal communication). Some information on in-house H&S programmes can be accessed via their advertising on the internet. My searches of programmes on offer reveal that many are targeted at managers rather than underground workers, and are designed to assist employers in understanding and implementing the basic requirements of the legislation. Recently, due to pressure to comply with the MHSA, more training vendors advertise H&S programmes for mineworkers. However, the actual programme outlines reveal that many do not relate specifically to mining, but are about generic H&S, such as physical fitness, fire fighting and first-aid.

Dedicated H&S training

Evidence of dedicated H&S training for mineworkers, focussed specifically on problems that represent the greatest risk to health and safety, is limited. This observation is supported by others: 'MQA training in the specifics of safety and health, as opposed to technical training, is still fairly poor at all levels' (Frankel, 2010:45). 'Health and safety as a subject has not been adequately addressed like the technical subjects' (DME, 2008:39). The most recent annual report of the MQA refers to only one detailed record of dedicated H&S training for the period 2009-2010, a skills programme for H&S representatives (MQA, 2010:53). The proposed training is discussed further in Chapter 6. It is not possible to ascertain how many mineworkers may have been enrolled on other MQA-supported H&S programmes, since such information is not published in the annual report, though it may be available on a restricted access data base (MQA-I-Share). Since its inception, part of the brief of the MQA has been to monitor and alleviate skills shortages in the sector (MQA, 2011:89). As stated in Chapter 1, the categories of workers forming the primary focus of this study, elementary workers, machinery operators and drivers, suffer injury and ill health: 'These occupations experience a high replacement demand due to mortality related to occupational and other diseases, and accidents on duty' (MQA, 2011:102). This is a researched trend in the sector, yet occupational H&S is not substantially evident in public reporting of training programmes, even if HIV is a contributing factor.

Lung disease kills many times more mineworkers than accidents each year, and the mining industry is experiencing its worst TB epidemic ever, yet evidence of programmes or guidelines on lung health for new recruits or any other mineworkers could not be found. This may be due to the occupational bias of training and the logic of attaching H&S to operator training. In terms of complying with the MHSA, there is no convincing evidence that every employee is being trained to deal with the biggest threat of all, lung disease. This observation is supported by Calver (2008:26), who states that 'Many employees have little or no understanding of the processes that lead to occupational lung disease, their consequences, how to protect themselves from the conditions.' More specific information on addressing lung health is presented in Chapter 6 on health communication.

5.4 Education and H&S

Under-education

In 1994, the Leon Commission identified the general levels of education of mineworkers as 'woefully inadequate for this multi-million rand enterprise' (Leon et al., 1994:70).

> Managers who are working for mining companies in more developed countries cannot comprehend fully the difficulties under which their South African counterparts have to labour to run their mines and try to maintain an acceptable level of health and safety. …Even symbolic communication is difficult when there is a large difference in cultural background between those who wish to communicate (Leon et al., 1994:70).

The Leon Commission advocated adult education and recommended that `all mining companies move forward the national initiative in adult education with a view to improving communication in mines, which will in turn result in improved health and safety' (Leon et al., 1994: 168). In 2008, 14 years later, the Presidential Audit made the same sort of observation:

> Most of the mining workforce lack basic literacy and numeric skills and a lack of literacy renders written communication with most of the workforce impossible… South Africa's standard of education in the mining industry is on average several years behind that of the developed world with our similar mining economic structure (DME, 2008:36-37).

The same kind of logic is still evident in some mining publications. The conflation of literacy, English language skills and a common language of communication into a single problem of worker under-education continues. In fact, it is regarded as inhibiting the thought processes of the workforce in relation to H&S, as seen in the extract below:

> Perhaps the most fundamental constraint is that of poor education and literacy in the workforce. This hampers not only workers' ability for advancement, but also affects their ability to benefit from training and awareness initiatives. Sixteen years later, many of the fundamental problems remain in place. A large proportion of the labour pool still enters the economy with weak or incomplete literacy and numeracy skills. A workforce that is able to absorb the importance of corrective actions and safety initiatives requires such skills. Three-dimensional thinking and clear communication of sometimes complex measures are required if safety initiatives are to gain traction (Reichardt, 2010:62).

Current documentation of the mining sector still suggests that literacy instruction and ABET are the most relevant training interventions for H&S: 'The MQA was specifically tasked with the improvement of the Occupational Health and Safety (OHS) skills capacity in the industry, by reducing the rate of illiteracy and increasing the human resources supply in scarce skills areas that are critical to OHS' (MQA, 2011:31).

DMR completed audits on 250 of about 333 high-risk mines and in its report it identifies numeracy and literacy as fundamental requirements for skills transfer and maintains that the lack of these skills among nearly one quarter of the employees is an obstacle to communication and effective health and safety training (ibid: 31).

Formal education of mineworkers

The origins of the low levels of education of South African mineworkers are not dealt with here, other than to acknowledge the obvious historical ties to racial and political inequalities, disparities in resource allocation, poverty in the southern African region, and unresolved problems in the delivery of schooling. Underground mine work is also physically demanding and tends to provide employment to people who cannot find other occupations because of their lack of formal education. The Mining Qualifications Authority (MQA) has recorded the formal educational levels of workers across the mining industry.

