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Harvesting mining engineering graduate’s potential for value added to the organisation

A minor dissertation submitted in partial fulfilment of the Master of Engineering in Engineering Management at the Faculty of Engineering and the Built Environment of the University of Johannesburg

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Co-Supervisor: Prof. A.F. Mulaba-Bafublandi
Abstract

The research was conducted at Sibanye Stillwater, a gold and platinum group metals (PGM) mining company with operations in the Witwatersrand Basin, along the platinum belt and in the United States (US). The research was titled “Harvesting mining engineering graduate’s potential for adding value to the organisation” and aimed at producing a framework for mining engineering graduate utilisation and retention within the organisation.

A quantitative study was done by means of a questionnaire with a population of 53 and a sample size of 17 participants. The composition of graduates in terms of their qualifications is as follows: 47% BSc, 35% B Tech, 6% BEng and 12% chose not to specify their qualifications. The composition of their current roles is as follows: 10% miners, 32% production supervisors, 16% other (shadowing production supervisor), 26% chose not to specify their role, 5% other roles, 11% other roles in service departments. The questionnaire was divided into three sections namely; Technical Knowledge Utilisation, Job Satisfaction and Potential to Add Value.

The results generally indicated that when analysed as per individual responses, the result was negative for technical knowledge utilisation. However, in the various groups (per qualification, per role), utilisation was found to be adequate. Job satisfaction was found to be generally dissatisfactory and this being largely attributed to working conditions and company culture, key performance indicators that do not reflect the true performance of the graduates and unattainable targets. Potential to add value yielded inconclusive results since equal proportions of the participants responded positively as those who were neutral.

Based on the results of the study obtained, the researcher proposed a theoretical framework as a means through which the organisation can harvest the full potential of its mining engineering graduates such that they add value to the organisation. The framework identified 3 components: Talent Management, Competency Development and Retention as foundational pillars which the organisation can use to aid the organisation in harvesting the full potential of its mining engineering graduates to add value to the organisation.
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- My family for their unwavering support
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<tr>
<td>SA</td>
<td>Southern African</td>
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<td>US</td>
<td>United States</td>
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<tr>
<td>PGMs</td>
<td>Platinum Group Metals</td>
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<tr>
<td>Wits</td>
<td>University of the Witwatersrand</td>
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<td>UP</td>
<td>University of Pretoria</td>
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<td>UJ</td>
<td>University of Johannesburg</td>
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<td>UNISA</td>
<td>University of South Africa</td>
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<tr>
<td>BTech</td>
<td>Bachelor of Technology</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>BSc</td>
<td>Bachelor of Science</td>
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<td>SAIMM</td>
<td>The Southern African Institute of Mining and Metallurgy</td>
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<td>GDP</td>
<td>Graduate Development Programme</td>
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<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>ECSA</td>
<td>Engineering Council of South Africa</td>
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Chapter 1: Introduction and Background
This chapter gives a detailed introduction to the research project and discusses the South African mining industry in general, the background of the organisation where the research was conducted, a description of the topic, the problem statement, research aims and objectives of the research, the scope and limitations of the research as well as an outline of the structure of the research report.

1.1 The South African Mining Industry
South Africa is well known as a mining country and has been producing a large variety of minerals for over 100 years (Cruise, 2011). It is one of the wealthiest countries in the world in terms of mineral wealth (Genc and Cawood, 2012) with the largest reserves of platinum-group metals (87.7%), manganese (80%) and gold (80%) and chromium (72.4%). This rich mineral endowment renders the South African mining industry as a major role player in the economy of the continent (van der Walt et al, 2016).

South Africa is the largest producer of platinum and is among the highest producers of gold, diamonds, base metals and coal. To capture the full value of these mineral resources the country needs the technical skills required to optimally run the existing operations. Mining is an important activity that serves to meet society’s needs for commodities and products that are made from them through processes of mineral extraction and beneficiation respectively (Haupt and Webber-Youngman, 2018). The country needs an adequate supply of mining engineers and other skilled personnel (Genc and Cawood, 2012).

South Africa is known for producing mining engineers of the highest calibre. These mining engineers are now in short supply and the industry needs the technical expertise they possess to gain competitive advantage and once again thrive (Cruise, 2011, Musingwini et al, 2013). The research is aimed at aiding the organisation in the harvesting of their mining engineering graduates’ full potential for value added to the organisation.

