Investigating the impact of formal education and training on employee performance in the coal mining industry

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ABSTRACT

The research investigated the impact of formal education and training on employee performance. The mining sector, in particular the coal mining sector, is experiencing a shift in the composition of workforce from the dominance of the unskilled labour force towards the skilled worker. The transition is coming at the back drop of a changing technological environment, improvements of education and new safety level of expectation. A qualitative research method utilising semi-structured interviews with the aid of an interview guide were self-administered by the researcher to a purposively selected sample of eight (8) participants. The sample includes participants from across the operations of the mine from a single mine right from the shop floor up to senior management level. The research study found that formal education and training had more weight in benefiting employees on the job although it may not be easily visible to the employees. The research also concurred with studies that found a positive relationship between formal education and training and experience on employee performance. Investigating the impact of formal education and training on employee performance as well as that of on the job training was found to be situational to the particular job of the employee. It is recommended that both mine managers and trade unions have a role to play in creating an environment where formal education and training qualifications improves among miners in order to achieve employee performance and subsequently organisational performance.

KEYWORDS

Formal education and Training, On the job training, Employee performance, Organisational performance, Department of Mineral Resources, literacy, illiteracy, Department of Labour, Mines Qualification Framework, Occupational Health and Safety, unskilled and skilled workers, accidents and incidents, South African Mining Industry, Mining Qualification Authority, Health and Safety, Technological adaptation.

DEDICATION

This research study is dedicated to the many that have helped to train and develop me along the way, including:

My wife, Lydia and my kids, Remoabetswe, Goitseone, Oratile and Gogontle;

My parents and family members; and

My Manager, W van den Heever and to the glory of God.

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LIST OF ABBREVIATIONS

ABET	Adult Basic Education and Training (ABET)
AET	Adult Education and Training
COM	Chamber of Mines
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DoL	Department of Labour
EFA	Education for All
ETQA	Education and Training Quality Assurer
FET	Further Education and Training
GCC	Government Certificate of Competency
GEAR	Growth, Employment and Redistribution
H&S	Health and Safety
HDSA	Historically Disadvantaged South African
HR	Human Resource
MHSA	Mine Health and Safety Act
MMCC	Mine Manager Certificate of Competency
MPRDA	Mineral and Petroleum Resource Development Act
MQA	Mines Qualification Authority
NGO	Non-governmental organisation
OHS	Occupational Health and Safety

RBV	Resource Based View
RDP	Reconstruction and Development Program
RPL	Recognition of Prior Learning
SETA	Sector Education and Training Authority
SHE	Safety Health and Environment

CHAPTER 1

1. ORIENTATION AND PROBLEM STATEMENT

1.1. INTRODUCTION

Employees represent an important resource of any organisation. They perform an active role towards company's success, underestimating this role could be detrimental to any company. As a result, equipping the employees through effective formal education and training becomes commanding in order to maximize job performance (Elnaga & Imran, 2013:137). The victory to any organisation rest on the quality of its human capital and, while it is known that training plays an important role, there are still concerns as to which kinds of training and skills acquisition bring economic success (Kum, Cowden, & Karodia, 2014:73).

Formal education and training in an organisation are the driving forces for good business performance and employee performance. Organisations, in particular in the mining sector, are investing in formal education and training as a strategy to attain positive organisational and employee performance. Investments by organisations such as the mining houses are normally in the form of employee bursaries, graduate-in-training programmes, educational loans and incentives; also partnership with institution that offers education and training such as colleges and universities (Russell, 2014:1). Training is delivering a certain skill to perform a particular task or work while development deals with general improvement and advancing an individual skill and abilities through conscious and unconscious learning (Asfaw, Argaw & Bayissa, 2015:189). On the other hand, Radakovic and Antonijevic, (2015:1) went further to distinguish training stating that informal training is an activity that stresses on the job that an employee presently holds

and formal education and training is an activity that, amongst others, focuses on prospective jobs an employee can hold in the future.

One of the biggest challenges in training and education is in building relationships and understanding between managers and employees in order to create practical understanding of the performance needs of the organisations (G20, 2010:1). Understanding such issues as management approaches, styles and employee awareness will help create interventions to directly address underlying challenges in training. In their research, Elnaga and Imran (2013:137) stated that training is a necessity in the workplace and that without it employees will not have a firm grasp on their responsibilities or duties. Thus this renders appropriate proactive training to become more and more difficult to identify in organisations and it is a far greater challenge than ever before (De Wit, Hunter, Howard & Egron-Polak, 2015:80).

The principle role of training and development is to become a strategic tool in the organisation that can be used to build capabilities and competitive advantage to attain strategic goal. In reality, this function is greatly undervalued by organisations and thus it becomes very difficult for training and development to influence and create any value (Park & Choi, 2016:279). The gap that exists between the prevailing and anticipated skills of a given workforce inclines to pave the way to erode the organisational effectiveness and efficiency (Perera, 2009:18). The mining industry had previously been one of the industries that employed more unskilled workers in South Africa (Botma, 2015:37). In recent times the employment structure has been shifting and workers in the mining industry are increasingly required to have formal qualifications in different mining fields. The shift in the employment structure has resulted in considerable changes in employee and organisational performance. The new skills composition of the mining labour force

affects the economy of South Africa especially since mining contributes about 18% to the Gross Domestic Product (GDP) (Michaels, Natraj & Van Reenen, 2014:62).

This study examined the influence that formal education and training has on employees' performance within the coal mining sector. It has become imperative that formal education and training is one of the major driving forces to enable employee performance and subsequently to organisational performance. In this study an employee's performance is bounded by their behaviour which is a function of personality and the environment of the employee, as outlined by Kurt Lewin's equation (B = f (P, E)) (Ramage, Shipp & Lewin, 2009:260). The research also attempted to investigate gaps in formal education and training on employees in the coal mining sector.

1.2. CAUSAL FACTORS

The causal factors for this study are as follows:

- The occupational categories, skilled and management levels in most mines are occupied by competent, successful incumbents coming from the old informal training (on-the-job) and some who received the formal education.
- There are still concerns as to which kinds of training and skills acquisition bring economic success, (Kum *et al.*, 2014:73).
- The recent shift in the employment structure in terms of qualifications in the mining industry.

The importance of this study is discussed in the next session.

1.3. IMPORTANCE OF THIS STUDY

This research examines the influence of formal education and training on employee performance. For formal education to have a maximum impact, managers and employees must have a common understanding and perception of the importance of formal training and education at the mines. In this research factors that enhance employee performance associated with formal training are investigated. The research stakeholders include the organisation, employees, managers and formal training practitioner within the mining sector. Employee performance subsequently translates to organisational performance which is central to meeting the objective of the mining organisation. The study outcomes will assist in efforts to build awareness on where employee performance fits in the objectives of the company and how formal training contributes to such efforts. The role of managers is to make strategic decisions that direct the organisation towards meeting its objectives. If formal training contributes to employee performance the outcome of this research will inform strategic decision making by managers. It is important for training practitioners to conceptually understand and practically demonstrate that education, training and development, as a strategic intervention, has an impact on business and training content must be responsive to the specific needs of business. This study will also explore whether the operation's culture has a bearing on the perceptions of the importance and influence of formal education in the total employee performance. The economy of our country has expanded drastically in the last two decades at the backdrop of a significant increase in formally educated employees joining the mines (Stamp, 2015:12). It is within this background that the influence of formal education and training on employee performance will be investigated in this study.

1.4. PROBLEM STATEMENT

There is a clear positive relationship between organisational performance and employee performance (Mafini & Pooe 2013:1 ; Dajani, 2015:141). In order to drive employee performance career advancement through formal education and training needs to be imparted to employees. Formal education and training within the mining industry is relatively not valued for career advancement as is the case in other industries, a situation that is most likely to prevent or minimize employee performance, career advancement, employee motivation and establishment of a good working environment in the sector (Mining Qualification Authority, 2014:17). The trend is, however, shifting. There has been a proliferation of new technology in the coal mining sector to boost productivity which has exerted pressure on the workforce profile to change, going into the future, from the current dominance of the unskilled workforce at mines towards a more skilled workforce. The skills sets required to achieve employee performance in the new order are already changing towards higher technical requirements as equipment and robots take over the manual tasks. Without effectively consolidating both formal education and training within the mining industry, slow growth as well as the never-ending protests in the industry shall prevail due to the pressure gaps between required skills sets and what being offered by labour. Formal education and training require a level of literacy which may not be an existing asset for the current workforce dominated by the unskilled workforce within the mining sector (Mining Qualification Authority, 2014:18). There is potential of a backlash with employees as these trends progress. The skills gaps pose challenges to managers who are hoping to ensure their employees attain optimum employee performance. Academic and practitioner attention need to be placed on identifying and addressing the gaps to sustain sector wide performance. It is thus within this background that this research will investigate the influence and impact of formal education and training on employee performance as an important requirement in achieving growth and stability in the mining industry through increasing organisational performance. The study seeks to

gain an in-depth understanding of the influence and impact of formal education and training on employee performance from the perspectives of the skilled mining labour force including managers and artisans. Furthermore, the study determines if there are differences in the perceptions of skilled labour force and theoretical argument on the subject in question.

1.5. RESEARCH OBJECTIVES

The research objectives of the study are split into primary and secondary objectives:

1.5.1.0. Primary objective

The objective of this study is to investigate the impact and the influence of formal education and training on employee performance and subsequently organisational performance in the coal mining sector.

1.5.1.1. Secondary objectives

To achieve the primary objective of this study, the secondary objectives to be realized are:

- To determine the relationship between formal education and on the job training.
- To investigate the perceptions and influence that formal education and on the job training have on employee performance
- To determine the influence of formal education and on the job training on organisational productivity at the mine
- To assess how skilled workers, view the influence of formal education and on the job training on mine performance.
- To recommend strategies that can be used to improve the formal education and on the job training at the mine.

- To examine the managerial implication of the influence of formal education and training on employee performance

1.6. RESEARCH METHODOLOGY

1.6.1.0. Research Approach

The research conducted using qualitative research method to answer the research questions. In the quest of conducting the study in light of the qualitative method approach, semi-structured interviews with the aid of an interview guide will be self-administered to a purposively selected sample. In fact, the research has used a non-probability sampling technique, purposive sampling method, to select a sample of skilled workers who are considered experts on the subject matter who have experienced both formal education and on the job training. Data was analysed using qualitative data analysis techniques.

1.6.1.1. Literature Review

For the purpose of this study a thorough literature review, on available theory up until the 15th November 2017, regarding the influence of formal education and training on employee performance and subsequently company performance in the coal mining industry will be executed. The following are the sources to be consulted relating to the topic:

- Journals
- Thesis/Dissertations
- Scientific books
- Online articles
- Internet

1.7. SCOPE AND STUDY LIMITATIONS

The study's utility was limited to groups represented by sample participants. In this case the study's utility was limited to employees from a single mine were they were conveniently drawn from. Generalisation of this research outcome will be constraint by the qualitative design which uses small samples which are conveniently selected. The unit of analysis will be skilled workers with at least three years of working experience within the coal mines.

1.8. LAYOUT OF THE STUDY

The mini-dissertation is divided into four chapters, which will be presented as follows:

Chapter 1: Introduction and problem statement

This chapter discusses the background, context of and causal factors to the study as well as the problem statement. It also presents an overview of the research design and layout of the next chapters.

Chapter 2: Literature review

This chapter investigates, through a literature review; the features of what constitute formal education and what its influences are on employee performance as opposed to informal education within the coal mines.

Chapter 3: Research Methodology and Findings

This chapter presents the research methodology by discussing the sampling methods used as well as the compilation of the survey instrument, the interview guide including the actual interview process, the study participants and the data collection. The results and findings of the investigation are also presented and discussed in this chapter.

Chapter 4: Conclusions and Recommendations

The conclusions of the study based on the literature review and empirical investigation as well as recommendations for further study is presented in this final chapter.

1.9. MANAGERIAL IMPLICATIONS

The study has several implications for management which includes recruitment decisions, training budgets, managerial role in an organisation and performance evaluations. Mining management is responsible for making recruitment decisions that can be informed by outcomes of this study. In particular, significant positive influence of formal training and education on employee performance can influence the recruitment and choice between skilled and unskilled workers. The growth and shrinkage of training budgets is another element in the scope of managerial work which benefits from the outcome study. Managers in the mines realize their plans and target through employees has employee performance is at the centre of their performance evaluation.

1.10. CONCLUSION

The significance of formal education and training in the business world has been emphasized a lot previously. It is now important to scrutinize any questions or concerns associated to formal education and training in any business sector. The study determines if formal education or learning and training has influence on employee, organisational performance in the Coal Mining Industry. In this chapter the problem being investigated is clearly articulated. In the chapters that follows the review of literature on how formal education or learning influence employee and organisational performance will be elaborated and discussed.

1.11. CHAPTER SUMMARY

The chapter highlighted the significance of educated and skilled employees within the coal mining industry as a whole and also indicated the recent changes among the education space within the South African Mining Industry. The attention was drawn to the influence of formal education and training on employee and mine performance within coal mines. Furthermore, the study questions the emphasis of improving employees' relevant expertise and intellectual capacity within the mines, since formal education has not been seen as a crucial aspect of career advancement within the mines; and if considered there are questions on what training is important for the success of the business.

The chapter included the background of the study's focus area and highlighted the main purpose together with the applicable objectives of the study. In addition, this chapter laid down a clear guide on how the study will be conducted and what each chapter will focus on, in terms of content. Finally, a brief conclusion emphasizing the significance of this chapter and introducing the next chapter is put forth.

CHAPTER 2

2. LITERATURE REVIEW

2.1. INTRODUCTION

This chapter is a discussion of the theoretical framework underpinning the study's focus area which is the influence of formal education and training on employee performance. Thus the literature review breaks the study's focus area into elements for discussions with a view to aid understanding of the variables involved in the coal mining industry. It is evident that there are different views, opinions and understanding worldwide as to the influence of formal education and training on employee performance (Degraft-Otto, 2012:xx). This views and opinions are analysed and discussed in this literature review. The answer to the research question asked has certain implications on the weight and enforcement of formal training by the various stakeholders within the mining industry, in particular the coal sector. The literature review will be presented under several title starting with the definition and discussion of key concepts, formal education and training in the mining sector, the relationship between organisational performance and employee performance, influence of formal education and training on employee performance, effects of informal training on employee performance, the future of formal education and training in the mining sector and concluding with the managerial implications. Definitions and discussions of key concepts are presented in the next section.

2.2. DEFINITION OF KEY CONCEPTS

To bring understanding to the focus area of this study the researcher identified and defined the key concepts that underpin this research. These key concepts were identified as follows:

- Formal education and training in the mining sector
- Informal education or on the job training
- Organisational performance
- Employee performance
- Skilled and un-skilled employee

In the next sections these key concepts are discussed in detail.