Table 14: Formal education of employees in the mining sector		
Year	**2002**	**2009**
No Schooling	16.3 %	15.4%
Pre-ABET	2.8	3.0
STD 1/ Grade 3/ ABET 1	12.3	5.0
STD 2/ Grade 4	7.0	4.1
STD 3/ Grade 5/ ABET 2	6.7	4.6
STD 4/ Grade 6	6.0	4.9
STD 5/ Grade 7/ ABET 3	8.2	6.9
STD 6/ Grade 8	6.9	5.0
Sub-total	**66.2**	**48.9**
STD 7/ Grade 9/ ABET 4/ NQF 1	5.6	6.1
STD 8/ Grade 10	7.9	8.2
STD 9/ Grade 11	4.4	7.8
Matric/ Grade 12/ NQF 4	11.5	19.5
Post-school Qualifications	4.5	9.5
Total	100 %	100 %

(Source: MQA, 2011:16)

This provides an uncertain scaffolding of foundational educational skills for further training:

- 15.4 % of all mineworkers never attended school at all.
- 37% of mineworkers did not complete primary school.
- 48.9% of all mineworkers left school before a level equivalent to NQF 1 (Grade 9 or ABET 4) and consequently lack the educational scaffolding for registered qualifications and skills programmes in mining or other employment sectors.
- 71% of all employees did not complete their schooling, but this figure is estimated at 80% for underground workers (DME, 2008:35).

The CEO of the MQA has said that more than 67% of mineworkers are illiterate (Chilwane, 2009:n.p.). This makes sense, given that the educational standard used to estimate literacy rates is arbitrary; some adults forget what they learned at school, especially if they were exposed to very little or poor quality schooling, while others advance their school-based learning, particularly if they operate in highly literate or numerate environments as adults. As Rule (2006:115) states: 'Because of the appalling standard of apartheid schooling, and the continuing dysfunction of schools in the democratic era, many adult learners who have nine years of schooling still require basic education.' Clearly, most workers in the mining industry are candidates for compensatory adult education, i.e. education intended to compensate those who were deprived of part or all of the education they would normally have received during the period of compulsory schooling. The mining industry has two possible responses to under-education: to employ only workers with school-leaving certificates, which may result in labour disputes, or to provide compensatory adult education. Some mines, especially the relatively more mechanized coal mines employ only workers, who have completed formal schooling (Grade 12), but this is not a publicly stated policy; it just happens.

The ABET response

The provision of compensatory ABET is a strategic programme of the MQA, though enrolment has declined in the sector over the past five years. In 2005, submissions to the MQA from mines set ABET numbers at 20 339 (MQA, 2006:59).

Problems with implementation appear to be the major barrier, followed by the limited prospect of reward in terms of further career or employment opportunities. The most recent programme results are:

Table 15: ABET in the mining sector 2009-1010		
No. Workers	**Enrolled**	**Completed**
Level 4	1 668	519
Level 3	3 527	1 288
Level 2	3 966	1 577
Level 1	4 769	1 687
Total	**13 930**	**5 071**

(Source: MQA, 2010: 24)

ABET in the mining sector faces more implementation challenges than in other industrial sectors in South Africa because of the complications of releasing workers at consistent times during shift changes. The physical demands of mining also result in workers being too tired to concentrate after their shift. Block release programmes are usually more successful in local industry, but workers may then have to forgo earning overtime bonuses during that period. These financial implications are critical for workers, but are not managed consistently in the industry. 'It is clear from the data that it is the larger companies that can afford to be more generous with regard to fully paid (including bonuses) full-time ABET programmes' (MQA, 2006:59). There is also no evidence of long-term reward for ABET: 'While companies are quite positive about the available career-pathing and counselling systems in place, union representatives and employees are quite negative about the systems (or lack thereof) for guidance, counselling and the provision of information on opportunities, etc.' (MQA, 2006:51). In 1987, David Brown conducted a study of literacy and language on the gold mines. He reported that there was no direct relationship at the time between leadership amongst unskilled workers and levels of literacy, i.e. no correlation with appointment to menial work or as team leader, and that the majority of people who went to literacy classes did not get promotion (Brown, 1987:12-15).

Currently, the MQA reports that 'the issue is improving with a mix of formal and informal advising on further opportunities,' and that the responsibility for these functions is located differently at different mines (MQA, 2006:61). There are other pertinent issues. Many mines do not offer ABET 4, and employees expressed some lack of motivation to enrol, as their educational upward mobility was capped at a particular point (MQA, 2006:59). Finally, experiences in other companies in South Africa have shown that advocacy and marketing of ABET have to be especially sensitive in large communities of men, many of whom may have been through intense manhood rituals and consciously put aside 'things of childhood,' such as schooling. The programme cannot simply be depicted as a return to school. The issue of the masculine identities of mineworkers was discussed in Chapter 2, but I have not found references to this question in relation to ABET in the mining sector.