1.2 Company Background
Sibanye Stillwater is an independent, global, precious metals mining company that produces a unique mix of metals comprising of gold and PGMs (Sibanye Stillwater, 2017). Sibanye Stillwater is the 3rd largest producer of platinum and palladium. It is also among the top producing gold mining companies in the world and the largest gold producer in South Africa. The company owns and operates a portfolio of high quality operations managed and operated in 2 regions: The Southern African (SA) region and the United States (US) region (Sibanye Stillwater, 2017).

The company was established in 2013 and has since transformed itself in terms of both location (geographically) and in terms of commodities mined. It was initially a South African gold mining company and is now an internationally competitive, diversified precious metals miner which produces gold and PGMs. Following the successful acquisition of Stillwater which took place in May 2017, Sibanye Gold Limited was rebranded as Sibanye Stillwater (Sibanye Stillwater, 2017).
In 2013 it was still a South African gold mining company that was operating relatively mature operations with short life of mine. Through the successful implementation of the operating model which was focussed on cost cutting the company managed to achieve several notable successes:

- Improvement of the flexibility and quality of mining
- Increase reserves which increases the life of mine
- Extend operating life
- Reduction of debt/gearing
- Delivery of consistent industry leading returns

Production from the different metals in 2017 was as follows: Gold (44%), Platinum (25%), Palladium (21%) and other PGMs accounted for 10% of overall production (Sibanye Stillwater, 2017).

The company has five core values with the acronym Commitment Accountability Respect Enabling and Safety (CARES).

In Southern Africa the gold producing operations as well as the projects are all located throughout the Witwatersrand Basin while the PGM assets are situated along the southern portion of the western limb of the Bushveld Complex near Rustenburg. Mimosa is situated in the Great Dyke in Zimbabwe and it is a joint venture between the company and Impala Platinum Holdings Limited (Implats) (Sibanye Stillwater, 2017).

The gold operations comprise the Beatrix (Free State), Driefontein and Kloof Operations in the West Rand in Gauteng. There are also projects being undertaken in the gold sector in the following areas: Burnstone, Southern Free State as well as the West Rand Tailings Treatment Project (Sibanye Stillwater, 2017).

The PGM operations are split between the Rustenburg operations where the company owns 50% of Kroondal and in the Platinum Mile where the company owns 50% of Mimosa. PGM projects currently being run as follows: Hoedspruit, Zondernaam and Vygenhoek (Sibanye Stillwater, 2017).

The gold division operations and projects are located in 3 geographical regions of the Witwatersrand Basin. These are the Far West Rand Goldfields (West Rand and West Wits Line), the Free State Goldfields and the South Rand Goldfield. The Far West Rand Goldfields are situated 30-80km west to south west of Johannesburg while the Free State Goldfield is 240km south-west of Johannesburg and the South Rand Goldfield is 75km south-east of Johannesburg. The Operations on the far West Rand Goldfield are the Driefontein, Kloof and Cooke operations (the Cooke operations are currently under care and maintenance) (Sibanye, 2016; Sibanye Stillwater, 2017). These operations are between the towns of Carletonville and Randfontein. In the Free State Goldfield, the Beatrix Operations are located near Virginia and in the South Rand Goldfield is the Burnstone project near Balfour (Sibanye, 2016).

These are illustrated diagrammatically in Figure 1
1.3 Description of the Topic

The research topic is “Harvesting Mining Engineering Graduate’s Potential for Value Added to the Organisation”.

It is cited by Musingwini et al, 2013 that the traditional career trajectory for a mining engineer is in production with the goal of mine management. One can almost say that mining engineers and mine managers can be terms used interchangeably.

The researcher challenges this viewpoint by considering the skills, capabilities and competencies possessed by mining engineering graduates and questioning whether these
are being utilised and if not, considering how best they can be utilised to add value to the organisation, which may not necessarily imply that this will be best done by them following the traditional career trajectory.

Consideration of the mining engineering curriculum in detail in terms of the knowledge content offered by the various courses brings one to the realisation that much of the knowledge gained goes under-utilised on the pre-set “traditional career path to mine management”.

The researcher explored the subject by means of a research study which focused on how the organisation could uniquely tap into the unused knowledge and skills possessed by their mining graduates for the benefit of the organisation for the attainment of organisational goals. When organisational performance is improved and enhanced, competitive advantage is gained, and the organisation can thrive and lead its peers.