2.2.1. Formal education and training in the mining sector

The South African mining industry employs a large number of people with no or very little formal schooling. In 2013 the mining sector employed about 564518 employees (Mining Qualification Authority, 2014:18). The employees who held unknown qualifications accounted for about 22%, no schooling accounted for 3%, grade 9 and below accounted for 20%, above grade 9 up to matric accounted for 41% while those with qualifications above matric accounted for 13%. In 2016 the trend shows that those holding unknown qualification and had no schooling decreased to 15% and 2% respectively. A decrease of 7% on those holding unknown qualification and 1% for those with no schooling was witnessed in 2016. The trend is expected to continue into the future due to the new technological configuration in the mining sector. Those holding qualifications grade 9 and below qualifications have increased from 20% to 22%, 41% to 47% for those holding qualifications above grade 9 up to matric and those holding qualifications above matric increased from 13% to 14% (Mining Qualification Authority, 2014:18; Mining Qualification Authority, 2016:20).

The data reveals a net increase in those who hold qualifications in grade 9 and below, above grade 9 to matric and above matric of 2%, 6% and 1%, respectively, from 2014 to 2016. The mining industry has been aggressively decreasing the numbers of those who hold unknown qualification as well as increasing the number of those who holds qualifications above grade 9 to matric.

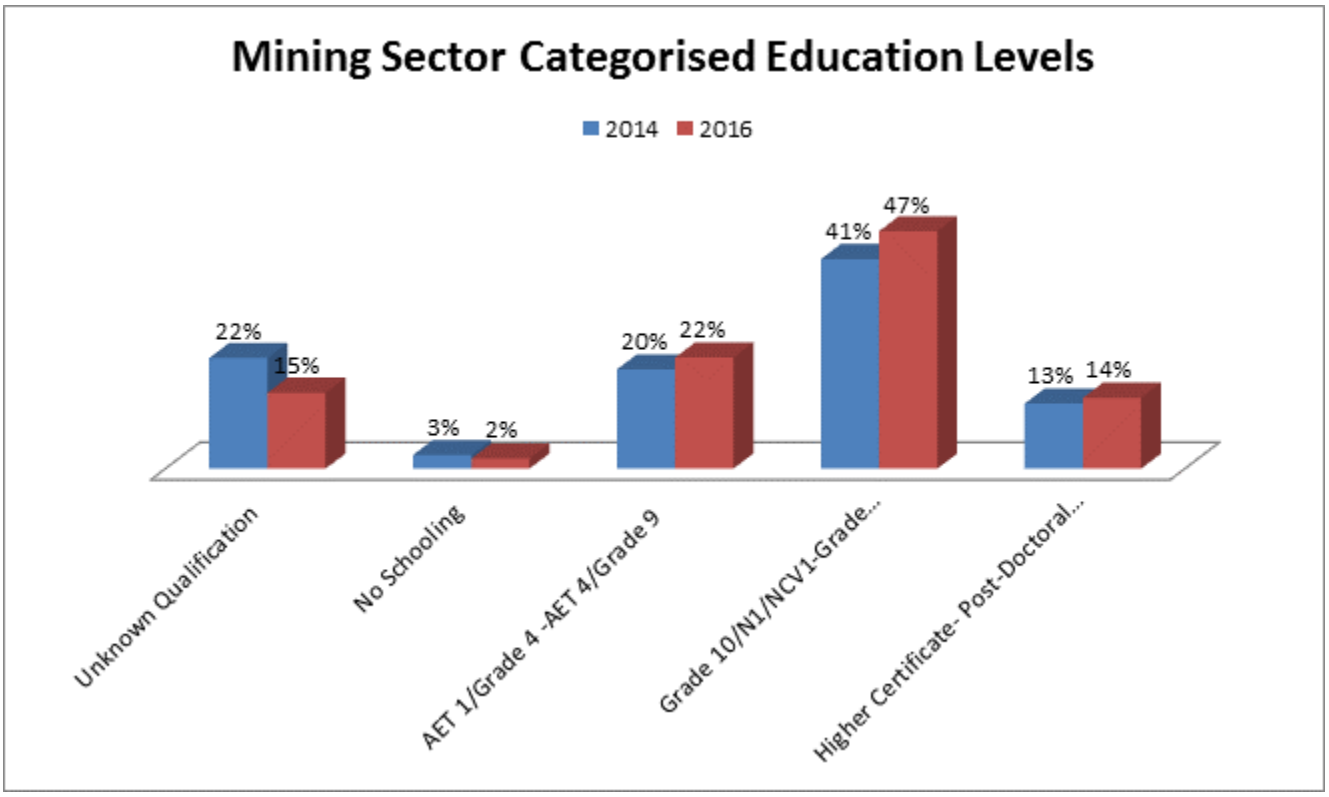

Figure 2.1: Mining Sector categorized Education Levels Adapted from: Mining Qualification Authority (2014:18), (2016:20)

Illiterate mine employees are mostly exposed to dangerous occupational hazards; hence the South African mining industry employs training initiatives such as Adult Basic Education and Training (ABET) as well as Occupational Health and Safety (OHS) training to provide opportunities to capable workers who lack formal education (Botma, 2015:37).

According to Misko, (2008:1) formal education and training denotes learning in courses or programs intended to attain nationally and internationally recognised qualifications. Accordingly, any programme or course that leads to a formally recognized qualification is considered as formal education and training. Formal education and training will thus be distinguished from any training or education that does not lead to any formally recognized qualification. Frankema (2012:336) argued that formal education is different in the sense that participants are assembled according to a prearranged schedule in a classroom setting to engage in recommended curricular activities. Thus participating in prearranged classroom schedules and engaging in prescribed curricular is another distinguishing features between formal and informal education and training. Another distinguishing feature is the fact that formal education and training is non-job related, but focuses on acquiring reading and writing abilities as opposed to learning on the job (Frankema, 2012:336).

Alhassan (2012:53) states that the formal education and training can be recognized by both recipient and deliverer as an intervention which has a structured mode of delivery, with the aim to impart new awareness or knowledge of a workplace process and activity. The definition does not depart from that in Frankema (2012:336) but presents the same issue from the perspective of the learner and teacher. Formal education and training methods takes the form of qualification courses run by universities or colleges, and distance learning institutions. Formal training can also be carried out on work premises such as in-house courses run by outside providers, formal in-house courses run by company staff and internet-based courses (Alhassan, 2012:53). Gok (2013:748) stated that formal education is basic training that gets participants to attain formal results without any understanding of the actual complexity of the problem. The participants do not deal

with a real problem in a real setting but acquire a recognized qualification which will be complemented by experience in a real setting.

In summing up, Park and Choi (2016:280) observed that formal learning can be identified as learning an approach happening within a traditional classroom and it is planned. Formal learning will include off-the-job, lecture-based, or Web-based training courses; and is regarded as an important approach for the employee's competence development (Park & Choi, 2016:280). For the purpose of this study with mining industry in focus, formal education and training was regarded as any education above or high than Adult Basic Education and Training (ABET); structured intervention with prescribed curricular intending to up-skill and enhance employee knowledge, eventually presenting formal qualifications.

2.2.2. Informal learning or on the-job-training

Informal learning is a major component of skills development in the mining sector; both the skilled and the unskilled employees go through informal learning on the job to attain required employee performance. According to Laguador (2013:301) on-the-job training is part of the tertiary curriculum which connects the gap between theory and practice as well as between classroom education and real industry life. The skilled employees join the mining industry armed with theory which combined with informal learning or OJT propels the employee to a level of competency in his work. The unskilled employees join the mining industry with very little theory or knowledge and relies upon their superiors to provide them with on the job training. The trends in the mining industry, particularly in the coal mining industry, places more value in term of remuneration to the skilled worker who joins the industry armed with certified theory to the unskilled worker who joins with very little and uncertified theory (Laguador, 2013:302). The rationale behind higher remuneration for skilled employees armed with theory would be that the costs, in time

and financial resources, of bringing a skilled employee to the required level of competence are deemed to be low (Almeida & Farai 2014:2).

Another interesting trend in the mining industry is that employment preference is given to the unskilled employees. This is evidenced by the dominance of the unskilled employees in the labour force of the mining sector although in recent times; according to Mining Mirror (2015:19). There has been an increase in the portion of the skilled employees in the mining sector. The most probable explanation to the preference of unskilled worker is that preferring skilled worker directly competes with the objective of the mining companies which is to maximise shareholder value. The recent shift towards a skilled workforce can possibly be explained by technological advancements as stated by Mamaqi (2015:1) which reduce the need for unskilled labour and the progress and development of the knowledge economy which requires a knowledge worker, in the backdrop of the development of the knowledge economy formal education and training would be positively associated with employee performance and complemented by informal learning or on the job training. On the job training presents a more precious learning experience that improves the importance of the academic program and forms the view of personal and social usefulness. Informal learning allows the graduating students to apply what they have learned from books in a work environment would develop their work values and attitude necessary to achieve the ultimate goal of education to produce efficient and effective leaders and professionals in cross-cultural and multidisciplinary undertakings (Laguador, 2013:301; Owusu, 2014:6).

Shelest (2016:347) also contributed to the definition of informal learning and stated that it is education that happens through intended activities, but was in contrast to the fact that it is organised in terms of objectives. Berg and Chyung (2008:230) equated informal

learning to riding a bike in that the individual decides on the route, pace and how to manoeuvre within the spaces provided. The emphasis in this analogy is that informal learning is predominately unstructured, experiential, and non-institutionalised and that it can take a reactive form, where the education was unplanned but still be recognized by the learner retrospectively.

2.2.3. Organisational Performance

In recent times, organisational competitiveness heavily relies on employees' continuous learning to develop their knowledge and skills. Organisational performance (OP) may be defined as what an organisation has accomplished with respect to the process, results, relevance and success, as in the mining sector attaining good safety and financials results anchors great performance and excellent strategic goals (De Jager & Steyn, 2013:32). Organisational performance can be narrowed to specific items such as employee job satisfaction, the motivation to transfer education, participation in decision-making, or innovativeness and innovation capacity (Škerlavaj, Štemberger, Škrinjar & Dimovski, 2007:349).

Škerlavaj *et al.,* (2007:351) further states that profit measures and other approaches that take the interest of shareholders are no longer valid methods of measuring organisational performance. Organisational performance which is also termed firm performance is simply underscored by achieving productivity hence there is a strong link between organisational performance and achieving profitability required by shareholders (Mamaqi, 2015:1). While it is acceptable that organisational performance includes employee engagement, job satisfaction, motivation, participation in decision-making, and innovativeness, it is apparent that all these factors dovetail into productivity and subsequently profitability which benefit shareholders. Dajani (2015:138) also found that

employee engagement had significant impact on job performance, but less impact on organisational commitment.

A valid definition of organisational performance can be viewed from a broader perspective that takes into consideration issues such as technology transfers, social legitimacy, and compliance to mining regulation and laws among other wide ranging factors. In terms of the argument above it is evident that employee performance is positively associated with organisational performance as most of the factors identified in the discussion are linked to employees and their performance. The role of employee performance in organisational performance is also confirmed in Nassazi, (2013:2) where it is stated that employees play an active role in achieving company success.

2.2.4. Employee Performance

As in line with the Kurt Lewin's formula on performance (B = f (P, E)) where behaviour is a function of an individual's personality and the environment other authors went further to explain their understanding on performance (Ramage *et al.,* 2009:260). Nassazi (2013:13) argued that employee performance is the outcome or contribution of employees to make them attain goals while performance may be used to define what an organisation has accomplished with respect to the process, results, relevance and success. Dajani (2015:141) stated that job performance or employee performance is the aggregated financial or non- financial added value by the employees in contribution to the fulfilment both directly and indirectly to the targeted organisational goals. If employees are actively involved in the success of the company, then the employee performance is the key input to organisational performance.

Performance was also defined as the achievement of specific tasks measured against predetermined or identified standards of accuracy, completeness, cost and speed. Employee performance can be manifested in improvement in production, easiness in using the new technology, highly motivated workers (Nassazi, 2013:13).

Employee performance is defined as the outcome or input of talented and dedicated manpower, to enhance the chances of organisation attaining its goals and get advantage over its competitors (Nassazi, 2013:13). Alhassan (2012:44) earlier defined performance as the achievement of specific tasks measured against predetermined or identified standards of accuracy, completeness, cost and speed. They further alluded to the fact that employee performance can be displayed in improvement in production, easiness in using the new technology, highly motivated workers. The definition of Ahmad and Shahzad (2011:5250) emphasized the point that employee performance does not include the results of an employee's behaviour, but only the behaviours themselves and that employee performance is about behaviour or what employees do, not about what employees produce or the outcomes of their work. Employee performance represents the known belief of the employee about his behaviour and offerings in the success of organisation. Employee performance may be taken from the angles of three factors which makes probable to perform better than others, these factors of performance may be such as "declarative knowledge", "procedural knowledge" and "motivation" (Ahmad & Shahzad, 2011:5251).

2.2.5. Skilled and unskilled employee

In general, skilled workers at the point of entry are those who join the mining sector with the formal qualification whilst the unskilled joins the sector with little or no formal qualification directly relevant to their job (Musingwini, Cruise & Phillips, 2012:937). On the job skilled worker have the benefit of theory and practical experience. The unskilled

worker is equipped with practical experience on the job. The skilled workers arguably attain a balance between theory and practical in the shortest of time where the unskilled workers gain more practical experience than theory. The underlying assumption is that, the skilled workers will perform better than the unskilled workers and hence are better remunerated (Parteka, 2012:2).

From the perspectives of job content, with specific reference to the coal mining sector, it can be argued that some jobs require more practical experience than theory (International Labour Organisation, 2016:23). Hence employee performance is achievable with the unskilled workforce. Most unskilled employees are designated in less technical but more labour intensive jobs such drilling operators and assistance in various general work.

2.3. FORMAL EDUCATION AND TRAINING IN THE MINING SECTOR

The mining sector presents a unique environment for the implementation of formal education and training due to prior trend where formal education and training was barely recognized. These trends may not be sustainable going forward owing to a number of variables, the change in technology and labour market dynamics included. In this literature review, technological advancements, productivity, matric entry requirement, standards, safety and shortages of skills in the coal mining sector are presented as the relevant unique variables which have a bearing on formal education and training (Musingwini *et al*., 2012:945).

The mining industry is a major source of employment in South Africa, though it recently experiencing a skills shortage in a number of areas, particularly in its technical disciplines (Mining Mirror, 2015:19). The Mining Qualification Authority (MQA) is a South African Sector Education and Training Authority (SETA) responsible for administrating

programmes to develop skills for the mining and mineral sector. The authority states that the number of graduates in fields related to mining and mineral has grown substantially in recent years. However, it does acknowledge that demand for skills far exceed supply (Mining Mirror, 2015:19; Mining Qualifications Authority, 2016: 7).

Mining mirror (2015:19) revealed that 75% of South African mining graduates join the mining industry after graduating but only 15% remains in the industry for long term. The situation results from not willing or not able to acquire the required experience due to lack of perseverance also the fact that they are not able to handle the prevailing production and safety pressure within the mining industry. The prevailing condition of employment and job grading renders the South African mining industry to lose mining engineering skills to developed countries like Australia and Canada (Mining Mirror, 2015:19). Again Neingo and Tholana (2016:286) as well as Botma (2015:12) stated that deficiency of education among mine workers is an imperative obstacle to productivity and safety because poorly educated employees have:

- Low literacy rates
- A low skill base
- Lack of understanding of business principles
- Lack of understanding of how workers fit into a productive workplace, or why productivity is important.