Impact of ABET

The MQA investigated the impact of ABET on H&S in the sector, which was found to be positive, but with a qualification: 'A common perception exists that ABET contributes to improved health and safety, but it is not possible to make this link quantitatively through data' (MQA, 2006:56). The MQA study treats ABET as a single holistic process and does not subject it to analysis of component variables and differentials (ibid:17-20).[36] I have tried to further explore the reported connection between ABET and H&S. The three sources of effect, improved *literacy*, enhanced *awareness of H&S i*ssues, and *self-concept*, are outlined below:

[36] For example:
My MEd. was a study of individual and organizational outcomes of ABET in a factory south of Johannesburg (Tuchten, 1997). Research participants were mainly migrant workers, having a social and educational background comparable to mineworkers. At the time, in the context, the findings suggested that there are some general trends that relate to ABET organization of levels and learning areas. Enhanced literacy and English communication helped in the workplace with reading and communication, while numeracy had the most impact on better management of money (Tuchten, 1997:99-100).

ABET Level 1 (Grade 2/ basic literacy in the mother-tongue of the learner): increased self-esteem of individuals, improved morale in company, lower absenteeism.
ABET Level 2 (Grade 5/ post-literacy and English communication): communication in company improves, reporting of rejects improves, machine down-time better.
ABET Level 3 (Grade 7/ reading and writing English and more complex numeracy): workers take on new tasks and machines as they can read English and understand basic numeric conventions (Tuchten, 1997: 111-136).

Improved literacy (mastery):

> Many reports mention that literacy improves safety in the workplace because employees can read and understand warning signs. …ABET helps learners to read and understand: safety warnings; instructions; company briefings; and to communicate better (ibid: 46).

An *enhanced awareness of H&S* issues (mastery):

> Almost all the mines commented that ABET employees are more aware of health and safety issues pertaining to the work place as well as the world in general… Employees are more aware of health issues, including HIV/AIDS, malaria and TB (ibid: 46).

Self-concept:

A universally acknowledged outcome of literacy and ABET is improved self-esteem. It can be a personally transformative experience, even when there are no economic or other gains. Any aspect of an adult's life that is difficult due to a lack of literacy, numeracy and English language skills, such as shopping, communication at work, organizing children's education, or reading out loud at church, would be enhanced by ABET. Consequently, H&S efficacy, as well as many other aspects of a worker's life, could be enhanced by the ABET process, especially if it were a positive experience, leading to enhanced self-esteem. This relates to 'self-concept', an accepted source of self-efficacy (Bandura, 1994:n.p.; Kear, 2000:2).

Furthermore, ABET practitioners generally aim to contextualize learning, so current safety, and especially health, issues would probably be discussed or read about in classes, enhancing participants' awareness and mastery of these subjects. ABET programmes in industry can be unique to the context, because adult educators have some exposure to AET traditions and concepts such as 'learner-centeredness', as compared with trainers and line managers. An ABET class may tend much more to a *dialogic space* than other industrial settings, allowing H&S issues to be interrogated with candour and validity, facilitating enhanced engagement and efficacy. However, the low showing of ABET indicates that it is necessary to facilitate comparable awareness and mastery of H&S subjects outside of ABET structures.

In terms of *scale*, the mining industry currently employs approximately 548 000 people (MQA, 2011:10), most of whom are elementary workers, drivers and machine operators, the categories which would be exposed to most danger underground and least formally educated. Graduates of all ABET levels, taken together without information about the number of subjects involved, amount to just over 5000 per year. Numerically, this is a very small proportion of the target employees. The ABET initiative is both too small in scale and too slow to have a definitive effect on H&S in the mining sector. Compensatory ABET is a constitutional right. Good quality ABET has tremendous potential for fast-tracking talented individuals and for compensating people who want a second chance at education. Not every adult worker, however, will have such an inclination. The recommendation of the Leon Commission regarding adult education as a primary intervention for improved H&S has not proved to be a feasible policy for widespread H&S advocacy or training. The diminishing impact of ABET on H&S over the past 17 years, reaching its present low level, supports a case for urgent alternative and additional interventions.

5.5 Language issues

Communication

The Leon Commission also suggested change in the mining sector in terms of language and communication (Leon et al., 1994:168). Since the employment of migrant workers in the 1900s, the accepted lingua franca of the sector has been a local pidgin language known as Fanakalo (or Fanagalo). 'The safe and healthy operation of the industry depends, inter alia, on effective communication. The lack of common communication undermines the efficiency of oral communication and has a negative effect on skills development' (DME, 2008:36-37). Over time this suggestion has become an unfulfilled quest for a single, suitable language for the sector. Communication in the mining sector is complicated by the following factors:

- Mineworkers use many different languages, at least 13.
- Many workers do not speak English.
- Most mine personnel still use the lingua franca of Fanakalo.
- Some stakeholders criticize Fanakalo as being both limited in its expressive capability and offensive.