The organisation is considered by others in the industry as being the pioneer and best institution that organises and provides training to both professionals-in training and established professionals in the industry. It is a training giant which other employers pay to provide training to their employees. Ironically, mining engineers are then in turn poached from this very giant by other employers that seem to offer these development hungry engineers more diverse roles where their knowledge is applied and adds value to the organisation.

There are several things one needs to bear in mind regarding the conventional gold mining industry: the labour intensity of conventional mining in general, generation Y character of the mining graduates, history of gold mining and generalised management style, primitive nature of the mine design and existing infrastructure, harshness of the working conditions and associated safety-related risks. These, according to the researcher are opportunities that exist for the employment of creative means of improving organisational performance.

The researcher, when comparing the hidden potential of the graduates with that which is currently being utilized, is of the belief that the organisation can benefit much more from the presence of their many mining engineers if the organisation takes the brave step of harvesting their knowledge and skills especially those that have been swept under the rug by means of the graduate development programme (GDP) which can be used synonymously with the traditional career trajectory of a mining engineering graduate.

The researcher, from observations of trends in the industry, had noticed the dissatisfaction which mining engineering graduates go about some of their daily prescribed duties and intended on determining the validity of this observation and if found valid, understand the root of the problem thereby enabling the researcher to produce or present the organisation with a solution.

For the organisation to gain competitive advantage accompanied by continued investor confidence through the immense challenges that the mining industry is experiencing, the organisation needs to consider the option of maximising its current assets. One of the assets
which can be optimised is their employees who can be trained, developed and convinced for optimal functioning of the organisation (Mphahlele et al, 2018).

1.4 Problem Statement
It appears that the mining engineering graduates’ potential is not fully utilised for adding value to the organisation.

The average time it takes a mining graduate to be appointed to a managerial position where they can make a full valuable contribution is 10 years. This period is an indication of the fact that the development, education and training of mining engineering graduates is a corporate strategic decision and should be treated as such (Musingwini et al, 2013). Stacey et al, 2009 agrees with this statement by saying that it takes approximately 15 years from a student’s start at university until they can complete their training such that they are able to occupy a managerial role

1.5 Research Aim and Objectives
The research was aimed at producing a framework for mining engineering graduate utilisation and retention within the organisation.

The research has 3 main objectives:
1. To evaluate the extent to which the graduates’ technical knowledge, skills and capabilities are utilised in their current roles in the organisation
2. To determine the level of job satisfaction among the graduates
3. To find out how the graduates think they can best add value to the organisation in the long-term

1.6 Research Question
The researcher has formulated the research question as follows:

*Does the organisation fully utilise the potential of its mining engineering graduates such that they add value to the organisation?*

This research question, when answered by the conclusions of the research will benefit the organisation in that the organisation will be in possession of a uniquely produced organisation-specific theoretical framework designed to ensure that the organisation gets to utilise the skills possessed by the mining engineering graduates to the benefit of the organisation, thereby giving it the competitive advantage and a baseline for ensuring that this competitive edge is sustained for productivity, safety and operation optimisation.

1.7 Scope and Limitations of the Research
The research was undertaken at Sibanye Stillwater and the topic is strictly limited to mining engineering graduates within the company. The graduates that are considered as part of this study are graduates that fall under the administration of the Sibanye Stillwater Academy and not those that fall under the various operations. Geographically, the study
was limited to the West Wits Line (West Rand) since all the graduates considered as part of the study are located here.

1.8 Structure of the Research Report
The report takes the following structure:

Chapter 1: Introduction and Background
Chapter 2: Research Methodology
Chapter 3: Literature Study
Chapter 4: Findings
Chapter 5: Discussion of the Findings
Chapter 6: Theoretical Framework
Chapter 7: Conclusions and Recommendations
Chapter 8: References
Appendices
Chapter 2: Research Methodology

The research can be classified as exploratory in nature in that it explores a subject about which little is known (Kumar, 2011) in the organisation and broadly in the conventional gold mining sector.

It is cross sectional in format as the researcher explores and assesses the current situation now and by taking a cross section of the population and only requires one data collection point with the population (Kumar, 2011).