The improvement of the skills of the workforce in the mining industry is imperative for the economic development of the sector. Moreover, skills development is important for the improvement of the health and safety record and as well as growth and wellbeing of all employees Now that there is some understanding on the importance of education and skill level situation within the South African mining industry; it is imperative to explore in a quest to understand the influence and the relationship of the fore mentioned key

concepts on employee performance, thus answering the study research question (Botma, 2015:13; Neingo &Tholana, 2016:287).

2.4. THE RELATIONSHIP BETWEEN ORGANISATIONAL PERFORMANCE AND EMPLOYEE PERFORMANCE

Adopting the definition of employee performance as the total contribution of employees to the organisation's objectives and goals means that employee performance positively associates with organisational performance, employee performance is an independent variable the has an influence on organisational performance. Dajani (2015:141) defined employee performance as the aggregated financial or non- financial added value by the employees in contribution to the fulfilment both directly and indirectly to the targeted organisational goals. Factors that influence employee performance such as formal education and training can also influence organisational performance. Nassazi (2013:29) noted that, in support of the argument, employee competencies change through effective training programs. In this study we adopt organisational performance as according to Mamaqi (2015:1) where organisational performance is achieving productivity and has linkages with profitability and achieving shareholder value.

Degraft-Otto (2012: xii) revealed that training and development contributed to achieving effectiveness and efficiency; which according to organisational performance understanding contributes to productivity. Nassazi (2013:29) states that there is evidence from literature on existence of the effects of training and development on employee performance. This explains the vast investments of organisations in particular coal mining house into employee training and development as an important input for achieving organisational performance. Some studies have proceeded by looking at performance in terms of employee performance in particular, while others have extended to a general

outlook of organisational performance (Nassazi, 2013:29). Thus there is a close relationship between employee performance and organisational performance to an extent of being interchangeable. Training and development, therefore, not only improves the overall performance of the employees to effectively perform their current jobs but also enhances the knowledge, skills and attitude of the workers necessary for the future job, thus contributing to superior organisational performance (Kennedy, 2009:37; Asfaw *et al.,* 2015:189).

Mafini and Pooe (2013:1) found statistically that five factors of employee performance (creativity, autonomy, working conditions, ability utilisation and teamwork) have a positive and direct influence on organisational performance. The three elements of employee performance (reward, autonomy and social benefit) have a positive and direct effect on the organisational performance (Nur, Dahie & Osman, 2015:41). Thus there is a positive relationship between employee performance and organisational performance that in achieving one you also achieve the other. It thus can also be argued that if formal education and training positively influences employee performance it also positively influences on organisational performance.

2.5. INFLUENCE OF FORMAL EDUCATION AND TRAINING ON EMPLOYEE PERFORMANCE

It is important to bear in mind that it usually takes about 10 years of training and development after graduating with a bachelor's degree (BEng, BSc) before a mining graduate is appointed to their first substantive managerial position, when they start to make a full contribution to the mining company. This time frame dictates that the education and development of mining engineers (as opposed to 'competitive poaching') should be treated as a corporate strategic decision (Musingwini *et al*., 2012:944). Armed

with more theory than experience a skilled worker joins the mining sector. Over the suggested 10 year period the skilled worker accumulates experience through interacting with the requirements of the job and colleagues. It is thus expected that at the point of appointment as a manager theory and practical experience would have reached an adequate balance for one to be proficient as a manager. The point of an adequate balance acquired theory and experience may also be the point at which optimal employee performance is achieved. Managers need to drive new recruits towards a point of a balance between theory and experience in order to attain organisational objectives (Musingwini *et al*., 2012:945).

Thomas and Feldman (2009:89-134) conducted a study on how broadly does education contribute to job performance. Their results revealed that, in addition to positively influencing core task performance, education level is also positively related to creativity and citizenship behaviours and negatively related to on-the-job substance use and absenteeism. Creativity has a direct positive influence on employee performance (Mafini & Pooe, 2013:1) and citizenship behaviours align to social cohesion. Collective and continuous absenteeism of mine workers has a real impact on productivity in South African coal mines (SA mine, 2016: 16). The mining industry is recognised for higher than average levels of risky and high-risk alcohol consumption by workers (Barnabas, 2015:1-92). The contribution of formal education in lowering absenteeism and incidents of substance abuse is important to creating an environment in which an employee performs. This is consistent to Kurt Lewis's model of performance where it is a function of personality and environment. Thus formal education and training is useful as an input to both the personality and the environment of a performing employee (Ramage *et al*., 2009:260).

Asiedu-Appiah, Kontor and Asamoah (2013:33) conducted a study within the mining industry in Ghana; they found that training and development is positively related to firm performance. They further posited that firstly training programmes increase the firm specificity of employee skills which in-turn increases employee productivity and reduces job dissatisfaction that results in employee turnover (Asiedu-Appiah *et al.,* 2013:33). Relevant to the scope of this study is formal education and training which is a larger and vital part of training and development taking part in the mining houses. Formal training programmes in the mining sector include NOSA Mine Management Training and Mentoring Programme aiming at growing mining professional through structured training and mentoring, Government certificate of competency(GCC), Mine manager certificate of competency (MMCC) aiming at training engineers and manager and NOSA's Safety Training Programme which provides the necessary knowledge and skills to identify and manage Safety Health and Environment (SHE) risks within the mining industry (Mining Qualification Authority, 2016:2).

Secondly, training and developing internal personnel reduces the cost and risk of selecting, hiring, and internalising people from external labour markets, which again increases employee productivity and reduces employee turnover (Musingwini *et al.*, 2012:949). The same is true of an investment into employees' formal education and training. In their study conducted within the Zimbabwean mines, Nyamubarwa, Mupani and Chiduuro (2013:116-123) focused on an analysis of the human resource practices and relooked at the resource based view (RBV) of managing human resources. The research revealed that the mining industry in Zimbabwe treat employees as valuable, rare and inimitable resource which they deploy in various ways to achieve organisational objectives. Thus formal education and training is an important factor for achieving higher employee performance and is an indispensable investment destination for organisations and employees seeking to establish their positions in the mining sector.

As such mining companies have come up with innovative methods of managing their human resources which includes providing job security, competitive rewards, and social welfare services amongst other methods (Nyamubarwa *et al*, 2013:116-123). These findings confirm that HR departments in the mining industry in practice the RBV approach to the management of human resources in their organisations and by so doing manage to resource their mining entities efficiently and effectively.

Jeremiah (2014:i-xcv) also conducted a study to investigate the effect of training and development on employee performance at AngloGold Ashanti (AGA), the research aimed to answer the questions on what type of training and development policies and procedures exist in company and what are the effects of training and development on the organisational performance. The study revealed that training and development have positive impact on mine employees' performance. The employees agreed that they are able to transfer the knowledge and skills acquired to their working environment. Based on the findings of the study it is recommended that management should have well planned; systematic and coordinated training and development programmes, formal and informal, throughout the organisation and also ensure that there is adequate budget allocation to finance the implementation of training and development programs in the company (Jeremiah, 2014:i-xcv).

Tshikovhi (2012:1-101) presented a study to determine the impact of a training and development programme on the perceived performance of human resource assistants at a platinum mine in South Africa. Based on the results obtained in this study, it was apparent that the training and development programme contributed significantly to an increase in the performance of employees.

Bakan (2015:341-355) encompasses all industries including mining in his study to bring out evidence regarding the direct impact of educational mismatch on firm productivity. Their findings revealed that additional years of over-education (both among young and older workers) are beneficial for firm productivity, and additional years of under-education (among young workers) are detrimental for firm productivity. Understanding that organisational performance labelled firm productivity is a resultant of employee performance, and that education enhances employee performance; it is clear that employees especially within the mining industry will perform and exceed the requirement of their set key performance indicators.

2.6. THE FUTURE OF FORMAL EDUCATION AND TRAINING IN THE MINING SECTOR

The mining industry is certainly faced with a number of uncertainties going forward. There are a number of moving factors that are guaranteed to change going forward and these include technology, the skilled and unskilled employee's composition of the workforce, the global debate and resolutions around sustainability and developments in safety managements (Pedram, Perez & Dowsett, 2013:64). These factors are likely to have profound implications on formal education and training as well as employee performance.

The coal mining sector has adopted technology at a faster rate than any other resource extraction operation in order to compensate for the low price per ton through pushing volumes (Chamber of Mines, 2016:14). This has seen coal mining adopting mechanisation in most of the operation in a bid to drive volumes. Mechanisation changes the profile of skills sets from low to high technical skills required at shop level in order to

maximise on volumes through the use of machines (Huang, Tian, Xing, Bian & Miao, 2017:1-18; Department, 2016:1-8).

Going forward technological developments in robotics and artificial intelligence (AI) is more likely to increase the technical specifications required for employees at shop level (Tshikovhi 2012:88; Van Wyk & De Villiers, 2009:55). These trends are synonymous with an increased role of formal education and training in the coal mining sector. Accordingly, the composition of the coal mining work force will skew towards the skilled work force meaning that formal education and training will play a more pronounced role. Employee performance will rely more on such personal and environmental factors as are acquired through formal education and training (Bakan, 2015:346).

The debate on sustainability rages on and consensus has been built on the role of fossil fuels in depleting the environment and the attendant adverse effects of climate change due to greenhouse effects. To survive the resultant threat to the fossil fuel extraction sector such as coal mining, workforce skill sets need to lean towards environmental protection and awareness. Such awareness can be achieved through formal education and training. Researchers are beginning to find linkages between environmental protection and awareness based formal education and training and employees' performance (Van Wyk & De Villiers, 2009:56).

Health and safety management is gaining considerable attention in the mining sector. Rightly so because the loss of one life and exposure to harm is on incident to many, hence the sector has set a zero harm objective for their extractive operations. There has been progress by the sector, in reducing incidents rate, in health and safety management despite that zero harm or zero incident target has not been achieved. Perhaps it is a

necessary unachievable target that makes mining companies stay the cause of continuously improving health and safety management. The education level of the mining workforce plays a central role in improving health and safety management. Drawing towards the zero harm may mean that overall education levels of the mine worker must be upgraded.

The Leon Commission observed that the general levels of education of mineworkers were woefully inadequate for the multi-million rand mining enterprise (Tuchten, 2011:132 ;Tuchten & Nkomo, 2012:13). The introduction of ABET as a lower formal training within the mining sector has had an improvement to health and safety, so will higher formal learning. It has been agued formal education and training improves the ability of mine employees to identify hazards and risk and hence contribute positively to their mitigation within their work space (Botma, 2015:37). Labour intensive mining methods provide much needed employment opportunities in the country, but also expose more mine employees to hazardous working conditions. In the mining industry across the board, approximately 60% of employees are underground workers. Therefore the chances of injuries to illiterate employees increase exponentially (Botma, 2015:30).

According to Botma (2015: iii) health and safety training is most evidently linked to operator training, which is aligned with unit-standards relevant to the South African formal education and training terrain. However, substantial numbers of mineworkers lack adequate formal education, although the trend is shifting, for such training programmes, or the informal skills to be included via recognition of prior learning (RPL) processes (Botma 2015: iii). The shop floor workers (unskilled workers), machinery operators and drivers are of specific concern and are seen as particular categories of workers that are most vulnerable to accidents and diseases and who generally have the lowest levels of

formal education and or training (Tuchten, 2011:135). It is argued in this study that there is a connection between relatively higher levels of formal education and enhanced Occupational Health and Safety (OHS) as in agreement with Botma (2015:7), and thus the future of health and safety management in the mining industry, particularly the coal mining sector will be positively influence by the progress in formal education and training on the mining workforce (Mine Safety, 2014:47).

2.7. MANAGERIAL IMPLICATIONS

The influence of formal education and training on employee performance in the coal mining sector is of interest to management on a number of fronts. Firstly, if formal education and training has a positive influence on employee performance, managers work formal education and training becomes a vital tool for achieving employee performance which is one of the key performance areas for Managers in the coal mining sector (Xingwana, 2012:xv). Using formal education and training as a vital tool to achieve employee performance has implications for Human Resources management in the coal mining sector (Xingwana, 2012:72). The workforce needs to be transformed as well as placing new value on academic recruitment thresholds. Minimum academic recruitment requirements have been slowly rising up to metric level for new entrant employees on the shop floor.

The trend may need to be sustained, going forward, in order to attain an employee performance which is positively associated with gaining a competitive advantage. There, are however, negative implications and issues with the current workforce which is dominated by the unskilled who have not attained metric qualifications. Formal education and training maybe resisted by the current workforce due to the lack of the prerequisite literacy levels. Managers need to navigate these issues in order to attain organisational

performance which employee performance is a major input. The market place for miners keep changing and traits required to maintain a competitive advantage are also changing meaning that the workforces cannot afford to remain static as managers achieve through employees. Real issues exist which may translate to costs and at worse the loss of a competitive advantage or even failure of the miner. Technology has evolved and so must the Human Resources (Simubali & Chileshe, 2013:79; Vance, 2011:21).

There is a chance that formal education and training could be a panacea to a number of the issues currently faced by the miners to achieve the required productivity, or copying with commodity price changes which normally narrows margins for miners and the reason for a number of managerial failures (Pedram *et al.,* 2013:66).

Managerial Implications based on literature review

The literature review has unearthed and led discussion into a number of variables relating to the influence of formal education and training on employee performance. Successful managers in the coal mining sector will need to deal with these variables in their day to day engagement with their work (Kotur & Anbazhagan, 2014:104). The literature review is conclusive that the trends are shifting towards an increased reliance on formal education and training as a way to attain employee performance and subsequently organisational performance (Xingwana, 2012:293).

2.8. CONCLUSION

It is thus clear that formal education and training influence employee performance, organisational performance and has a greater role to play in the mining sector and specifically in coal mining. The market environment for coal miners is faced with serious headwinds and there is substantial literature to support the notion that formal education and training will play a significant role, going forward in preparing the workforce and

organisation to navigate and perhaps succeed despite these headwinds. Formal education and training may be constraint by the current educational profile of miners but a shift is underway through raising entry level educational threshold to matric. Already the mining sector, according to the literature review is beginning to put more value to formal education and training as complementary to work experience, this is a requirement for maintaining organisational performance in the future. Technology and development in the health and safety status of the extractive sector are helping to highlight the role and significant of formal education and training today and tomorrow (Van Wyk & De Villiers, 2009:53).

2.9. CHAPTER SUMMARY

In the quest to understand the relation between formal education and training to employee performance within the coal mining space, the chapter started by outlining a bit around the education status of South African mines including the challenges faced. To clear off all the misconceptions, key concepts in support of the study objects had to be defined and discussed. The chapter outlined the status of formal education and training within the mines and clarified the relationship between employee performance and organisational performance. Additionally, a review of various literatures on how employee performance is influenced by formal and training was conducted. Lastly this chapter looked into the future and spelled out all the status and challenges that the mining sector will encounter if the shift in terms of the labour profile does not happen. Finally, a conclusion was drawn following the analogy of the available literature on the effect and influence of the two variables in question.