To date, a clear and constructive language policy continues to evade the mining industry, and especially the training departments. Current language policy for the industry veers between English and multilingualism. 'If Fanakalo is phased out one solution is to substitute it with English, the other is to encourage and promote multilingualism in the industry' (Diliza, 2009: 1). A review of the MQA language policy is under way (MQA, 2011:30), but the Chamber of Mines has not formulated a language policy to date.

Fanakalo

Fanakalo is described as a pidgin language that consists of about 2000 words, about 70% of which are based on the Zulu language. Put simply, a pidgin language has simpler structures and is less developed than a creole. Fanakalo is still widely used in the mining industry and other sectors, but is thought to have origins in the KwaZulu Natal sugar farms or in interaction between missionaries, farmers, traders and residents of KwaZulu Natal and the Free State regions (Allman, 2009:31; Oosthuizen, 2008/9:42). Although Fanakalo is classified as a pidgin, it has qualities that differentiate it from classical pidgins. For example, the European language is usually the target language, but in the case of Fanakalo the indigenous language, Zulu, was the target language that the European settlers tried to learn (Oosthuizen, 2009:42). The word Fanakalo probably originated in a translation of *enza fanaka lo*, which means 'do it like this.' As is the case with most creole and pidgin languages, Fanakalo developed in a context of disparity of power and resources. It is often described in very negative terms, as in the following quotations: 'South Africans, though, view the language, as an entity, with disdain, despite its continued use, due to its symbolization of social hierarchies and the apartheid era' (Allman, 2009:31); it is 'a language of command and carries connotations of boss-servant relationships' (Block, 1998:A1); it is 'designed to drive people at work' (Moodie, 1994:102); and is, 'in essence, a language of instruction' (Oosthuizen, 2008/9:42). The language is also said to be limited in its functionality, 'with little subtlety and no nuance' (Moodie, 1994:102); it 'has a very limited vocabulary and is unable to convey subtle meaning' (Oosthuizen, 2009:42); and is 'inadequate to convey the nature and extent of the dangers in the occupation of mining' (DME, 2008:36). A mining publication describes attempts to change language use in mining as follows:

> I am aware of numerous attempts to stamp out Fanakalo in the past by various mining houses, but this is the first time that such a comprehensive solution is being sought and is being enacted. We know we have a solid working model that will finally release mining from the shackles of Fanakalo (Mining Africa Yearbook, 2008: 2).

The quotes above demonstrate the kind of invective that has been attached to language debates in the sector. The expressive limitations of Fanakalo have not been studied, but it seems questionable to state that people are unable to express themselves in pidgin or creole languages, which are usually flexible in terms of developing new vocabularies and registers. Motsaathebe (2010:105) describes Fanakalo as wide-ranging and 'utilised by many artists especially novelists and playwrights.' During the 1980s, white Portuguese-speaking miners, if unable to speak English or Afrikaans, were allowed to take their examinations for blasting and supervisor certificates in Fanakalo (Brown, 1987:4). More recently, it has been advocated that 'a common language such as Fanakalo could potentially be developed, studied, and used as a common language across the continent' (Motsaathebe, 2010:98). Much intense advocacy work is being carried out on behalf of indigenous pidgin and creole languages all over the world. It would be unthinkable to describe other pidgin and creole languages in the pejorative terms used for Fanakalo, often by academics who themselves do not use the language. The history of Fanakalo under apartheid raises questions about how such debates can be manipulated for and against skills development and the degree of caution required. Brown (1987:7) argues that negative opinions of Fanakalo perpetrated by linguistic academics suited apartheid ideologues and militated against it acquiring the status of a language. 'The majority of workers came from 'homeland' areas, whose sense of national identity [they] wished to promote,' and officially maintaining separate ethno-linguistic groups 'promoted this desired sense of nationalism' (ibid: 7). Maintaining the uncertain status of Fanakalo helped to prevent it from receiving equal status with the official languages (English and Afrikaans) for the purpose of training skilled labour, entrenching the situation that remains today, where blasting examinations must be taken in English or Afrikaans (ibid:7).

Language policy

Language policy for training remains unresolved. A reading of local in-house reports of training activities reveals that trainers often default to the use of Fanakalo. However, as Fanakalo is not one of South Africa's 11 official languages, its mandatory use in the workplace or in training may not align with national or sectoral language and training policies. In turn, this could impede access to funds provided to employers for training by the South African government via the sector education and training authorities (SETAs). However, the call to replace Fanakalo with English is proving difficult:

> In this context, the politically motivated removal of the mine language Fanakalo has not helped. There is no question that Fanakalo is a command language, lacking subtlety or respect for people. However, being part of the induction process, the language formed a common medium of communication that allowed all levels of the workforce to interact and communicate at the rock face, irrespective of their background and skills levels. Given the high levels of illiteracy persisting among the mining workforce, English could not automatically take Fanakalo's place at the rock face, despite the demands of politicians that it should (Reichardt, 2010:62).