Data was collected using a questionnaire for the following reasons:

- Questionnaires ensure anonymity (Kumar, 2011). This was important for the research because respondents might not want management to identify for fear of intimidation of any kind since it might be unfairly linked to their on the job performance
- Geographic location of the participants was not an obstacle but the irregularity of their working hours posed a challenge which a questionnaire could resolve since it could be emailed to the respondents and emailed back to the researcher upon completion
- The research had no external source of funding and was under budgetary constraints. Questionnaire administration is relatively inexpensive and convenient (Kumar, 2011)

The target population generally is the set of elements that are usually people in the context of a research survey who will be studied in a survey. The people that will be unable to take part in the survey or cannot be reached are excluded from the target population. The people who respond to the survey make up the survey population. These are the people that are able to give responses to the survey if they have been selected to do so. Initially, researchers should critically identify their population of interest, unit of analysis and the questions they will ask that will optimally answer the research questions and satisfy the aims of the research (Gideon, 2012).

The target population for the survey is all the mining engineering graduates that are employed by Sibanye Stillwater and fall under the database of the Sibanye Stillwater Academy not the operations irrespective of when they graduated or time entered into service with the employer and means by which they were employed be they internal or external employees.

2.1 Sample Selection

The study was aimed at exploring the extent of utilisation of the skills, knowledge and capabilities of the organisation’s mining engineering graduates. The study has not been done in the organisation before so no historic data to this effect exists. The size of the population is 53 (Kies, 2018). Since the study is limited to only the mining engineering graduates on the Academy’s database, these are the only graduates included in the study. A sample size of 30 participants was selected by the researcher due to availability, willingness to participate and logistics pertaining to getting the questionnaire to them and having it returned.
2.2 Data Collection

A primary data source in the form of a questionnaire with closed-ended questions on a summated rating (5-point Likert) scale was used to collect data from the selected respondents. The respondents were given a period of 2 weeks to complete the questionnaire and return it to the researcher. The respondents were given an option to have the questionnaire either emailed to them or to fill out hard copies of the questionnaire and have the researcher collect them.

2.2.1 Questionnaire Design

Questionnaires are “self-report data collection instruments that can be administered by various modes to various individuals in different locations as part of one’s research project. Questionnaires can include questions in a variety of formats. Questionnaire items can ask for a simple yes or no answer or they can be statements requesting that participants rank their responses” (Gideon, 2012).

Questionnaires are written lists of questions asked by the researcher to the participants to which participants provide written responses whether in the presence or absence of the researcher (Kumar, 2011).

Questionnaires provide answers to research questions if two criteria are met (Jann and Hinz, 2016):

1) The researcher can translate the research questions into survey questions asked in the questionnaire
2) The respondents provide correct responses that are meaningful to the subject of interest

The questionnaire should be designed in such a manner that it is not biased and does not ask the questions in a way that either supports or refutes the hypothesis. The researcher’s view on the hypothesis should not be evident in the questions asked.

The validity of a questionnaire can fall under the threat of unintended bias which can arise when there is no common understanding between the researcher and the respondent in terms of the way the researcher intends the question and the manner in which the respondent understands the question. These two should be on par to ensure that the questionnaire fulfils its purpose of creating a question and answer dialogue that provides answers for the research question (Lotz, 2017, Kumar, 2011).

Gideon, 2012 gives a comprehensive three step method of designing a questionnaire. The method is outlined as follows:

1) Define the required elements as per the research goal and objectives. Ensure that the questions asked are intended at answering the research question and satisfying the research objectives
2) Categorise the elements of the questionnaire. Create general titles under which to place related questions which will answer the research questions. The various categories should enable the researcher to ask a wide array of questions that under a category, will answer the stated questions
3) Evaluate the items on the questionnaire using the following seven step method as follows:

a. Clearly outline and define the conceptual variables required as per the research objectives
b. Derive the items to be included on the questionnaire based on these variables
c. Examine the preliminary items on the questionnaire, particularly checking for the following:
   i. How relevant they are to the main research topic
   ii. How they relate to the other items on the questionnaire
   iii. Whether or not they are constructed such that information flows logically
   iv. The presence of double-barrelled questions
   v. The presence of double negative questions which should be avoided
   vi. Repetitiveness has been avoided
   vii. The presence of loaded or leading questions
   viii. Questions are objective and avoid any form of bias
   ix. The language used is simple and direct
   x. Questions are short and concise
   xi. Whether the subject at hand will be best answered by an open-ended, close-ended, multiple choice or a ranking response
   xii. All possible answers have been included if multiple choice questions are asked
d. Run an empirical examination in a small study that is representative of the main study
e. Make corrections where the need arises from findings of the previous step
f. Write an introductory statement and give instructions to respondents detailing how you want them to complete the questionnaire
g. Make necessary adjustments as per the need

When research questions are clear, the data gathered from them can be assumed to be reliable and comparable (Lotz, 2017).