CHAPTER 3

3. RESEARCH METHODOLOGY AND RESULTS

3.1. INTRODUCTION

In this chapter the methodology of research study and the data analysis process are present and discussed.

3.1.1 Research Methodology

A methodology refers to the collection of tools that are used to collect the relevant information in order to satisfy an investigation into the influence of formal education and training on employee performance in the coal mining sector. According to Welman, Kruger and Mitchell (2012:2) research methodology explains the logic behind the research method and techniques. This research study is fashioned to investigate the influence of formal education and training on employee performance. Thus to give an appropriate answer to the research question the methodology included the research philosophy, research design, data collection, validity and reliability of the study, ethical consideration and the analysis of data leading to the conclusions in Chapter 4.

3.1.2 Results Discussion

This chapter also present and discussed the results from the data analysis process. The results or emerging themes are subjected to literature control and were possible extracts from the transcripts are presented from its original form to emphasize the discussion points. The results are presented into two sections, the first section being the presentation and discussion of the biographical information. The second section is the presentation of the research specific outcomes, discussion and the literature control. The research philosophy is discussed in the next section.

3.2. RESEARCH PHILOSOPHY

According to Saunders, Lewis and Thornhill (2009:107) and Kumar (2011:27) research philosophy is an over-arching term relates the development of knowledge and the nature of that knowledge. Welman *et al*., (2012:13) stated that research philosophies are people's assumptions about the world and the nature of knowledge. It is the researcher's view that the nature of reality or knowledge is subjective to the social and cultural construct of participants. In other words, the influence of formal education and training to employees' performance is best understood by those who have been formally trained and worked in the coal mining sector. This view is in opposition to the view that the reality or knowledge development is objective and hence can be manipulated mathematically. While mathematical manipulation maybe required with some data it may not on its own account for the phenomena under study. In general, there are four philosophical paradigms namely positivism, interpretivist, realism and pragmatism (Saunders *et al.,* 2009:119; Bryman & Bell, 2014:13). The interpretivist paradigm which argues that reality is socially constructed, subjective, may change and is multiple, is consistent with the researcher's view of the nature of reality and what constitute knowledge. The research design is discussed in the next section.

3.3. RESEARCH DESIGN

According to Welman *et al.,* (2012:52) research design is the plan according to which we obtain research participants and collect information from them. Saunders *et al.,* (2009:119) stated that research design section gives an overall view of the method chosen and the reason for that choice. In other words, research designs are plans and procedures of the research that details all the steps from broad assumptions to detailed method of data collection, analysis and interpretation (Creswell, 2014:31). Thus research design is a step by step plan of action that give direction to thoughts and effort enabling

the conducting of the research in a systematic way and on schedule to provide an appropriate answer to the research question and detailed report of the research. According to Welman *et al.,* (2012:37) there are two distinct research designs that can be followed which are quantitative design and qualitative design. A mixed method design employs the use of both the quantitative and the qualitative designs.

Quantitative research design is an approach for test objective theories by examining the relationship between variable, this variable can be measured typically on instruments so that data can be analysed using statistical procedures (Creswell, 2014:34). Bryman and Bell (2014:30) define quantitative approach as one whereby the researcher deals with numbers and uses questionnaires to collect primary data and statistical method to analyse data. On the other hand, a qualitative research, according to Creswell (2014:34), is a study for exploring and understanding the meaning individuals or groups ascribed to a social or human phenomena.

Bryman and Bell (2014:33) prescribed that a qualitative research be used in situation where the phenomenon to be studied is ill-defined or not well understood, deeply rooted with the participants' personal knowledge of understanding of themselves and when it need to be understood from the vantage point of individual or group that place a highly specialised role in the society. Accordingly, a qualitative research design is employed in this to suit the chosen research philosophy where reality or knowledge is argued to exist within the social and cultural context of the participants. Qualitative research studies use interviews to collect primary data and data is analysed by using interpretative techniques. A qualitative study is, therefore, concerned with non-statistical method, and small samples often purposively selected.

The research is a cross section survey cutting across employees of one coal mine from the shop floor up to middle management. The target population and sample are discussed in the next section.

3.3.1 Target population and Sample

The entire collection of a group for which the researcher has made conclusions regarding phenomena in question is referred as the target population; the target population is regarded as a group of potential participants to whom the researcher want to generalise the results of the study (Welman *et al.*, 2012:22 & 55). According to Saunders *et al*., (2009:212) target population is the full set of cases from which a sample is taken is called the population. Accordingly, a target population consists of a full body of people or items under consideration for purposes of the research on which the research outcomes will be generalised on. In this study the population included all employees of one coal mine. The study was conducted in a mine that employs a total number of approximately 1700 employees including contractors.

A sample was selected conveniently from the target population due to time constraint. According to Bryman and Bell (2014:168) a sample is defined as the elements of the population considered for actual inclusion in the study, or it can be viewed as a sub set of measurements drawn from a population in which we are interested. In other words, a sample is the number of people who participate in the research study and are selected from the whole population by the researcher. In qualitative study a sample size is not predetermined but is regulated by the point of saturation. A point of saturation is that point when interviewing the next participant does not add new information to the research. At which point the sample size must be determined. The point of saturation was reached after interviewing 8 participants and new information was not coming; hence the sample size for this study is 8. The study sample cuts across the whole mine workforce from shop

floor employees which are mainly operators up to middle managers. The sample included operators, miners and artisans, shift-overseers and foreman, mine-overseers and chief-foreman, engineers and managers.

Qualitative research involves small samples of people, studied by means of in-depth methods (Welman *et al.,* 2012:55). The results of a qualitative research approach cannot be generalised over the population due to the small samples, and the convenient sampling which make the sample unrepresentative of the population. Sampling techniques are discussed in the next section.

3.3.2 Sample and Sampling Technique

There are generally two types of sampling techniques which are probability or representative sampling; non-probability or judgemental sampling. With probability samples the chance, or probability, of each case being selected from the population is known and is usually equal for all cases (Saunders *et al.,* 2009:213). We can determine the probability that any element or member of the population will be included in the sample (Welman *et al.*, 2012:56). Probability sampling techniques are associated with the quantitative research design in which the result can be generalised over the population. Generalisation of results can take place because the sample size is predetermined by a mathematical function where all participants have an equal chance of participating in the research study, eliminating selection bias. Probability sampling includes random sampling and stratified random sampling. On the other hand, non-probability sampling techniques are dependent on the researcher accessibility to the participants and judgement. Only those participants accessible to the researcher or deemed fit for the purposes are included. Under non-probability sampling, the researcher can use judgemental, purposive and snowball sampling techniques.

In this study, non-probability purposive sampling techniques were employed. The researcher identified employees from the mine who were considered to have experience and knowledgeable to answer the research question. The researcher study sample cuts across the whole mine workforce from shop floor employees which are mainly operators up to middle managers. The sample included operators, miners and artisans, shift-overseers and foreman, mine-overseers and chief-foreman, engineers and managers.

3.3.3 Research Instrument/ Research Tool

A qualitative study employs the use of interview to collect primary data and data is normally analysed using interpretative techniques. The choice of the instrument in this research was motivated by the need to collect views, opinions and understanding of those participants who can be considered as experts of the phenomena under study. In this study sample cuts across the whole mine workforce from shop floor employees which are mainly operators up to middle managers. The sample will include operators, miners and artisans, shift-overseers and foreman, mine-overseers and chief-foreman, engineers and managers. Data was collected using self-administered face to face interviews with the aid of an electronic voice recorder and an interview guide with semi-structured questions, see attached Appendix B. The interview guide assisted in ensuring that the desired coverage of the areas of enquiry and comparability of information across respondents (Kumar, 2011:153). The interview guide questions were divided into two sections, the demographic section and the research specific section. The interview guide is presented as follows:

INTERVIEW GUIDE

Section A: Demographic information

1. Gender
2. Which department do you work for?

3. How long have you been employed at the coal mine?
4. What is your designation?
5. What is your highest qualification?
6. Was the qualification acquired prior to or after employment at the coal mine?

Section B: Research specific information

7. From which between formal education and on-the-job training did you benefit most? Explain?
8. What drive employee performance in your line of work? Why?
9. How does formal training and on-the-job relate in your line of work?
10. Do those with more formal education perform better than those with more on-the-job training? Why?
11. Do those with more the-job training perform better than those with more formal training? Why?
12. What are the challenges of attaining formal education at the mine?
13. What do you think can be done to improve formal education and training at the mine?
14. Do you think formal education is important in improving health and safety at the mine? Explain?
15. What do you think is the relationship between formal education and technological adaptation?

3.3.4 Research Protocol

In preparation for data collection in this study the researcher began by establishing a relationship with the prospective participants informing them of his intention for them to

participate in the research study. The researcher explained the study focus area and the purpose of the research as academic work required for the fulfilment of MBA requirements. The researcher gave participants assurance that their name will remain anonymous and will not appear anywhere in the report. The participant had to give voluntary consent (Appendix A) for their participation in the study and they were free to withdraw from the study at any time. Once participants indicated their willingness the researcher booked an appointment, allowed them to sign the consent form then proceeded with the actual interviews.

During the interviews the researcher used observation, attentiveness, and listening and empathy skills as vital skills for the collection of data from sample participants. Observation skill was mainly used to analyse participant's non-verbal communication. The use of observation is consistent with Welman *et al.,* (2012:170) who identified body language as a type of non-verbal communication that relates to movement, gestures and attitudes that can be identified by both participants and the researcher. Attentiveness is related to listening to non-verbal and verbal communication. Saunders *et al.*, (2009:334) argued the listening is the bridge between hearing and understanding a person. Empathy has to do with the ability to see what the participant's world is like to him or how the participant sees it, by temporarily setting aside the researcher's frame of reference and without prejudice and preconceived ideas. The researcher heard and understood, and then conveys his understanding verbally or non-verbally.

3.3.5 Data analysis

According to Kumar (2011:210) data analysis entails the strategy the researcher used for analysing the collected data. The analysis of data requires a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inference. Saunders *et al*,

(2009:17) prescribed quantitative analysis as statistical techniques the helps the researcher to investigate variables as well as they effect, relationship and patterns of involvement within their world. On the other hand, qualitative data analysis is an ongoing process involving continual reflection about the data, asking analytical questions, writing memos throughout the study and using open ended data for the most part by asking general questions and developing and analysis from the information supplied by the participants (Creswell, 2014:36).

The researcher specifically used the eight steps of data analysis proposed by Tesch as cited in Alpaslan (2010:25). The following are the steps which the researcher took in order to get an answer to the research question:

Step 1: The researcher wrote down word for word the interviews that were recorded including notes that were generated during the interviews. To gain a sense of the whole study the researcher read all the script carefully and noted the ideas as they came to mind.

Step 2: One document was selected, the most interesting and shortest, and read it through to gain a sense of what it was about while generating notes on the margin.

Step 3: The researcher made the lists of the topics, classifying similar topic together and identifying other topics as major.

Step 4: Classified topics were reclassified and listed.

Step 5: The most descriptive topics were identified and were converted into themes or categories.

Step 6: The researcher made a final decision on the abbreviation for each theme and alphabetised them as codes.

Step 7: The cut and paste method was used to assemble the data material belonging to each theme in one place and a preliminary analysis was done.

Step 8: The research findings were presented in Chapter 4 and subjected to literature control.

Although the process of data collection became distorted, at some point, the research emerged from the process with the answerers to the research question of this study (Greener, 2008:82-83).

3.3.6 Limitations, Bias and Elimination

The limitations of this study pertain mainly to the qualitative research approach. Firstly, the utility of the research is limited to the groups of people in the target population represented by the small sample. In other word the outcome of the research cannot be completely generalised to the target population because the sample in unrepresentative of the target population. Two procedure of the qualitative research approach, sample selection and sample size, stand out to produce this limitation (Saunders *et al, 2*009:538). Sample selection allows researcher bias in that only participants that are accessible to the researcher are included in the sample. The sample size is too small to be representative of the target population hence assumes an unacceptable error when generalising outcomes (Saunders *et al., 2*009:538).

In a qualitative research approach, the location of the researcher is such that he is an important factor in the research (Saunders *et al., 2*009:538). That is to say that the qualitative research approach is subjective. The conclusions are based on the opinions and views of participants as well as those of the researcher. Hence the outcomes of the research are limited to the experience and skills set of the researcher. To manage selection bias, the researcher exercised carefully his judgement to include only those participants who were fit for the purpose of the research study. The researcher

interviewed twelve (12) participants but reached saturation at eight (8) participants (Saunders *et al., 2*009:235).

3.3.7 Ethical Consideration

Vogt, Gardner and Haeffele (2012:227) described ethics as a good conduct and the moral obligation that the researcher has towards participants and others. This is in support of Greener (2008:40) who described the main purpose of research ethics as to protect the well fares of research participants. Kumar (2011:43) summed it up and argued that ethical guidelines serves a standard and a basis upon which each research should evaluate his or her own conduct. Therefore, ethics in research has to do with avoiding the exposure of participants and the community or organisations they come from (Welman *et al.,* 2012:181). In this study ethical conduct was considered by addressing informed consent, confidentiality, anonymity and management of information. For confidentiality only the researcher and possible few other relevant people were aware of the identity of participant and these people assured the researcher to keep confidentiality of the participant. Confidentiality also meant that sensitive and private information was supplied with the understanding that the identity of the participant will be protected and will not be repeated elsewhere (Welman *et al*., 2012:361). To ensure anonymity the researcher ensure that names of participants were not writing on tapes, transcripts and note, pseudonyms or number were allocated to participants to hide their names (Welman *et al*., 2012:153). Informed consent refers to right of the research participant to be fully informed about all aspects of the research that might influence their decision to participate. This is a voluntary participation; they are free to disengage from the research process at any time, and that the process is for the academic purpose. The data was always secured in a lockable container and tape recordings were erased following this transcription.

3.3.8 Validity and Reliability

In this study the researcher used qualitative methodology to obtain primary data. According to Welman *et al.,* (2012:145) reliability is the extent to which results are consistent over time and are an accurate representation of the total population under study and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. The qualitative approach in this study did not depart significantly from the prescriptions in literature of conducting a qualitative research. According to Welman *et al.,* (2012:173) validity in qualitative research consists of controversial issues surrounding the use and nature of such term. Pandey & Pandey (2015:82) further argued that most authors contend that validity is not a single, fixed or universal concept, but rather a contingent construct, undeniably grounded in the processes and intentions of particular research methodologies and projects.

According to Welman *et al.,* (2012:145), rejection of reliability and validity in qualitative inquiry in the 1980s has resulted in an interesting shift for ensuring rigor from the investigator's actions during the course of the research, to the reader or consumer of qualitative inquiry. Saunders *et al.,* (2009:10) stressed the fact that reliability and validity remain appropriate concepts for attaining rigor in qualitative research thereby emphasizing the fact that qualitative researchers should reclaim responsibility for reliability and validity by implementing verification strategies integral and self-correcting during the conduct of inquiry itself. Saunders *et al*., (2009:213) emphasized the need of qualitative researchers to reclaim responsibility for reliability and validity by implementing integral and self-correcting verification strategies during the conduct of the inquiry, thus highly the importance of reliability and validity. In qualitative research, verification refers to the mechanisms used during the process of research to incrementally contribute to ensuring reliability and validity and, thus, the rigor of a study (Kumar, 2011:31). Verification strategies are used to help in the identification of when to continue,

stop or modify the research process in order to achieve reliability and validity and ensure rigor (Kumar, 2011:87).