The many mineworkers who do not speak English would take many years to master it with confidence, as they have little time for part-time study, which often clashes with shift work and overtime employment opportunities. Mineworkers have relatively few opportunities to practice and reinforce new language skills, as they do not use English socially and mining is a largely physical occupation in a noisy environment that does not encourage conversation, especially as workers are encouraged to use ear protection. The extremely negative critique of Fanakalo, one of the assured abilities of these workers, simply undermines them personally and professionally. I could find only one serious attempt to study mineworkers' attitudes to its continued use. A survey of workers conducted in the Anglo Platinum operations, revealed that more than 60% of the workers would support the banning of Fanakalo in their place of work.

> As research conducted among some 6000 employees revealed, most employees agreed that a change in Angloplat's language policy would improve understanding among employees and enhance work place safety. The aim is to provide for an operational level of communication proficiency, rather than to enable literacy and fluency (Mining Africa Yearbook, 2008:1).

I was unable to access the actual research report, but found an article on the study and spoke to the senior researcher involved. The findings of the study were that the mineworkers elected to use one of their local languages (Setswana or sePedi) over the Zulu-based Fanakalo, rather than English, as the dominant medium of communication in the workplace, though they regarded English as extremely desirable (Thwala, 2009: Personal communication). This made sense, as the mining press articles I had read suggested that the Anglo Platinum workers had rejected Fanakalo in favour of English as the language of the workplace. This would have been a form of professional suicide for many older workers. Reflecting on the study and his linguistic research experience, the researcher said that these findings were specific to the locality in which the study was conducted, the platinum mines of the North West Province, and should not be generalized across the mining industry. He anticipated that the findings might be different in the gold mining areas of Gauteng, where Zulu, as well as other languages, was more often used (ibid). The increasing use of contract workers also affects language and training policies:

> Contract workers do not usually reside in one mining operation for a long time. It is therefore difficult to make them part of a specific mine culture. Furthermore, contract workers are usually from different parts of the country and they often speak different languages. Their lingua franca is in most cases Fanakalo. Requiring them to adapt to the language policies of particular mining operations may prove very difficult indeed (Thwala, 2008: n.p.).

Policy directives generally take the form of a choice of language. A more functional approach may be a process of real research and engagement with language practices, though the MQA is currently conducting research into language use on mines (MQA, 2010:37).

The interface between English and Fanakalo (or any other local language) could be interrogated in a more positive way, rather than presenting them as dire alternatives, and policies of localized bilingualism could be considered. Optimal learning opportunities should be provided for those mineworkers who wish to learn English and fast-track their career development, but acquiring a language for simple oral communication and using that language as a medium for new learning and advancement requires different interventions. Short-term English language instruction, confused with literacy, seems to have had little effect since the Leon Commission in 1994 in changing language practices in mining, or in enhancing health and safety.

5.6 H&S culture

Introduction

The three broad approaches to H&S training, making operations safe, focusing on H&S issues, and ABET, have been reviewed. More recently, research and negotiations in the mining sector have revealed consensus about a weak H&S culture[37] (MQA, 2011:31; COM, 2010:129; DME, 2010:126; Hill & Pitzer, 2005:3). The 2008 Tripartite Action Plan on Health and Safety proposed the implementation of a culture transformation framework, after research indicated that OHS culture in South Africa was significantly more negative than in other mining countries, and the Mine Health and Safety Council (MHSC) is currently conducting research into a 'culture transformation framework' for the sector (DME, 2010:126).

South African mining

One of the most influential 'culture' studies, the Safemap report (Hill & Pitzer, 2005), reported many indicators of H&S culture in which South Africa is rated lower than Australia and other international benchmarks. Examples of these follow.

[37] Safety culture refers to shared values and beliefs, those things that are regarded as important in the company, and how they translate into the actions and behaviours of people; characteristics that are the collective behaviours of people in the organization, that over time become patterns (Hill & Pitzer, 2005:5-6).

Trust shows a significantly negative trend in the research. Trust and loyalty to the employer are significantly lower than international benchmarks, and even managers express an extremely low level of trust for their management (Hill & Pitzer, 2005:27-28). Low levels of trust and a poor relationship (regarding safety and otherwise) between employees and their immediate supervisors are also reported, with employees perceiving that their immediate supervisors do not genuinely care about safety (ibid:27). A difference between espoused safety and the application of the safety systems and rules demonstrates 'a high level of non-compliance of safety standards' (ibid:28). The Safemap report recommended a shift away from compliance towards an enhanced H&S culture, suggesting that 'the local mining industry move beyond compliance and systems as a driver of H&S as this may be inhibiting the industry in moving to the next level of developing a more positive safety culture' (Hill & Pitzer, 2005:33). Research has found that the imposition of standards facilitates a culture of blame, especially when adherence to standards conflicts with the responses workers make to achieve production targets, yet infringements of rules and regulations are met with institutionally sanctioned penalties (Phakathi, 2006:13). A shift away from compliance is valuable, because it focuses on efficacy, rather than a kind of rehabilitation of elementary workers, but requires the input of mastery: 'This approach will require that employees at all levels become more competent in the understanding and managing of risks, rather than relying on the prescribed rules and procedures' (Hill & Pitzer, 2005:34). It also builds on a *positive* finding of the Safemap report, one that drew little comment. Compared to relatively low international benchmarks, there is an indication that there is a culture of 'self-preservation' among local mineworkers (Hill & Pitzer, 2005:28). This is a positive base for facilitating more substantial self- and collective efficacy for health and safety. As stated before in this review, there are many aspects of mineworkers' complex lives in which they demonstrate great self-efficacy.