The quality of the responses is negatively impacted when respondents feel that the questions are difficult to understand or that their response requires far more effort to process than the respondents are prepared to give. This phenomenon is termed the satisficing theory: If respondents are required to think with much more difficulty about the answer to a question without supporting motivation their response strategy changes such that they revert to compromising the standard to which they answer the questions instead of investing the additional energy and effort required to answer the seemingly difficult questions. As such they resort to providing satisfactory answers instead of optimal answers. This can be avoided by ensuring that questions are asked in a concise, simple manner. This will ensure that the energy of the respondent is expended in answering the question in as much detail as desired instead of trying to comprehend the question (Lotz, 2017).
Minor, overlooked details in the way questions are phrased can have major impacts on the quality of the responses as well as the overall outcomes of the research. Therefore, questions should be kept as short as possible to maintain the respondent’s interest and increase comprehension. This is the recommendation: 16 words maximum has been specified per sentence where a question may consist of more than one sentence (Lietz, 2009, Lotz, 2017 and Gideon, 2012).

Lotz, 2017 adds the seven factors that have been identified which hinder the effective answering of questions in a research questionnaire: low-frequency words, vague or imprecise relative terms, vague or ambiguous noun phrases, complex syntax, complex logical structures, low syntactic redundancy and bridging interfaces.

Questionnaire designers need to be specific on the kind of information they want to obtain. Thus, the ambiguity of open-ended questions should be avoided. Also, only one concept should be asked per question to increase clarity and simplify the response mechanism (Lietz, 2009 and Gideon, 2012). Researchers are encouraged to provide medium-length introductions to questions or groups of questions concerning the same subject as it has shown to improve the quality of responses generated (Lietz, 2009).

2.3 Data Analysis
The data was analysed using spreadsheets to perform statistical calculations. The data was analysed in terms of respondents’ responses to individual questions, collective group responses, as well as responses divided into various groups such as per qualification, role and how each group responded to the different sections of the questionnaire. The results were also analysed in light of the literature in Chapter 3 of the report.

2.4 Limitations of Selected Method
Limitations of the cross-sectional study is that assessments are made after one data collection point at a particular time and change cannot be effectively measured (Rankit, 2011).

Limitations of the Questionnaire:

- Questionnaires generally have a low rate of response (Kumar, 2011). Because it is presumed that not everyone will return it, this may impact on the size of the sample
- How a respondent responds to one question may be influenced by another question on the questionnaire (Kumar, 2011). This would imply that the questions would not be treated as separate entities, thereby influencing the validity of the responses
- It provides no chance for clarification of some of the questions. As a result, the respondent if they do not understand a question, will probably leave it unanswered (Kumar, 2011)
- If the question is not interpreted by the respondent the way in which the researcher meant it, it could be insufficiently or inadequately answered (Kumar, 2011)

Limitations of Closed-Ended Questions:
• The information that can be extracted from them often falls short of variety since the choices of responses are limited to the researcher’s frame of mind which increases the possibility of researcher bias (Kumar, 2011)
• The given response options may not fully express the respondent’s opinions or thoughts since they are limited to the options given by the researcher so they might not give a true reflection of respondents’ opinions (Kumar, 2011)
• The ease with which it is done may make it possible to simply tick an option without thinking it through (Kumar, 2011)
Chapter 3: Literature Study

The literature study section of the report is divided into three sections: Utilisation of graduates, Job satisfaction and Employee retention. These sections attempt to aid the researcher in solving the research problem by considering available literature on the subject matter.

3.1 Utilisation of Graduates

It is important to understand how engineers process information to render them more effective in their roles. It is equally important that graduates are integrated into the workforce by means of socialisation. This would allow them to get an understanding of their roles, gain knowledge of job skills and be acquainted in to the organisation (Riley and Cudney, 2014). The maximum value needs to be extracted from the organisation’s graduates since from a human resources perspective, education acquired is an indication of the productive skills that an individual possesses and can thus make available for value added to the organisation (Assirelli, 2015).