If the principles of qualitative inquiry are followed, the analysis is self-correcting; in other words, a qualitative research is iterative rather than linear, so that a good qualitative researcher moves back and forth between design and implementation to ensure congruence among question formulation, literature, recruitment, data collection strategies, and analysis (Greener, 2008:82). These mechanisms were woven into every step of the inquiry and they constructed a solid product by identifying and correcting errors before they were built into the research study and subverted the analysis.

In a bid to ensure reliability and validity the researcher compiled the following research specific questions and used them to probe for more information from the participants during the interview session.

- From which between formal education and on-the-job training did you benefit most? Explain?
- What drive employee performance in your line of work? Why?
- How does formal training and on-the-job relate in your line of work?
- Do those with more formal education perform better than those with more on-the-job training? Why?
- Do those with more the-job training perform better than those with more formal training? Why?
- What are the challenges of attaining formal education at the mine?
- What do you think can be done to improve formal education and training at the mine?
- Do you think formal education is important in improving health and safety at the mine? Explain?

- What do you think is the relationship between formal education and technological adaptation?

Generalisability and transferability are important elements of any research methodology, but they are not mutually exclusive: generalisability, to varying degrees, rests on the transferability of research findings (Saunders *et al., 2*009:335; Greener, 2008:38). Researchers who intend to make a generalizable claim must carefully examine the variables involved in their study. Among these are the sample of the population used and the mechanisms behind formulating a causal model. According to Saunders *et al.,* (2009:335), furthermore, if researchers desire to make the results of their study transferable to another context, they must keep a detailed account of the environment surrounding their research, and include a rich description of that environment in their final report. Armed with the knowledge that the sample population was large and varied, as well as with detailed information about the study itself, readers of research can more confidently generalize and transfer the findings to other situations (Kumar, 2011:182). The whole methodology including the choice to use a qualitative approach and the sampling strategy was designed to give the best answer to the above research questions thereby enhancing the validity of the study (Greener, 2008:38).

In this study the researcher intends to gain insight into the influence of formal education and training on employee performance within the coal mining sector. To the effect the interview questions, discussions, and conclusion were restricted to challenges related to the above area to maintain content validity. Criterion-related validity refers to the degree to which a measurement can accurately predict specific criterion variables (Saunders *et al.*, 2009:373). The two types of criterion-related validity are concurrent validity and predictive validity. Concurrent validity involves measurements that are administered at the same time, while predictive validity involves one measurement predicting future

performance on another. The researcher adopted a qualitative research approach which is more suited to phenomenon that can be best understood from the participant's point of view, criterion validity is therefore achieved. Construct validity is the degree to which a test measures the construct that it is supposed to measure (Greener, 2008:37; Saunders *et al.,* 2009:373). A construct is a skill, ability or attribute that is based on established theories and exists in the human brain. Obtaining an in depth understanding of the influence of formal education and training on employee performance the researcher uses semi structured interviews on the sample. Construct validity was achieved through obtaining descriptions and reactions to the phenomenon from the participants. Face validity is simply whether the test appears (at face value) to measure what it claims to, or whether the question appears to make sense; for example, where people are asked to rate the validity of a test as it appears to them (Saunders *et al.,* 2009:394)**.** External validity refers to the extent to which the results of a study can be generalized to other settings (ecological validity), other people (population validity) and over time (historical validity) (Saunders *et al.*, 2009:591-592; Greener, 2008:38). In the research eight participants led the researcher to the saturation stage thus provided the information about phenomena.

Reliability is concerned with the consistency, stability and repeatability of the informant's accounts as well as the investigators' ability to collect and record information accurately (Welman *et al.,* 2012:145). It refers to the ability of a research method to yield consistently the same results over repeated testing periods. In other words, it requires that a researcher using the same or comparable methods obtained the same or comparable results every time he uses the methods on the same or comparable subjects. The presentation of the results follows in the next section.

3.4. PRESENTATION OF RESULTS AND DISCUSSION

3.4.1 Biographical Information

This research study utilized a convenient sample of eight (8) participants whose biographical information is presented in Table 3.1 below.

Table 3.1 Biographical Information

Participant	Gender	Department	Experience	Job Designation	Highest Qualification	Pre/Post
Participant 01	Female	Mining Operations	5 years	Shift Boss	BSC Mining Honors Degree	Prior
Participant 02	Male	Engineering	4 years	Chief Foreman	B-Tech Electrical Engineering	Prior
Participant 03	Female	Mining Operations	4 years	Contruction Foreman	SAMREC	Post
Participant 04	Male	Mining Operations	10 years	Technical Service Manager	M Eng	Post
Participant 05	Male	Mining Operations	10 years	Shift Boss	Mine Overseer Certificate	Prior
Participant 06	Male	Engineering	7 years	Training Manager	Diploma Training Management	Post
Participant 07	Female	Mining Operations	10 years	Mine Overseer	BSC Mining Honors Degree	Prior
Participant 08	Male	Engineering	10 years	Chief Foreman	B-Comm Degree	Post

3.4.2 Discussion on the demographics

The sample comprised of five (5) male participants and three (3) female participants. The male participants dominated the sample in line with the dominants of male employees in the coal mining sector. Mining Qualification Authority (2016:5) argued that although the sector is historically male-dominated, the proportion of females has been increasing gradually, from 11% in 2012 to 14.5% in 2016. The sample of participants included a higher percentage of women (37%) to reflect the influence of the growing participation of females in the mining industry. None of the female identified as participant came from an engineering department. Of the total male participants three (3) were from the engineering department and two (2) were from the mining operations.

Most of the participants worked in the mining operation department representing five (5) of the eight (8) participants, three (3) of the participants worked on the engineering department. To enable the sample to cut across the department and attain some form of representativeness of the coal mining sector, the dominants of the coal business which is mining operation is reflected in the sample. The engineering department is a support function which is normally manned by fewer skilled employees.

The participants had an experience curve ranging from four (4) years to ten (10) years in the mining sector, this experience curve of the participants was well above and beyond the minimum threshold of three for participating in the sample. Most experience was associated with male participants working in the mining operations department. The sample was in line the observation that the participation of females in the mining industry particularly coal mining is only emerging. The outcome is in support of the position of the Mining Qualification Authority (2016:5) which it had stated that although the sector is historically male-dominated, the proportion of females has been increasing gradually, from 11% in 2012 to 14.5% in 2016. The researcher purposed, through the convenience sample, to create a sample whose representativeness cut across the operations of the mine. The job descriptions of those who participated included the Technical Service Manager, Training manager, Mine Overseer, Chief Foreman, Shift-bosses and Foremen. The sample was not inclusive of every job description at the coal mining company due to financial and time constraints but for the purpose of answering the research question in this research study, the coverage suffices.

In term of the highest qualifications held by participants, six (6) of the participants held qualification that is classifiable under Higher Certificate to Post-Doctoral Degree and two (2) held qualification that is classifiable under Grade 10/N1/NCV1 to Grade 12/N3/NCV3.

According to Mining Qualification Authority (2016:20) the Higher Certificate to Post-Doctoral Degree qualification was held by 14% of the mining workforce in 2016 whilst 47% of the workforce held Grade 10/N1/NCV1 to Grade 12/N3/NCV3 qualification. Thus it can be loosely assumed that the utility of the research is limited to the views of the workforce who have attained these qualifications. There is an equal split between participants who had acquired their qualifications prior to joining the mining sector and those who had acquired their qualifications post joining the mining sector. Since the point of acquisition of the qualification was not the criteria for constructing the convenience sample, the split outcome is consistent with the argument that formal education has gained millage especially in the mining industry (Stamp, 2015:12). In a nutshell the qualitative sample in this study is valid and can be relied upon to give a reasonably adequate answer to the research question. The discussion pertaining to the research focus follows in the next section.

3.4.3 Research Specific Discussion

The data was subjected to qualitative analysis which identified the themes and issues for discussion for discussion through interpretative techniques. The emerging themes included experience versus theoretical education, employee performance drivers, relationship of experience and theory on the job, performance perception between employee with more experience versus those more qualified, challenging of attaining formal education, measures for the sector to adopt more formal education, formal education versus safety management and formal education versus technological adaptation. The themes are discussed in the next section.

Theme 1: Theoretical learning against learning by experience

Question 7 of the interview guide required participants to identify from which of the two ways of learning did they benefit most and give an explanation as to the answer. The question was set to extract perceptions on the contentious notion that miners where more

akin to favour learning by experience as opposed to theoretical learning offered in most formal education training. Botma (2015:37) stated that the mining industry had previously been one of the industries that employed more unskilled workers in South Africa. One participant, one of the exceptions, had the following to say:

> *"On-the-job training plays a much bigger part of my day to day job; I only apply 20% of my formal education on my day to day job. For me to shape my job performance I apply my formal education theory; my job design does not allow me to fully apply what I learned through formal education"*

Most participants claimed that they benefited most from learning through formal education. The participants had the following to say in favour of formal education:

> *"I benefited most from the Formal Education, but my formal education included a bit of OJT exposure; this is called a blended learning approach (theory and a bit of OJT exposure). Pure OJT is limited; if you don't have the academic theoretical part of learning your flexibility in terms of applying or thinking out of the box are limited; reason being you don't have any structured learning that help or assist you in how to do things or how to approach a problem or how to improve a situation or how to confront something. If you are from the OJT/experience your intellectual of attacking things that are above your thinking capacity is challenged; but if you went to school your thinking is widened and when you go into practical of doing things (work-place scenario) you draw from your school intellectual and it helps you to enhance how you see, reason and resolve problems. With formal education there is no restriction in how you think and how you execute things, you have got plenty option of doing thing in a more productive and more economical way."*

According to the participant one will be incomplete without formal learning as your reasoning capacity will be challenged in unstructured situations. Structured decisions would be more suitable to those who have learned through experience more than they

have been exposed to theoretical learning. The perception is consistent with Botma (2015:37) and Mining Qualification Authority (2015:19) that the mining sector has been dominated by unskilled workforce taking up jobs requiring structural decision making.

The findings under the theme, theoretical learning against learning by experience, were consistent with the arguments in Musingwini *et a*l., (2012:944) and the Mining Qualification Authority (2014:18) that formal education and training is gaining traction in the mining sector. The majority of the participants are finding comfort in their formal learning as antecedent to employee performance. The next theme of employee performance driver is discussed in the next section.

Theme 2: Employee performance drivers

Another question in the interview guide was designed to collect information on what the participants thought are drivers of employee performance. Participants identified, experience to be gained, Inspiration, recognition and accomplishment, rewards, meeting set goals, fear of failure and managerial support as the drivers for employee performance in their line of work. A participant had the following to say:

> *"I think is recognition; if you work hard without any recognition and rewards/awards, people stay in positions for long and don't get recognized/rewarded"*

Another participant had the following to say:

> *"Inspiration-if I feel that I am doing something that has value at the end (activities that are linked to value); doing something that will make a difference"*

Another participant had the following to say:

> *"Personally I fear failure; I have not experienced failure then I respect failing that I work against it. My career growth I want to grow as much I can; I want to in my*

career I make sure that I learn the best, I want to be different in this few woman industry that I stand out to be the best".

Another participant had the following to say:

"Employee performance is most driven by clearly define goals/plan, if you know that we are doing this task but this is actually what we want to achieve and the significance of what we are doing and seeing the whole (bigger) picture; so it is not that you are doing a task because you were told to do it but you understand the reason behind doing that particular task. If I'm aware that the task I'm doing will impact on the bottom line and the criticality of these task to the company, the sense of urgency will be high; If you understand why you are doing the task and how does it fit to the bigger picture then automatically performance will come".

Of the list of performance drivers listed four are personality drivers as per Kurt Lewin's formula which includes inspiration, recognition and accomplishment, meeting set goals, fear of failure whilst the rest present environment driver namely, experience to be gained, reward and managerial support. Personality drivers are more dominant in this sample than environment drivers.

It can be said that, by its absence on the employee performance drivers list, formal education and training seizes to be an important driver of employee performance once an employee is on the job. The failure by the sample in the study to identify formal education and training as driving employee performance is losely in contrast to the finding by Asiedu-Appiah *et al.*, (2013:33) and Nyamubarwa *et al.,* (2013:116-123) that formal education and training is positively related to firm performance. Performance is linked to productivity and the influence of formal education and training on productivity could not be ascertained in this study as Kampelmann and Rycx (2012:1-32) had argued that

additional years of education supported productivity. The next theme is discussed in the next section.

Theme 3: Relationship between experience and theory

Question 9 of the interview guide was designed to determine and establish the relationship between formal training and experience. All the participants agreed that there is a relationship between formal training and experience. Laguador (2013:301); Owusu (2014:6) stated that on the job training presents a more precious learning experience that improves the importance of the academic program and forms the view of personal and social usefulness. Informal learning allows the graduating students to apply what they have learned from books in a work environment would develop their work values and attitude necessary to achieve the ultimate goal of education to produce efficient and effective leaders and professionals in cross-cultural and multidisciplinary undertaking.

The position taken by participants further validates the general approach of institutions of learning and that of businesses. The relationship between theory and experience has given birth to such construct as internship, apprenticeships, job attachment and work based learning (WBM). One participant had the following to say:

> *"When I started, at a lower level I thought that formal education was irrelevant since my job (miner/shift-boss) then involved more practical part of mining in detail. As I progress up into the ladder I started applying what I learned at school;"*

The constructs of internship and work based learning are based on the understanding that institutions of learning prepare learners to suit the need or the requirement of organisations. Thus the best place a learner can be initiated for the workplace is to spend some of their time during formal education and training at work. Participants had varying perspectives on how theory and experience relates in the execution of their work. Few of the perspectives are captured below:

"Formal training teaches you basics, basics of civil work. You from time to time have to refer to the books especially if you are not sure"

And

"Formal education gives you a structured way of doing things, methods that you must implement; learned people understand both worlds; The is a relationship between the two(formal training and on the job training); an artisan with formal education and a bit of practical on the job exposure will always surpass the one with only on the job training when they have to do faulty finding on any electrical equipment; latest machine works on soft-wares PLC (Programmable logic circuits) ,you need to go to school to understand how PLC functions ;working with this machine requires logical thinking on how a PLC system operate, if you did not go to school you are limited the is a disconnection"

Then

"The formal education give you the managerial skills to be able to better manage and support my teams thus attaining the set results; it further helped me to manage better manage the mines assets and resources well; You cannot do the above without education; on the job training is more task specific and requires your technical knowledge; When you move up the ranks you don't need a lot of technical knowledge since you have teams performing the technical-practical work for you; In this space your role is to coordinate this activities and account for the work of others. In a nutshell formal education is related to on the job training in a sense that in takes you role as a leader/manager and links it to the objectives (what you have to achieve) of the company. Your role shifts as a leader cause at that level you need to coordinate those technical people below you; this is where on the job training lacks, it does not cater for such leadership skills and related managerial skills".