Modifying H&S culture

The H&S cultures of individual mines are not distinct from holistic mine or organizational cultures and are dependent on working conditions and morale, i.e. employees being satisfied with their jobs, perceiving that their supervisors are supportive and considerate, and believing that they are treated fairly by the organization (Jansen & Brent, 2005:725).

It is a challenge to consider how such cultures would be amenable to training. Initiatives in companies with the resources to attempt culture change have been challenging:

> Many multinational mining companies have found that the behaviour-based safety programmes, instituted among their workforces in countries such as South Africa, struggle as they seek to impose a safety behaviour culture at work that exceeds that of employees' everyday life experiences. This suggests that further advances in workplace safety will need to change very fundamental tenets of the workforce culture (Reichardt, 2010:63).

Yet the culture of large and complex organizations, even H&S culture, may not be amenable to interventions. A more defined focus on team culture may be more valid. As stated before, the interaction between workers, team leaders and immediate supervisors is critical to H&S behaviour, because immediate supervisors are clearly significant in the execution - or otherwise - of H&S practices underground. As with the overviews of mine H&S culture, some of the literature on team culture is also negative and speaks of a lack of trust (Hill & Pitzer, 2005:27) and intimidation, as presented below:

> Many young miners are simply too intimidated to approach their older team leaders with information, no matter how intense their HIRA training, because they fear disrupting work that can cause economic loss in the form of a production bonus for the entire team. Others lack sufficient self autonomy to transgress patriarchal boundaries that elevate team leaders, miners, or shift bosses to near imperial status (Frankel, 2010:39).

However, a positive critique is emerging. Panels or work teams who work together underground can be sites of unique energy, ingenuity and loyalty. According to Campbell (1997:278), 'Much has been written about the creative and innovative way in which mine workers have responded to the alienation and danger of their working lives, constructing personally meaningful identities despite massive social constraints.' Researchers have found it difficult to quantify the effects of HIV on injury because of 'anecdotal reports that sick miners are sheltered from more arduous

tasks by their co-workers' (Murray, Sonnenberg, Nelson, Shearer, Bester, Begley & Glynn, 2005:2023).

Phakathi (2006) develops and advocates a *Planisa* (make a plan) model of training which builds on these positive aspects of work team culture and skill. He envisages an approach that grows up from the workplace, taking the 'view from below,' rather than attempting to create a 'new worker' from above (Phakathi, 2006:3):

> There are two ways of thinking about the relationship between work and training. The first approach takes as its starting point the training needed to create a new worker for a putative new workplace. This is described as the *New Worker* model. The second approach starts from the actual workplace and elaborates pre-existing skills and knowledge (Phakathi, 2006:3).

'Planisa is a Fanakalo injunction, entreating miners to deploy their skills and ingenuity to tackle the day-to-day problems posed by the endemic uncertainties and organisational dysfunctions of mining' (ibid:14). It is 'part of the existing occupational culture of miners and an embryonic form of teamwork' (ibid:1). The unique challenges of South African mining, often used as a case for defending the poor H&S record, contribute to the formation of this culture:

> The specificity of ultra-deep mining – depth, heat, the possibility of rock falls and seismic events – represents a unique, artificially created, total work environment. Workers learn to deal with the complex of uncertainties that characterise this environment and it is out of this scenario that their occupational culture is born (Phakathi, 2006:4).

Phakathi points out that management not only recognize *planisa* but consistently order workers to do so: 'In effect, workers are instructed to create their counter-plans to get things done. ...the challenge is to harness the capacities of miners to exercise these occupationally learned skills while eliminating the unsafe aspect' (ibid:14). The most frequently encountered issues requiring this kind of ingenuity, as recorded by Phakathi, were shortages of materials, breakdown of machinery, budgetary constraints, and the imposition of standards (ibid:12-13).

This type of deep contextual research indicates the realities and experiences of a shared culture and suggests curricular priorities for this target group of workers (ibid:15). Health promotion specialists Airhihenbuwa and DeWitt Webster (2004:7) addressed the issue of negativity and suggested that a conscious goal is 'to ensure that an intervention is developed with the idea of *not* only the bad in mind, but to also to promote the good and recognise the unique or indifferent aspects of culture.' More genuine contextual inquiry of underground practices, good, bad and indifferent, could inform H&S training.

Self- and team efficacy

Team culture also relates logically to Bandura's conception of *social persuasion* as a source of self-efficacy (Bandura, 1994:n.p.). The application of learning or technology transfer in the workplace is frequently cited as a problem in mining. The implementation of acquired technique and knowledge is also frequently eroded, if not neutralized, once the worker reaches the underground workplace, because of section, shaft or even team cultures, behaviours and short-cuts that have been sanctified over time (Frankel, 2010:45). A worker who acquires mastery of a task or H&S issue may have such efficacy subsequently undermined in the workplace by social persuasion of his/her peer group. 'It is more difficult to instil a high belief of personal efficacy by social persuasion alone than to undermine it' (Bandura, 1994:n.p.). Rather than grand designs of culture change, it may be functional to address sources of social persuasion at an underground team level, facilitating positive influence directly where efficacy is most vulnerable, at the interface between workers and team leaders. This would avoid placing workers 'prematurely in situations where they are likely to fail' (Bandura, 2004:622).