3.1.1 Mining Engineering Education

South Africa has been well known as a mining country for over 100 years and has been producing world class mining engineers of the highest calibre since the beginning of formal mining education at the School of Mines in Kimberley in 1896. At the start of the 20th century it then became known as the University of the Witwatersrand (Cruise, 2011).

At present there are four institutions that produce mining engineering graduates in South Africa: The University of the Witwatersrand (Wits), University of Pretoria (UP), University of Johannesburg (UJ) and the University of South Africa (UNISA). Wits and UP produce graduates with BSc and BEng qualifications respectively while the UJ produces graduates with BTech/ National Diploma qualifications. UNISA is the only of the four that offers this qualification (National Diploma) through distance learning (Musingwini et al, 2013).

Mining engineering applies the knowledge and understanding of mathematical sciences, natural sciences and a body of mining engineering knowledge which includes extraction methods and technological resources required (Haupt and Webber-Youngman, 2018).

The general approach of the mining engineering programme is that in the first two years, the students are taught engineering sciences which and the curriculum is the same as for other engineering disciplines these include broadly mathematics, chemistry, geosciences, physics and mechanics which gives them the academic foundation and sets the tone for enabling them to think analytically (Haupt and Webber-Youngman, 2018). In the final two years the programme is streamlined towards mining sciences and the students are taught content that is specifically applicable to the mining discipline. These include but are not limited to courses such as various mining methods, mine financial valuation, orebody modelling, technical valuation and report writing and in the final year students undertake a mine design project (Wits, nd).

Mining engineering education therefore differs with that of other disciplines mainly in that when streamlined it requires that the necessary knowledge be mastered. This means that the teaching of skills should be administered in ill-structured, non-routine, real world
problem-solving contexts (Haupt and Webber-Youngman, 2018). Also, the education of mining engineering education needs to rapidly evolve to remain relevant and applicable for mining in the future, especially with regards to the core methods and technology it emphasises (Motsoeneng et al, 2015).

However, engineering education literature opposes this linear problem-solving approach stating that it is not effective in its application to the kind of thinking one needs to have when working in environments with complex systems such as the kind a mining engineer would typically work in (Haupt and Webber-Youngman, 2018). Universities are criticised for producing graduates that are only technically competent but lack the adequate training and preparation for the real work environment (Riley and Cudney, 2014).

Engineering skills can be placed in two skills categories: technical and soft skills (Motsoeneng et al, 2015). It can therefore be a daunting endeavour for an engineering student to make the transition to be a practicing engineer or an engineer managing large projects or large numbers of people (Riley and Cudney, 2014) largely due to the lack of soft skills that engineering graduates possess upon entering the world of work.

3.1.2 The Mining Engineer’s Career Trajectory

The traditional or organisational career, with its accompanying expectations of long term employment and predictable promotions, originates from bureaucratic organisations which are characterised by hierarchical, inflexible structures which place an emphasis on stability (Bezuidenhout, 2011). Historically careers were focused outwardly on an ideal generalised career path of vertical progression which entailed positions that held increased responsibility, status, rewards as well as an offer of security for the employee (Bezuidenhout, 2011). The concept of a career path was limited to being linear and bound by orderly employment arrangements and progression through a single employer and occupation where it gained the definition of “having a clearly defined pathway of work in a particular field (Oam and Wyganowska, 2008). The career of a mining engineer falls in this category of careers and is discussed in detail herein.

The traditional career path for mining graduates is in mainstream production and mine management (Musingwini et al, 2013). There is an ongoing debate about the importance of placing emphasis on leadership at the top of all the skills a mining engineer needs to develop in the process of being groomed towards the management role. This is being opposed by the emerging pressing need for specialised technical skills in the fields of mine planning and design, strata control/rock engineering, mine ventilation and control, mineral resource evaluation and mineral asset valuation (Haupt and Webber-Youngman, 2018).

Mining engineering is perceived as being an unpopular career choice for two main reasons; the difficult working conditions and the rural location of mine sites (Musingwini et al, 2013).