It is, therefore, clear that formal education and training plays an important role in ensuring that employees are capable of performing their jobs. By extension, employee performance and subsequently organisational performance maybe positively associated with formal education and training. Degraft-Otto (2012: xii) argued that formal training and development contributed to achieving effectiveness and efficiency; which accordingly contributes to productivity. These findings are consistent with argument by Laguador (2013:301) that on-the-job training is part of the tertiary curriculum which connects the gap between theory and practice as well as between classroom education and real industry life.

Theme 4: Performance perception between employees with more experience versus those more qualifications

Two questions were designed to explore performance perceptions between employees with more experience and those holding more formal education and training and vice versa, participants also had to provide a reason for their choice. The majority of the participants perceived that performance of those with formal education and training and on the job training was situational. Those with more formal education and training were more likely to perform in finance, management, planning and designing functions. Technical skill and operations were to a certain extend associated with those with more on the job training or experience.

What also came clear in the perceptions of the participants is that those holding more experience have a narrow view of the company and its operations. Those holding more formal education and training were perceived to have a bigger picture of the company, hence their role in planning and management functions. The other argument advanced for the situational performance is that experience or those workers with more experience perform better in a task oriented environment, where the job must just be done

irrespective of the abuse, policy, safety and vice versa is valid. One participant had the following to say:

> *"I think it depends on what is the basis of your measure in terms of performance; if you are more concerned that the job be done, irrespective of whether the process and people where abused and policies where not followed and safety rules where not adhered to, you are more result focused, then you will view those with more OJT to be better or performing better. It depends on what is important for the business or for you as a manager; if you are results orientated and not care about how the results where attained those with OJT will be the best"*

Bakan (2015:341-355) states that additional years of education (both among young and older workers) are beneficial for firm productivity, and additional years of under-education (among young workers) are detrimental for firm productivity. The sample results do not agree with the position in the sense that additional education may not necessarily benefit an employee in a technical or operational position. Further to Neingo and Tholana (2016:286); Botma (2015:12) argued that deficiency of education among mine workers is an imperative obstacle to productivity. If performance is situational then these arguments may not hold. A participant had the following to say:

> *"Those with more formal education perform better in planning and design department"*

And

> *"Those with more on-the-job training perform better in operations"*

Another participant had this to say:

> *"No and yes: People with formal education they understand better why they should perform certain tasks (they can see the bigger picture); they also value what they have i.e. they value the equipment and machinery in use because they understand the financial prospect behind; they understand the bigger picture of the company*

(the vision); they have better understanding in terms of business planning and clearly understand to fit into the visions and missions of the company. They understand the ins and outs in terms of the micro and macro-environment; they can easily make sense of what is happening in the country and globally and relate that to how the company is doing. The people with formal education will pull to make the company perform better though better ways of doing things (innovation)".

Those participants who perceived that holding a formal qualification enhanced higher employee performance gave the following reasons to explain their belief:

- Adapt quickly to change and perform better that those with more on the job training
- Requisite work principles are in place
- Broader view of the task which benefits employee performance

A participant had the following to say:

"When they have to adapt to change; they will not necessarily perform better but will quick adjust, they will reason easily, they will take a shorter period to understand how the work systems work or operate; they only focus on one which is acquiring experience. After a while they will be running on two legs (education and on-the-job training); Do not give higher positions based on Education only, you are will be setting the candidate for failure"

Another had the following to say:

"The more formal education will perform better; because when you go to school you are taught certain principles; an engineer from school get taught various fields of engineering (electronics; electro-mechanics, electric fields, etc.) this give him some latitude of solving engineering problems. They have the abstract thinking capacity which is a deficiency for those with only OJT"

For performance of those with more experience or more on the job training the following reasons were given:

- Superior technical knowhow
- They perform better up until those with formal education and training gain experience and they are over taken.

A participant had the following to say:

> "*Yes, they can be able or they a skill to converse with everybody on technical and non-technical issues; you have picked up a skill of communicating, of technical knowhow for you to have a judgment on something"*

The influence of formal education and training on employee performance is suggested, by the sample in this study, to be situational to the task that the employees perform as part of their job, the goal of the company in terms of task orientation and other orientation such as perfection, safety and compliance to policies. The reasons advanced in favour either of formal education or experiential learning in aiding employee performance is also compatible with the general situational view of the sample.

Theme 5: Challenges of attaining formal education in the mining sector

Sample participant identified several challenges associated with acquisition of formal education and training in the mining sector. The pressure is certainly on for those entering employment in the sector as well as those already in the employment of the mining sector. According to Mining Qualification Authority (2014:18) the composition of the mining sector is shifting towards the skilled labour force. Participant identified the following challenges in acquiring formal education in the mining sector:

- Lack of flexible funding for learning in other fields
- Misaligned learning interests of employees
- Tight work schedule
- Physical fatigue
- Funding
- Cost restrictions for study leave relievers
- Perceptions that mining work is for uneducated people

Theme 6: Measures for the mining sector to adopt more formal education

Suggested measures to deal with the challenges included

- Create an environment to encourage learning goals among employees
- Align reporting structures to qualifications
- Get rid of the mine unions
- Picked up the qualification entry level for employment into the mines
- Invest in awareness campaign of available financial schemes and institutions of learning
- Provide flexible support for learning even to those programmes not aligned to the core business.

Russell (2014:1) argued that mining houses invest a lot on employee education in the form of employee bursaries, graduate-in-training programmes; educational loans. The sample results still highlighted funding as a challenge of attaining formal education. Participants in the sample also highlighted a notion that the mines are still perceived to be for uneducated people even with the shift made in terms of formal education within the mining industry between 2014 and 2016 (Mining Qualification Authority, 2014:18); 2016:20). These challenges, as identified by sample participants, are likely militating against or slowing down the shift towards a mining work force dominated by skilled employees. Skilled employees are likely to be more productive hence performers in the

current technological mining terrain. The discussion point is consistent with the argument in Pedram *et al.,* (2013:64) that there are a number of moving factors that are guaranteed to change going forward and these include technology, the skilled and unskilled employee's composition of the workforce, the global debate and resolutions around sustainability and developments in safety managements.

It came out from the sample data part of the solution in attaining formal education and training in the mining sector is the removal to trade-unions. Trade unions are said to be responsible for the lowering of entry qualification standards and misalignment of qualification qualifications and reporting structures. Unions pile pressure on mines to lower their qualification threshold and to consider formal qualifications as basis for promotion. Unions argue that increasing the threshold or favouring formal qualification for promotion and reporting lines excludes the majority of the employees who are not skilled or don't have and may not able to acquire formal education. The findings in Mining Qualification Authority (2014:38) do not support the argument of the unions as the composition of mine workforce is already skewing towards the skilled workforce. There is need for the unions to align their arguments with data and perhaps allow mining companies to raise minimum qualification threshold and realign qualifications to the reporting structures as opposing the response of mining house to the market environment can be detrimental to the employees. Employees run the risk of becoming obsolete if they fail to upgrade their skills with formal education because the modern knowledge economy and subsequently knowledge markets (commodity and labour) require that employees gain new skill set. Implementing qualification threshold and realigning reporting structures foster an environment where employees realise the need to upgrade their skills.

Theme 7: Formal education and safety management

According to Botma (2015:37) illiterate mine employees are mostly exposed to dangerous occupational hazards; hence the South African mining industry employs training initiatives

such as Adult Basic Education and Training (ABET) as well as Occupational Health and Safety (OHS) training to provide opportunities to capable workers who lack formal education. All the participants are of the view that formal education and training is an important input to safety management. The explanations advanced for their views include the following:

- Safety consciousness
- Build safety management commitment
- Develop literacy skill
- Aid disseminating of Safety through coaching and mentorship at shop level
- Moderates behaviour towards safety
- Comprehension of safety standards and procedures

The outcome on the relationship between formal education and the management of safety from the sample participants confirms the argument in Botma (2015:7) that there is a connection between relatively higher levels of education and enhanced occupational health and safety (OHS). Tuchten (2011:135) had also emphasized that a skilled worker is a safe worker.

Theme 8: Formal education and technological adaptation

There was consensus among participants that formal education and technological adaptation are positively related. Consensus centred on the following few factors that:

- Formal education and training is antecedent to change
- Technology challenges the status quo so do formal education and training
- Formal education breaks career limiting among employees
- Helps employee embrace technology

Musingwini *et al*., (2012:945) argued that technological advancements, productivity, matric entry requirement, standards, safety and shortages of skills in the coal mining

sector are presented as the relevant unique variables which have a bearing on formal education and training. The empirical discussion ranged on these factors and more, a viable conclusion and recommendations based on the findings will thus be presented in the next chapter.

3.5. CONCLUSION

The influence of formal education to employee performance has been demonstrated as positive. Formal education and training is perceived as vital to employee performance although in varying degrees increasing with the increment in the complexity of the task at hand. The coal mining sector is adopting technology at a faster rate than before changing the profile of the work towards complex tasks which demand that the work force be formally educated and trained in order to achieve employee performance which is central to organisational performance. Perceptions which were previously skewed towards informal education and training are certainly shifting and very few tasks require experience along which may lead to joblessness and unrest which does not help organisational performance. Thus the uptake of formal education by the mining workforce thus critical factors in managing unemployment, labour peace and employee performance in the mining sector.

3.6. CHAPTER SUMMARY

The chapter describes the empirical research and discusses its rational. The research employs a qualitative research method that uses a sample of eight participants drawn from across a single coal mine employee structure. The sample is conveniently selected and semi structured interviews used to collect data. The qualitative data process collected data from the sample which is presented as well in the chapter. The presentation began

with the discussion on the demographics of participants. The research specific section is discussed per theme and subjected to literature control.

CHAPTER 4

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. INTRODUCTION

The objectives of the research were classified into the primary objective and the secondary objectives. The primary objective was to investigate the influence of formal education and training on employee performance and subsequently organisational performance in the coal mining sector. The primary objective was split into the secondary objective which include, to determine the relationship between formal education and on the job training, to investigate the perceptions and influence that formal education and on the job training have on employee performance, to determine the influence of formal education and on the job training on organisational productivity at the mine, to assess how skilled workers' view the influence of formal education and on the job training on mine performance, to recommend strategies that can be used to improve the formal education and on the job training at the mine, to examine the managerial implication of the influence of formal education and training on employee performance. To achieve these objectives a qualitative research method was employed. In the quest of conducting the study and in light of the qualitative method approach, semi-structured interviews with the aid of an interview guide were self-administered by the researcher to a purposively selected sample.

4.2. CONCLUSION

4.2.1. To determine the relationship between formal education and on the job training

The research findings on the relationship between formal education and training and on the job training were conclusive in that most participants indicated that they benefited or drew more from formal education and training in their daily duties. On the job training was also found to play an important role, albeit to a lesser extent. A balanced mix, in the sense of an appropriate exposure to each mode of learning, both formal education and training and on the job training would optimise the benefits that employees draw from these modes of learning.

4.2.2. To investigate the perceptions and influence that formal education and on the job training have on employee performance

Participants did not identify formal education as a driver for performance, but were able to associate positively on the job training with employee performance. This is not to say that formal education and training does not positively associate with employee performance. The researcher argues that formal education and training seizes to be recognized, by the employee, as an important driver of performance once on the job but is a critical silent driver of employee performance. The above explanation is the reason why formal education and training is excluded on the list of employee performance drivers. On the dimension of theory and experience the research found a positive relationship between formal education and training and experience which validates the arguments behind the establishment of internships and work base learning. Thus this research study concludes that formal education and training positively influences employee performance.

4.2.3. To determine the influence of formal education and on the job training on organisational productivity at the mine

By extension employee performance and subsequently organisational performance are positively influence by formal education and training. Organisational performance can be measured by the productivity of the organisation. Formal education and training positively influence productivity although the impact of formal education and training compare to that of on the job training is situational.

4.2.4. To assess how skilled workers, view the influence of formal education and on the job training on mine performance

It was the view of participants in this study that the influence of formal education and training and on the job training on employee performance varied situationally to the nature of the job. The researcher concludes that, it is the task of mining organisations that are orientated to performance to ensure matching of formally educated and trained workers to the appropriated jobs. The same goes to those who received on the job training. The alignment of workers into positions according to the mode of learning is antecedent to mine performance.

4.2.5. To recommend strategies that can be used to improve the formal education and training at the mine

The role of trade unions has not been synonymous with improvement in the uptake to formal education and training amongst mine employee. The researcher, therefore, concludes that, trade unions in the mining sector need to be education on the positive role that formal education and training can play in safeguarding the welfare and right of employee. The education of trade unions in the mining sector, in this regard, paves way for the creation of an environment that encourages employees to set formal education and training goals, allow mines to align reporting structures to qualifications, raise minimum educational qualification thresholds and bring awareness to employees of the

existing financial schemes and institutions of learning. Trade unions need also to be encouraged to pressure mining houses to adopt flexible educational support policies.

4.2.6. To examine the managerial implication of the influence of formal education and training on employee performance

Managers need to adjust their educational policies to allow mining employees to learn new skills while on the job in order to remain relevant in the mining sector. The transition of the labour force from dominants of the unskilled towards the skills raises operational costs but the investments has a reasonable return in employee performance, productivity and mine performance. Managers may need to repackage and sell the role of formal education and training to their counterpart at the trade unions.

4.3. RECOMMENDATIONS

The recommendation of the study includes the following:

- Mine policies need to include the support of education and training of educational content in areas other than those aligned to worker's current job. Such improvement in policies can be signalled by growing investments in formal education and training for staff as well as corporate social responsibility programs.
- Trade unions need to work on a policy shift that puts pressure on mines to match the skills set of employees in the mining sector to that of the specific labour market environment through skills development programs that are formal in nature.
- Realignment of mine worker's knowledge and structures to the new qualifications requirements is strategic to achieving employee and mine performance, as well as productivity. Managers must involve all role players in the design and implementation of the new strategy to upgrade workers in the sector.

4.4. ACHIEVEMENT OF THE OBJECTIVES OF THE STUDY

The research study managed to achieve its objectives credit to the qualitative design that enabled the researcher to deploy interpretative techniques on the data supplied by the participants. The research provided valid and reliable answers to the research question that naturally arise from the research objectives. Once the validation of the answers was achieved, there was therefore no doubt that the research was successful in answering the research question and answering them viably. The primary research objective and secondary research objectives were achieved by gathering perceptions on the factors that indicate or signify, according to the body of literature, the influence of formal education and training on employee performance such as theoretical learning, experiential learning, employee performance drivers, challenges to formal education, measures to formal learning, safety management with education and technological adaptability with education.

4.5. RECOMMENDATIONS FOR FUTURE RESEARCH

In the future researchers could expand the utility of the study by expanding the sample size to include participants from more than one mine or all mines. Participants may also include trade unions and managers in the mining sector.

While the qualitative designs served the purpose in this study, outcomes maybe further validated by the use of a quantitative design. The subjective analysis maybe validated by the objective analysis.

The influence of formal education and training on employee performance can also be understood by examining organisational performance factors and their relationship with formal education and training.