5.7 Other approaches

This section attempts to identify more subtle approaches, as well as the most reported trends, for training the relevant group of workers. Sources include a mix of approaches, methods and modalities often described as solutions. The integration of these is often advocated (Venter, 2000:34-35; Frankel, 2010:85-93; Jansen & Brent, 2005:719), as is the use of a multi-disciplinary study applying 'general principles derived from other industries' (Willis & Hamilton-Attwell, 1998:1).

'The fact that human loss continues in the industry also indicates that no single correct health and safety method has been defined and no absolute consensus has been established' (Badenhorst, 2004:47).

Hazard identification and risk assessment (HIRA)

An approach that has gained acceptance in the legislated policy and subsequent training is an analytic process generally known as hazard identification and risk assessment (HIRA). 'Risk management processes are fundamental to the Mine Health and Safety Act and most other modern OHS statutes' (Hermanus, 2007:536). This approach is already used in other mining functions, such as assessing financial risk, equipment costs, world financial markets and commodity prices, and supply and demand. It is widely used across other sectors and disciplines as well. HIRA is basically a stage in the wider analytic and sometimes practical process of managing risks of any sort. Foster, Rose and Talbot (1998:334) state that there is an almost bewildering range of approaches and risk assessment techniques available to local mine H&S, but in essence they all contain the same fundamental steps:

- Identify hazards – something with the potential to cause harm.
- Assess the likelihood, or probability, of harm arising from the hazard.
- Assess the severity of harm resulting from realization of the hazard.
- Combine assessments of likelihood and severity to produce an assessment of risk.
- Use the assessment of risk as an aid to decision making.

(Foster et al., 1998:334).

The general complexity of HIRA models has inhibited implementation and training in the sector (Badenhorst, 2004:48; Hermanus, 2007:537; Foster et al., 333). However, the approach is useful in demonstrating compliance with legislation, as it 'also enables the employer to demonstrate readily, both to himself and to other persons, that all the factors pertinent to the activities have been considered, and that an informed and valid judgment has been reached about the risk posed by the hazards' (Badenhorst, 2004: 48). More recently, efforts have been made to extend the training offered to include elementary workers and H&S representatives, as well as managers and occupational hygienists.

'Most consultancies and training organizations now offer HIRA to front-line supervisors and operators with the consequence that relatively more people underground today know a hazard, or potential hazard, when they see one' (Frankel, 2010:37). Local mines have found it most functional to simplify and adapt the HIRA process to specific local conditions and H&S issues (Furter, 2007:5-16; Foster et al., 1998:337; Buys, 2006:30- 31; Stacey, 2009:291-292). Examples of local adaptations cited include applying the concept specifically to engineering design (Stacey, 2009:291-292), or inverting the process, i.e. analysing and ranking factors which increase risk rather than reducing it (Foster et al., 337). Another aspect has been the inclusion of behaviour-based safety (BBS) training methods in the approach. The phrase behaviour-based safety (BBS) refers to the use of applied behaviour analysis methods to achieve improvement in safety performance, i.e. analysis of specific incidents or at-risk behaviours in terms of the organizational structures and practices (Jansen & Brent, 2005:720-721). A local application of both risk assessment and BBS has been the introduction of a rotating safety 'pack' or group who 'stop and fix' problems underground and report valuable information, and of a reward scheme including badges, vouchers, and an electronic board displaying the names of current safety champions (Furter, 2007:15-16). However, these examples are really indicative of integrated and adapted approaches.

Clearly, HIRA has validity and could constitute one of the conceptual tools that make up the 'mastery' component of a self-efficacy approach. This approach tends to be applied more to safety than occupational health, for example, in relation to travel paths, heavy equipment, hazardous materials and explosives (Hermanus, 2007: 537), and does not always carry over into the workplace. 'The long line between identification of a hazard, a risk assessment and a mitigating behaviour is also punctuated by many variables reflecting the social psychology and power relations of those seeking to enhance safety performance' (Frankel, 2010:40).

Computer-aided learning

A current and recurring suggestion in the media and in more formal studies is the use of computer-aided learning for H&S training of mineworkers (Heyns, 2011; Creamer, 2011; Webber-Youngman & van Wyk, 2009; Squelch, 2001).