It takes about 10 years for a mining graduate to occupy a managerial position. It takes a student approximately 15 years from the beginning of their career at university until they can occupy a managerial position when pursuing the traditional career trajectory. This implies that the training of such persons is a long-term process that requires strategic decision making and the selection of persons that actually want to pursue this career stream.
For this reason (their perceived natural roles as mine managers), mining engineers are often perceived as jacks of all trades but master of none (Motsoeneng et al, 2015). For effective occupation of managerial positions, engineering managers seemingly lack the skills that are considered as the backbones of success in a managerial role. Effective managers need communication skills, trust, leadership, collaboration and active learning. Engineering managers must be both technically competent as well as have a good understanding of the business side of operations (Riley and Cudney, 2014).

In South Africa, only 75% of mining graduates enter the mining industry for employment (Musingwini et al, 2013). According to Stacey et al, 2009, only 15% of mining graduates remain in the employment of mining companies for the long term.

The Graduate Development Programme (GDP) as published by the Learnerships Unit of the Mining Qualifications Authority (MQA) in 2005 details the graduate development programme as having a 2-year duration with the following exit requirements:

- Blasting Certificate
- Mine Overseer Certificate
- 66% towards Mine Manager Certificate of Competency
- Knowledge of the Mine Health and Safety Act and Regulations
- 2 years practical experience i.e 500 risk shifts which are required by the Commission of Examiners

The assessment criteria is as follows: The candidate must display the ability to comprehend and apply advanced knowledge of the widely applied principles underpinning good engineering practice, specialist knowledge and knowledge specific to the jurisdiction and local conditions. This outcome is demonstrated in the course of the design, investigation or operations where the candidate undertakes these duties:

- Displays mastery of understanding of mining principles. Practice and technologies in the practice area
- Applies general and underpinning mining knowledge to support analysis and provide insight
- Uses mining fundamental based on first principles
- Displays working knowledge of areas that interact with the practice area
- Applies related knowledge: financial, statutory, safety and health management
- Exposure to the Mine Health and Safety Act and Regulations
- Conducts his/her engineering activities ethically
- Be responsible for making decisions on part or all complex mining activities
- Apply entrepreneurial principles to engineering activities
- Practice engineering management principles
- Formulate and evaluate a project/process plan

A Mining and Metallurgy Best Practice Graduate Development Programme Guideline was published by the Southern African Institute of Mining and Metallurgy (SAIMM) by the then president of the organisation. The guideline was aimed at assisting to obtain the maximum
recruitment and retention of local talented, qualified individuals in the mining and metals industry with the objective of enhancing the satisfaction of recent graduates as they make decisions to foster their career development in the early stages and it introduces and outlines the various components that should be part of the graduate development programme.

**SAIMM Graduate Development Programme Best Practice Guideline**

According to SAIMM, nd it has been observed that recent mining graduates are quick to leave the country in search of better career prospects within a few years (2-3) of graduating and being employed locally. Some of the reasons for their dissatisfaction in the initial years are:

1. They have the wrong impression of what they will be doing
2. They are given responsibilities that are not aligned with their competence
3. They are insufficiently challenged for their intellectual capacity
4. They are not guided into their work environment
5. They see and follow greener pastures for added career development

**Generic Components of an Engineering Graduate Development Programme (GDP) (SAIMM, nd):**

1. **Recruitment Interview**
   This is the starting point of the anticipated employment relationship and should be a platform for honest discussions between the graduate and prospective employer regarding the expectations of both parties from the employment relationships. The graduate should then ask all the questions they feel are necessary especially regarding the development programme, opportunities and some of the responsibilities they will be assigned before considering signing the employment contract. To ensure that each party sticks to their end of the bargain, the interview can be recorded.

2. **Employment Contract**
   This contract should entail all the details required on an employment contract and, details of the graduate programme.

3. **Time Frame for Development Programme**
   The time-frame should highlight the milestones that have been identified. Generally, an engineering graduate development programme has a minimum duration of 2 years. But it is important that it is flexible depending on the available opportunities and nature of the employing organisation. This time frame should be as long as it would take a graduate to complete a Stage 2 license to Practice type of qualification such as ECSA Registration.

4. **Induction**
   A comprehensive induction into the company is essential since it introduces the graduate to Health and Safety aspects, visits to all components of the company, introductions to peers, senior managers and executives, as well as an introduction to the general activities of the company and how they interrelate to each other. The duration can be at least 2 weeks giving the graduate sufficient time to get comfortable with the workplace.
5. Career Mapping
The programme should have a long-term perspective and should ask the question of where the graduate would want to be in the next 10-15 years, assuming that this is in line with the organisation’s goals as well. The programme should aim to develop the graduate in the long term and indicate very clearly the expected time-frames for achieving the overall goal. This time frame is not fixed but is dependent on how the graduate progresses throughout their participation in the graduate development programme.