4.6. CHAPTER SUMMARY

In chapter 4 the conclusion of the research is presented as well as the recommendations that naturally follow the conclusions. The researcher discuss his view on whether the objectives of the research were achieved and why. The chapter is concluded by identifying the recommendations for future research. In the future, it will be useful to expand the utility of the study by expanding the sample size and using a quantitative research method to validate the outcomes of this research.

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APPENDIX A: INFORMED CONSENT FORM

Informed Consent Form

I would like to invite you to participate in a research study examining: **The influence of formal education and training on employee performance in the coal mining industry**, which will add to the knowledge related to the effect of formal education within the coal mining sector. My name is **Tshepo Vincent Kaston** and the data collected in this interview will help fulfil the requirements for a Master of Business Administration at

NWU School of Business & Governance. I am under the supervision of Mr J.C Coetzee a professor at the NWU School of Business & Governance.

Participation Requires of You: To respond to the best of your ability to the question posed to you, you can explain with examples. There is no planned use of deception involved in this study.

Your Privacy: Your participation in this study and your responses will be kept confidential. Any reference to you will be by pseudonym, including any direct quotes from your responses. This document and any notes or recordings that might personally identify you as a participant in this study will be kept in a locked place that only the researcher will have access to. Only the researcher and the research supervisor might know who has participated in this study. Three years after the completion of this research study all personally identifying information will be destroyed.

Risks to you: There are five acknowledged risks generally associated with participation in research studies such as this one: Physical, psychological, social, economic, and legal. The researcher foresees minimal risk for those who choose to participate in this study. There are no foreseen physical risks associated with this study; other risks might include the following:

You might experience anxiety, discomfort, or negative emotions as a result of responding to the questions asked during this research study. If you experience a negative reaction, you may choose to skip the question, to withdraw from the study, or you may contact my faculty advisor or the University and the Review Board, especially if your discomfort continues after the study. See the contact information on the page below.

You might experience social, economic, or legal implications if you share your responses or your participation in this study with others. If you choose to participate in this study, you are encouraged to keep your participation in this study and your responses

confidential. The researcher will maintain your confidentiality throughout the study, and will destroy the records of your participation three years after the study is complete.

Benefits to You: There are not foreseen direct benefits to you regarding participation in this study beyond the general knowledge that you are assisting in furthering the knowledge related to this research topic, and assisting the researcher in completing the MBA degree requirements. There is no compensation associated with participation in this study.

The Participant

By signing this document I acknowledge that I understand my rights as a participant in this study, which the researcher has explained to you earlier.

I acknowledge that the researcher has explained my rights, the requirements of this study, and the potential risks involved in participating in this study. I understand there is no

compensation for, or direct benefit of participating in this study. By signing below and providing my contact information I am indicating that I consent to participate in this study, that I am at least 18 years of age, and I am eligible to participate in this study.

You may withdraw from this study at any time by notifying me by email. If you have any concerns regarding your participation in this research study you may contact my faculty advisor, **Prof C J Botha**, or the University committee. You may ask for a copy of this document for your own records.

Signed Name: _____Date: _____

Printed Name: _____

Phone Number_____email address_____
OR Postal address_____

Thank you for your participation,

Researcher Details:	**Supervisor Details:**
Mr. Tshepo Kaston	Mr. Johan Coetzee
email address: tshepo.kaston@gmail.com	email address: Johannes.Coetzee@nwu.ac.za
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Final Year: Masters of Business Administration (MBA)

NWU School of Business & Governance

APPENDIX B: INTERVIEW GUIDE

Section A: Demographic information

1. Gender
2. Which department do you work for?
3. How long have you been employed in the coal mining industry?
4. What is your designation?
5. What is your highest qualification?
6. Was the qualification acquired prior to or after employment at the mine?

Section B: Research specific information

7. From which between formal education and on-the-job training did you benefit most? Explain?
8. What drive employee performance in your line of work? Why?
9. How does formal training and on-the-job relate in your line of work?
10. Do those with more formal education perform better than those with more on-the-job training? Why?
11. Do those with more the-job training perform better than those with more formal training? Why?
12. What are the challenges of attaining formal education at the mine?
13. What do you think can be done to improve formal education and training at the mine?
14. Do you think formal education is important in improving health and safety at the mine? Explain?

15. What do you think is the relationship between formal education and technological adaptation?

APPENDIX C: PARTICIPANTS TRANSCRIPTS

Participant 01

Section A: Demographic information

RQ1 Gender?

PR1 Female

RQ2 Which department do you work for?

PR2 Mining

RQ3 How long have you been employed within the coal mining industry?

PR3 4yrs 5 months

RQ4 What is your designation?

PR4 Shift Boss

RQ5 What is your highest qualification?

PR5 Honours Degree Mining Engineering

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 Prior to employment

I paid my own tuition the searched for work later

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 From formal education; she feels that she is not doing what she went to school for in her current position; she learnt people management and POLC in the current line of work

RQ8 What drive employee performance in your line of work? Why?

PR8 I think is recognition; if you work hard without any recognition and rewards/awards, people are stay in positions for long and don't get recognized/rewarded

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 There is a relationship because you can apply what you learned at school on the job situation

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 Those with more formal education perform better in planning and design department

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 Those with more on-the-job training perform better in operations

RQ12 What are the challenges of attaining formal education at the mine?

PR12 Work schedule (Time management between work and school); juggling with time

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 Career Expo/work-shops; because most employee think and believe they have reached their ceiling thus not putting any effort in furthering their studies

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 Yes; Education helps to change your mind-sets and think and respond well in terms of Safety Management; Education will get rid of the 'I don't care mode'; Those that have not reached their ceiling will manage safety better, they can the thinking to want to know more' why should i act safely'

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 Formal education will assist in adaptation; we must just manage resistant to change on those that feel they have low self-esteem and feel they have reached the ceiling.

Participant 02

Section A: Demographic information

RQ1 Gender?

PR1 Male

RQ2 Which department do you work for?

PR2 Engineering

RQ3 How long have you been employed within the coal mining industry?

PR3 4 years

RQ4 What is your designation?

PR4 Chief Foreman

RQ5 What is your highest qualification?

PR5 B-Tech Electrical Engineering

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 Prior to joining the mine; I acquired only certificates of competency while employed at this mine.

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 On-the-job training plays a much bigger part of my day to day job; I only apply 20% of my formal education on my day to day job. For me to shape my job performance I apply my formal education theory; my job design does not allow me to fully apply what I learned through formal education

RQ8 What drive employee performance in your line of work? Why?

PR8 People get motivated when they are recognized for a job well done and also when they accomplish something(task);they get demoralized when they are doing a monotonous task; those that are continuously developed and trained will be driven to perform and vice versa. People need to be trained and developed equally to have the inner drive.

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 You will have to do both for you to qualify as an Engineer; the practical exposure is important in line with your formal education, they are both important (you can't do one without the other)

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 When they have to adapt to change; they will not necessarily perform better but will quick adjust, they will reason easily, they will take a shorter period to understand how the work systems work/operate; they only focus on one which is acquiring experience. After a while they will be running on two legs (education and

on-the-job training), Do not give higher positions based on Education only, you are will be setting the candidate for failure.

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 No, they will feel threatened and resist any change coming their way; they will feel that their skill is becoming obsolete, they will take long to understand things and reasoning and questioning how thing systems function and how all the systems get together to make a complete functional system; they have to learn and work at the same time which brings its own stress; They still have to understand how thing are packed in this way. They still lack the reasoning capacity.

RQ12 What are the challenges of attaining formal education at the mine?

PR12 Time management; Schedule management (family time, work time etc.); Money is not a challenge since there are a lot of systems (bursaries etc.) for funding. The other challenge can be replacing you i.e. getting a body to replace you (take your position while you are studying or training

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 The unfair situation at the mine that people with all the qualifications are still not rewarded; those without education still occupy higher post; The mine has to have consistent standards in term of the requirements of all position; and pay them accordingly

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 There is a relationship between Safety and formal education; people without education will regard safety rule, procedures, checklist as time wasting, because

they don't know the implications of not following those safety rule. The people with formal education will understand the reason behind following or adhering to a certain Safety rule; these people will question and wants to deeper understand why they should adhere to safety rules

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 There is a relationship between the two; you will need education to adapt to technology; People with education and training will not resist the change of new technology

Participant 03

Section A: Demographic information

RQ1 Gender?

PR1 Female

RQ2 Which department do you work for?

PR2 Mining (Construction Department)

RQ3 How long have you been employed within the coal mining industry?

PR3 4 years

RQ4 What is your designation?

PR4 Construction Foreman

RQ5 What is your highest qualification?

PR5 Matric + N3

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 Prior; I also have certificates of Safety through SAMREC

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 I personally benefited mostly from on-the-job training: Because you doing the job physically; you learning quickly. The qualification teaches the basics of the job; at the end of the day both is important

RQ8 What drive employee performance in your line of work? Why?

PR8 Experience to be gained, getting experience and if I go for training courses

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 Formal training teaches you basics, basics of civil work. You from time to time have to refer to the books especially if you are not sure

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 No, Those with more formal education has the basics will take some time to acquire the practical experience. The people with on-the-job perform better they know what to do.

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 Yes they got practical experience

RQ12 What are the challenges of attaining formal education at the mine?

PR12 Money, not everyone gets loans, bursaries etc

Time-management, employees work shift and if the take leave to attend classes they lose money

Not all institutions offers part-time studies, we need more institution to offer part-time studies

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 A system to identify people willing to work something like awareness sessions; educational career workshops

RQ14 Do you think formal education is important to improve health and safety in the mines? Explain

PR14 Formal education will make safety behaviour to sink into people's mind you as a supervisor will stop telling or reminding subordinates on safety behavior; it will get them to a state where there tell/remind each other about health and safety.

Employee with matric will better manage safety in their area than those without matric

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 With education you can quickly receive the coming technology

Final Remark: You cannot divorce the two (formal education and on-the-job training) but OTJ weigh more

Participant 04

Section A: Demographic information

RQ1 Gender ?

PR1 Male

RQ2 Which department do you work for?

PR2 Mining Services

RQ3 How long have you been employed within the coal mining industry?

PR3 10 year

RQ4 What is your designation?

PR4 Technical Service Manager

RQ5 What is your highest qualification?

PR5 M-Eng.

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 Undergrad prior. Masters after employment

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 I will choose OJT if I had to choose, the formal training gives you a reasoning skill, a skill you can apply a thinking methodology you can use. But you do not get the skill for being productive. When you finish school you have a certain knowledge (advance) not a skill (you can do a pump calculation as the books guide-theoretical calculation); on the job you apply the knowledge (e. g the 23.5 kW motor apply the factor of safety due to the up-normality in practice of the situation you end up using 30 kW motor; supplement with you practical)

RQ8 What drive employee performance in your line of work? Why?

PR8 Inspiration-if I feel that I am doing something that has value at the end (activities that are linked to value); doing something that will make a difference

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 You need to be able to take what you learned from school to the working environment, the qualifications acquired is lesser applied in the work environment.

At work you use your people skill and general management which is not taught at school

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 I cannot answer with a straight Yes or No; It does not matter, but the people that have gained some OJT and link it with their formal education they turn to perform better; if I had to choose between the two I would drop formal education with a justification; you will not be successful with your formal education only unless you go sit in the office in and do research work (theories thing); You need to marry the two to become successful

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 Yes, they can be able or they a skill to converse with everybody on technical and non-technical issues; you have picked up a skill of communicating, of technical knowhow for you to have a judgment on something;

RQ12 What are the challenges of attaining formal education at the mine?

PR12 The in no challenge; people who want to learn they learn; we are taking people to do ABET learner ; shift management can be an issue; people who want to learn they find time; they is no financial issues with all the opportunities available for financing

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 Get reed for the unions at the mine; the mine is pushed to take/employ people with lesser and lesser formalize education; we continue to lower our entry level to a

point where people leaving matric comes with lower formal education. The entry level for the generation Y has to be picked up;

Increase the appetite for formal education by advertising (financial schemes available, what institutions are available etc.). Access to information; people aspire what they have seen.

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 Yes I think so; directly, but is not the only thing; what is happening with that formal education is the ability to think; a person's reasoning grows and this is proven the more you learn about something the more you have your brain developed (neuro networks-more links of hoe the brain works), as you learn and that brain develops your reasoning capacity grows as well; formal education help you to think and assess the situation completely different; although there are certain people that can reason equally although they don't have any formal education; but if you had formal education your brain development or reasoning is already there…is almost like a given; it does help you making better judgment, reasoning through and thinking through risk…so it does have and influence.

An exception rather than a norm:

But if you were to take a person who has no formal education (with good OJT) at all but he is always keen to learn and put him against an individual with formal education but who cannot apply; I would rather work with someone with no formal education but willing to learn and is able to apply the learning on the job.

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 The people that are educated turn to learn or adapt faster; I had bosses that would say they are born B.C (before computers) this people don't like anything to do with

computers or gargets or new technology; those that are learned like new things, like to learn things, like changes, they adapt a lot faster than those that are not learned. Those that are not learned but like those gargets is an exception to the norm. There is a direct correlation btw learning and change (you cannot learn and don't want to change, when you learn you want to change and become more receptive of newer things does newer technology)

Participant 05

Section A: Demographic information

RQ1 Gender?

PR1 Male

RQ2 Which department do you work for?

PR2 Mining- Production Services

RQ3 How long have you been employed at Impumelelo/Brandspruit coal mine?

PR3 9 to 10 years

RQ4 What is your designation?

PR4 Shift Boss

RQ5 What is your highest qualification?

PR5 Matric and certificate of Competency as Mine Overseer

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 Prior to joining the company; the mine

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 I think I benefited from both; but if you have the education you can better understand what is happening around you at work; rather than someone without formal education; it becomes difficult for them to understand the way things/systems functions and the way they actual are supposed to function and the reason behind how things function; but you have both you end up have a better understanding, you reasoning capacity is much broader

RQ8 What drive employee performance in your line of work? Why?

PR8 In my area of responsibility, taking care of employees; handling their need well (through money or through training i.e. remunerate and send employees for training; empower them); people must get remunerated in accordance to the work they are doing; I believe employees will perform if they are happy, so taking care of them their needs will drive them to perform; the other thing is for you to have a good approach to you subordinates; if you get understand your subordinates you will have a better way of handling them at work and they will perform .

For me personally: Money, I like to work in a safe environment; I like to meek my set targets; meeting my project schedule.

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 There is a great relationship between the two. With formal education I can be able to motivate and lift the morale of my subordinate easily by easily showing them or exposing the bigger picture even during negative situation.

You can have the formal education but without the OJT you will fall short; on the other hand if you have OJT only you are limited to career advancement

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 No, Those with more OJT perform much better than those with education, up until those with education acquires the OJT/experience then they will excel because they are now having both education and OJT.

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 Yes those with OJT turn to perform much better although you always have to keep an eye on them since they like taking shortcuts sometimes.

RQ12 What are the challenges of attaining formal education at the mine?

PR12 Challenges on the mines relates to favoritism (if you connect well with your supervisor or you are a favoured guy you will be granted opportunities to study; the other thing there is no career advancement after coming with that qualification; there is no career-path even if you come back with a qualification.