This is inevitable, as the use of computer-generated virtual-reality (VR) images is common in many hazardous sectors, such as aviation, the nuclear industry, the military and mechanized mining (Foster & Burton, 2004:129). The use of such technology has valid support in mining because it has unique applications; these include the rehearsal of certain operations, accident reconstruction, hazard recognition, creating a variety of scenarios, and simulating situations that would be dangerous in real life (Webber-Youngman & van Wyk, 2009:350-352; Foster & Burton, 2004:129). Engagement with such programmes by relatively uneducated workers is facilitated by the use of touch screens and joy sticks, rather than keyboards and alternative language options (Squelch, 2001:210; Webber-Youngman & van Wyk, 2009:353). Vendors of these programmes inform the press that this modality also reduces training times, cuts costs, reduces the number of training practitioners needed, builds confidence, facilitates leadership, develops pride, and offers multiple language options (Heyns, 2011:3-4). Large sections of the mining industry, including the powerful employers' organization the Chamber of Mines, have adopted the notion of 'high tech' and 'computer-aided techniques' as optimal for health and safety training (Creamer, 2011:n.p.; Naidoo, 2011:n.p.). The specific use of the technology in relation to occupational health and mine culture, however, is unclear. It is evidently a modern, valid and significant component of a comprehensive H&S training system, but is not necessarily applicable to all H&S issues.

Other issues

Various other suggestions are made in the local literature, but with no evident consistency. These include modelling, systems learning, cognitive apprenticeship and African collective learning systems (Venter, 2000:34-35), and demonstrating caring behaviours (Loubser, 2010: 45). A previous literature review I was commissioned to do revealed support for Freirian-type empowerment-based approaches and video as a training modality for mineworkers (Tuchten, 2005:17, 19). These topics did not recur in the current local literature, and empowerment approaches are dealt with in Chapter 2. The quality of training in the sector is an acknowledged problem, and the MQA is currently addressing the issue with the introduction of programmes for educators and trainers (Frankel, 2010:44; MQA, 2010:62; MQA, 2011:91).

5.8 Conclusions

The MHSA is extensive and formulated according to world standards, but is proving difficult to implement. The policy framework for training, provided by the legislation and the skills levy, has not offered public evidence of an extensive and high quality H&S safety training system for elementary workers. A number of legislative and policy requirements, additional to the MHSA, influence training priorities and plans in the mining sector. The public documentation of the sector suggests that the dedicated focus on mine H&S training may be displaced by a number of contingencies: agencies may be required to comply with many diverse policies; the menu of policies may enable a bias towards those who are amenable to demonstrating compliance; or there may be a bias in the structure of reports.

The H&S training logic of the MHSA, which originated in the Leon Commission of 1994, has three foci: task- or operator- specific training, ABET, and hazard-specific training. These do not appear to be fully addressed in the information available on H&S training. Occupation- or task-specific training is the H&S intervention that currently shows most evidence of progress. The low showing of ABET indicates that it is necessary to facilitate comparable awareness and mastery of H&S subjects outside of ABET structures. The hazard specific aspect of H&S training on generic and critical issues such as lung health appears to be quite neglected. Limited evidence is available of dedicated H&S training for mineworkers, focussed specifically on problems that represent the greatest risk to health. The neglect of advocacy around lung disease and other critical occupational health problems is a breach in local interventions and supports a case for immediate additional and alternative interventions. Both the conceptualisation of H&S as a generic subject or issue for mineworkers; and its facilitation outside of ABET and operator training are core problems.

The generally low levels of formal education in the mining industry are assumed to negatively affect H&S. However, the negative effect of under-education is not analysed in depth. ABET is perceived to contribute to H&S and probably does so via three sources of efficacy: literacy, enhanced H&S awareness, and self-concept.

The MQA has been responsible for the design and delivery of extensive qualifications and skills programmes, and has assisted in the development of national unit standards for these programmes. Many of the unit standards and skills programmes contain elements that relate to operating in a safe and healthy way. However the training of elementary workers, machinery operators and drivers is often the responsibility of employers, because such workers generally do not have the adequate formal schooling which would make them eligible for accredited skills courses and qualifications at NQF Level 1. These categories of workers may be excluded from operator qualifications and skills programmes because of their lack of education. The issue of language policy is marred by a lack of serious engagement with language use and practices in mining. Risk assessment processes and computer-aided virtual-reality equipment have unique and valuable uses in H&S training, but are not applicable to all issues. Generally, the integration and adaptation of a number of approaches and methods appears to work best.

Research in South African mines supports a move away from a compliance-based approach to one that supports the development of competence/efficacy in identifying and managing risk. This builds on a finding that there is a positive measure of self-preservation among South African mineworkers, compared to other countries. The transformation of mine H&S culture is a current research concern. Such a culture is dynamic and defined in different ways. At the work team level, it relates to Bandura's notion of social persuasion as a source of efficacy. Rather than grand designs of culture change, it may be valid to address sources of social persuasion at an underground team level, facilitating awareness directly where efficacy is most vulnerable, at the interface between workers and team leaders. However, the negative critique may be an inadequate base for formulating training approaches. Recent research points to positive features of team culture, such as ingenuity and concern for sick co-workers. Generally, research that approaches complex issues, such as H&S culture or even ABET, as single concepts has limited interpretive value. Deeper and more open-ended contextual research is required to inform approaches to advocacy and training, and contribute to building a theoretical base for addressing a dire national problem.