Even if I'm given money to study but there is no career path/plan for me I will still be discouraged to go to school.

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 Remove favoritism of employees and judge an individuals or employee according to their education and experience; Remove friendship and relations in choosing people to go for studies/courses; also to motivate employees to study by exposing them to the available education within the mines

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 Yes is very much important. An employee with formal education can understand and analyze safety standards/procedures easily; and they help to translate these safety rules to their fellow colleagues thus inculcating the seriousness of safety in the mines;

An employee with formal education will easily understand the safety systems (Checklist for machine inspection etc.) used within the mine better than the one with only OJT; an employee with some understanding works much safer. Those that don't understand why things are carried or done in a particular manner are a safety hazard themselves. Employee need to understand all available safety rules and safety risks.

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 Education is needed for you to operate this new technology (machine or equipment). Those with education takes short time to master the new technology (they will quickly adapt) while those without education will take longer.

Closing Remarks: I feel if I can learn the way I wished I will benefit more and have an impact on my job.

Participant 06

Section A: Demographic information

RQ1 Gender?

PR1 Male

RQ2 Which department do you work for?

PR2 Engineering (Technical Training Dept)

RQ3 How long have you been employed at the mine?

PR3 7 years

RQ4 What is your designation?

PR4 Training Manager

RQ5 What is your highest qualification?

PR5 Diploma in Electrical Engineering and Diploma in Training Management; Moderator, Assessor

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 I joined the mine with my Diploma in Electrical Engineering the rest I acquired whilst I am employed.

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 I benefited most from the Formal Education, but my formal education included a bit of OJT exposure; this is called a blended learning approach(theory and a bit of OJT exposure);

Pure OJT is limited; if you don't have the academic theoretical part of learning your flexibility in terms of applying or thinking out of the box are limited; reason being you don't have any structured learning that help or assist you in how to do things or how to approach a problem or how to improve a situation or how to confront something. If you are from the OJT/experience your intellectual of attacking things that are above your thinking capacity is challenged; but if you went to school your thinking is widened and when you go into practical of doing things(work-place scenario) you draw from your school intellectual and it helps you to enhance how you see, reason and resolve problems. With formal education there is no restriction

in how you think and how you execute things, you have got plenty option of doing thing in a more productive and more economical way.

RQ8 What drive employee performance in your line of work? Why?

PR8 Learning drives employee performance; they perform causes they want to learn further about the work; by so doing fear is eradicated

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 Formal education gives you a structured way of doing things, methods that you must implement; learned people understand both worlds;

The is a relationship between the two(formal training and OJT); an artisan with formal education and a bit of practical on the job exposure will always surpass the one with only OJT when they have to do faulty finding on any electrical equipment; latest machine works on soft-wares PLC (Programmable logic circuits) ,you need to go to school to understand how PLC functions ;working with this machine requires logical thinking on how a PLC system operate, if you did not go to school you are limited the is a disconnection.

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 The more formal education will perform better; because when you go to school you are taught certain principles; an engineer from school get taught various fields of engineering (electronics; electro-mechanics, electric fields, etc) this gives him some latitude of solving engineering problems. They have the abstract thinking capacity which is a deficiency for those with only OJT

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 An engineer with only OJT has minimal or zero exposure of the above engineering fields, thus their efficiency in-terms of resolving engineering problems that require those fields is low; they will be sharp on routine tasks but the minute the face of the task changes it becomes more complicated for him. Because the problem now warrants logical thinking, thus becoming a stumbling block for those with OJT only. But a straight forward easy to see mechanical problem they will be able to fix.

RQ12 What are the challenges of attaining formal education at the mine?

PR12 The challenge is that most of the people working on the mines have learning interest (personal interests) that are not aligned with the mine, thus they do not get support from the mine either (financially or time) and they eventually become negative towards learning mine related courses.

No any other challenge.

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 An individual must first decide that they are going to pursue studies. Individual must have a dream to learn; the company cannot instigate learning into any individual. It is a personal decision to go and study, no one can come from outside and persuade you to study.

The mine has done everything to enhance learning within the career aligned or related to the mine interest (mine related careers): the mine has clear career-paths for every mine related careers that are well communicated; The will support any mine related (stream related) learning and vice versa is the same.

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 Yes, firstly the Mine Health and Safety Act (MHSA) is written in English; the employees with formal education will easily learn and understand this Act and strengthens the Safety compliance factor. The educated employees can fluently interact with any Safety Police (e.g. Inspector of Mines); education assists them to understand Safety management better. Learning changes behaviour, so an educated person will change the way they manage safety within their workplace; those without formal education don't engage a lot on safety issue or don't interrogate any Safety rules/standard and procedures, they turn to accept and carry-on with what they are being told.

Safety in the mines is not a function of management but a function of all (from shop floor to managers), thus with a learned workforce we going far with on Safety Management.

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 Employees with formal education easily or quickly receives, and will explore further function coming with the new technology at their own initiative, they are always on a continuous improvement, they always challenging the status quo, the always want to work better, thus making work simple.

Learned people are not resistive to technology (they accept technology easily), they embrace technology and they will always create a number of ideas in term of executing the task using technology to the fullest

Participant 07

Section A: Demographic information

RQ1 Gender?

PR1 Female

RQ2 Which department do you work for?

PR2 Mining Department

RQ3 How long have you been employed at Impumelelo/Brandspruit coal mine?

PR3 10 year

RQ4 What is your designation?

PR4 Mine Overseer

RQ5 What is your highest qualification?

PR5 B.Sc. Mining Honours Degree

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 No, I did the qualification before I applied for the job.

Section B: Research specific information

RQ7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 I think I have benefited most from formal the education; I can give formal education 60% of my benefits and OJT give it 40%; reason being my formal education I got to understood the whole process of mining and that my formal education included some OJT/ practical exposure during school breaks. When I came to work (OJT) I knew most of the things; I have to give to formal education that I benefited most from; the only thing that I did not know was blasting the rock but the rest in terms of the process (planning; survey ore-body) on extracting the coal I learned a lot form formal education.

My people management skills comes from a split between formal education and OJT; but it becomes much more better now that I am OJT since I am experiencing different people issues and problems; I benefited more from formal education, but

I am giving it a split of 60%:40% (formal education and OJT respectively) because there is some of the skill that I acquired from OJT.

RQ8 What drive employee performance in your line of work? Why?

PR8 <u>For the team</u>

Getting the tonnage right, achieving goal in terms of coal-performance in terms of achieving their tonnages; secondly recognition and reward (cold drinks & bonuses) and rewards in terms of Illima cutting the Illima drops the moral; also listening to employees as management.

<u>Personally</u>

Personally I fear failure; I have not experience failure then I respect failing that I work against it.

My career growth I want to grow as much I can; I want to in my career I make sure that I learn the best, I want to be different in this few woman industry that I stand out to be the best.

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 When I started, at a lower level I thought that formal education was irrelevant since my job (miner/shiftboss) then involved more practical part of mining in detail. As I progress up into the ladder I started applying what I learned at school;

RQ 10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR 10 A split of 50%:50%

No and yes: People with formal education they understand better why they should perform certain tasks (they can see the bigger picture); they also value what they have i.e. they value the equipment and machinery in use because they understand

the financial prospect behind; they understand the bigger picture of the company (the vision); they have better understanding in terms of business planning and clearly understand to fit into the visions and missions of the company. They understand the ins and outs in terms of the micro and macro-environment; they can easily make sense of what is happening in the country and globally and relate that to how the company is doing. The people with formal education will pull to make the company perform better though better ways of doing things (innovation).

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 No, People without formal education but with more OJT they just want to mine coal or do just what the company wants, they don't engage with the company in order to improve its way of doing things and standards; they understand their environment much better; they understand and focus only on the micro-environment; they understand stuff on the smaller scale; they will only improve on the environment in which they are operating; they will not come with any change.

RQ12 What are the challenges of attaining formal education at the mine?

PR12 No really major challenges; but there is a believing or a misconception that the person operating machines should not be educated, eradicate the thinking that the mines are only for un educated people and up the entry level.

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 Change the system and want people graduated people to work in the mines; up the entry level to maybe more than matric; do away with the mentality of having uneducated people at the mines

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 Yes it is; with formal education you understand the implication that will happen to a mine if you are not safety cautious; with formal education you understand the if the inspector of mines closes a mine there are serious consequences and implications; people with formal education look at safety differently; they will be proactive in safety management; they asses and manage safety differently; people without formal education don't understand the effects of not using PPE(personal protective equipment);the understanding comes with more formal education

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 Yes I think there is a great relationship; educated people want to improve and be technologically wise; those without education fear for the job (they fear technology will take their job)

Educated people believes that technology or automated mining industry will have less standards/rules since there is less human factor; automation outweighs conventional mining

Participant 08

Section A: Demographic information

RQ1 Gender ?

PR1 Male

RQ2 Which department do you work for?

PR2 Engineering (Service Dept Water reticulation)

RQ3 How long have you been employed at Impumelelo/Brandspruit coal mine?

PR3 10 years

RQ4 What is your designation?

PR4 Chief Foreman for 8 years

RQ5 What is your highest qualification?

PR5 B-Com Degree in Industrial and Organisational Psychology

RQ6 Was the qualification acquired prior to or after employment at the mine?

PR6 While I was employed at the mine.

Section B: Research specific information

RQ 7 From which between formal education and on-the-job training did you benefit most? Explain?

PR7 I benefited most from formal education; because with OJT you are only taught specifically on what you need to know to do the job practically; anything outside of that e.g. how to manage a team, how you diagnose problems within your work will not acquire; Basically OJT focus on how to do the job (the practical side of it) i.e. the standards and the process, so it is limited. But we need to acknowledge that success in the job is not only about the how, there is a personal aspect as well i.e. the type of management skills, the type of interpersonal relationship, decision making skills which you only acquire through formal training; Formal education and training benefited me most.

RQ8 What drive employee performance in your line of work? Why?

PR8 Employee performance is most driven by clearly define goals/plan, if you know that we are doing this task but this is actually what we want to achieve and the significance of what we are doing and seeing the whole (bigger) picture; so it is not that you are doing a task because you were told to do it but you understand the reason behind doing that particular task. If I'm aware that the task I'm doing will impact on the bottom line and the criticality of these task to the company, the sense

of urgency will be high; If you understand why you are doing the task and how does it fit to the bigger picture then automatically performance will come.

The second thing is support; managerial support (it does not help me to explain to me why I need to do certain task but you don't support on that).

RQ9 How does formal training and on-the-job relate in your line of work?

PR9 The formal education give you the managerial skills to be able to better manage and support my teams thus attaining the set results; it further helped me to manage better manage the mines assets and resources well; You cannot do the above without education; OJT is more task specific and requires your technical knowledge; When you move up the ranks you don't need a lot of technical knowledge since you have teams performing the technical-practical work for you; In this space your role is to coordinate this activities and account for the work of others.

In a nutshell formal education is related to OJT in a sense that in takes you role as a leader/manager and links it to the objectives (what you have to achieve) of the company.

Your role shifts as a leader cause at that level you need to coordinate those technical people below you; this is where OJT lacks because it does not cater for such leadership skills and related managerial skills

RQ10 Do those with more formal education perform better than those with more on-the-job training? Why?

PR10 I think it depends on what is the basis of you measure in term of performance; if you are more concerned process that are put in place are followed, employees are doing thing ethically and morally right, we follow the rules, we use available resources to the best of our ability-The you are leaning more in favour of formal

training or you will regard those with formal education to be performing well. It depends on what is important for the business or for you as a manager;

Personally: Formal education is never a waste of time, because the will come time where that knowledge is applicable and will make the difference; so if you have it you are at an advantage;

Finally: I will confidently say people with formal training are most likely to perform better since they are one step further.

RQ11 Do those with more the-job training perform better than those with more formal training? Why?

PR11 I think it depends on what is the basis of you measure in term of performance; if you are more concerned that the job is done, irrespective of whether the process and people where abused and policies where not followed safety rule where not adhere to-You are more result focused, then you will view those with more OJT to be better or performing better.

It depends on what is important for the business or for you as a manager; if you are results orientated and not care about how the results were attained, then those with OJT will be the best.

RQ12 What are the challenges of attaining formal education at the mine?

PR12 Support, financial support and time as well;

The mines have bursary schemes, but they only support those streams that are relevant to the business; in essence personal development is just on paper since the mine don't support those stream that are outsides of your working environment (even though there is a department dealing with what I'm studying within the mine)

For me in the Engineering field I will get support if I study something engineering related; that the challenge.

Without this support you won't get financial support, time support (need to take leave and study at you own time)

Furthermore, there is this unwritten rule 'we have employed you to work' your development would come later; so the way in which the work/job is structures (i.e. shift, workplace) is more conducive to do work;

For people working an 8-9 hour shift underground to pursue studying coming from the physical mining environment is very tough; by the time they knock off they want to rest and prepare for tomorrow's hard labour; the nature of the job, the work environment is demanding to such an extent that is a challenge to study after work.

Your studies do not guarantee that will get promoted unless you studied a work related course.

RQ13 What do you think can be done to improve formal education and training at the mine?

PR13 Support even the stream than are not related to employee's work but is once personal development (own growth) cause; not everyone wants to study the mine related courses; this might reduce turnover and people withholding information.

Value formal education within the mine; people with higher formal education are still reporting and remunerated the same as those without formal education

RQ14 Do you think formal education is important in improving health and safety at the mine? Explain?

PR14 Formal education broadens your horizons; it helps employees to understand the safety management tool that the mine is using. But this system alone do not answer the question of 'Why do we still have incidents/accidents on the mines; we need to back to the theoretical understanding of how does a human mind work, what is the impact of sleeping or working shifts on safety; once we understand

change (this can only be understood through formal education) then we will be in a position see and understand why we still have incident/accidents on the mine;

Safety Management: It is not about giving PPE but also about understanding the above various variables that interact with the environment to render a mine safe.

So formal education will close that gap where we look at models, theories, the rationale behind why people are doing certain things why certain thing are happening

Formal education will assist to go beyond in safety management and answer and ask questions that are not asked.

A person without formal education will lack the commitment to managing safety since they don't have the language proficiency, the reading skill when coming to applying the safety rules/standards and managing safety. A person with formal education will manage safety better; some of the safety concept needs education for understanding i.e. the bird triangle; the probability of having an incident/accident.

RQ15 What do you think is the relationship between formal education and technological adaptation?

PR15 Formal education will enhance technological adaptation; with formal education the operator of the new technology (machine/equipment) will be able to know how to respond to the signs and signal given by the new machines (responding to the close proximity technology); people with formal education will not resist the change even if it is rapid; those with OJT struggles to adapt and accept the change blaming it being rapid;

APPENDIX D: LANGUAGE EDITOR CERTIFICATE

ABC SOLUTIONS

Saturday, 19 November 2016

To whom it may concern,

Re: Letter of confirmation of language editing

The dissertation, **The influence of formal education and training on employee performance in the coal mining industry,** by Tshepo Vincent Kaston (25730612) was language and technically edited. The referencing and sources were checked, as far as was possible, as per NWU referencing guidelines. The final corrections and adjustments remain the responsibility of the author.

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