6. Experiential Learning
This is the hands-on learning that takes place outside of the lecture hall and at the workplace at the operational level and will often include practical work that requires the graduate to get their hands dirty. The graduate may feel that this kind of work is below them while the employer explicitly expects it from them. This could be a possible source of conflict which needs to be resolved by detailing the type of work the employer expects the graduate to undertake as part of the programme. It is essential that this part of the programme is not overlooked. It should be allocated the necessary time with the possibility of extension should the need arise before proceeding to other areas of development. This activity is rendered more effective when it is merged with academic knowledge and skill and the benefits are well achieved when a graduate is given a project which requires them to get some operational aspects under control. This enables them to build confidence and core knowledge in the workplace.

It is vital that experiential learning is done under the supervision of a suitably qualified supervisor who will also teach the graduate healthy workplace habits and encourage productive behaviour.

7. Formal Courses to support Career Choices and Development
These should be within the boundaries of the roles for which the graduate was employed. For this purpose, the programme should include and support any both in-house and external formal development courses where the graduate would gain theoretical knowledge or practical experience that will enhance his ability to fulfil the role for which they were employed. Areas such as conflict management, report writing, assertiveness, language proficiency, communication, project planning, personal finance, management finance, specialist software and others should be taught in the programme.

8. Culture Adaption
The corporate and operational culture of the company should be well described to the graduate and they should be assisted in adapting to it. The graduate should be made aware of the company expectations in terms of dress code, reporting structures, protocols, outside work behaviour and health and safety policies.

9. Mentoring
The process of mentoring should be undertaken with the aid of the company. Ideally, the graduate should seek out a mentor that is not three-line management levels above the graduate. The purpose of this is that they would be able to see, at an early stage if something is not right and would be able to help in maximising the graduate’s potential.
Formal regular meetings should be held between the mentor and mentee and these should not just be restricted to current work situation and current work-related issues but they should also discuss things on a broader, social perspective.

10. Confidence Builders
The aim of this aspect is to build on the weaknesses of the graduate identified. This would mean that once weaknesses are identified, action plans are put in place to take logical steps into alleviating the effects of these weaknesses or finding a way to work around them such that the graduate is still rendered effective. Confidence building must also be emphasised when certain milestones of the programme are achieved. These could include things such as visits from senior officials, reports on projects success, interviews and others.

Progress reports based on interviews conducted by senior officials should be included in the programme. It is recommended that they be more frequent in the early days of employment and then less frequent as the graduate adapts to the work environment.

12. Providing Challenges
Graduates need to be challenged intellectually. This could be done by giving the graduate research work that would be related to the long-term goals of the development programme. Substantive work should be encouraged and given to the graduate at early stages of employment since failure to do this will lead to the graduate being stagnant, frustrated and dissatisfied.

13. Providing Opportunities
The innovation graduates possess should not be taken for granted. They can make contributions that are appropriate to their skills and they should be given the opportunity to do so. Opportunities for self-development for the greater good of the organisation should be given and supported

14. Inter and Intra Company Placements
If possible, the graduate should be awarded the opportunity to work in as many components of the company and in as many activities of the company as possible during the programme. This will definitely have a positive impact on both the company as well as the graduate as they develop the graduate for long-term retention in the company as well as their own career development.

15. Professional Associations and Symposia
Active membership and participation in a professional body should be encouraged as this is the platform that allows the graduate to interact with others in different sectors of the industry, thus preventing them from becoming one-track minded and stagnant.

16. Professional Registration- ECSA
Qualified engineers unless they choose to follow a stream that does not require engineering work, should be supported and coached as per ECSA requirements. The graduate should initially register as a candidate engineer at the level of work he will be doing in the long run. The ECSA registration process should form part of the graduate development programme. In
addition, ECSA requires Continuous Professional Development activities which ensure lifelong learning and also characterise a good graduate development programme.

17. Conflict Indicators
At some point during the programme, graduates will probably be frustrated and discouraged. Since this is expected, means must be put in place to detect such conditions early to ensure that their effective development is not negatively impacted. This can be countered by constant reporting and communication which along with open dialogue will help take preventive measures before the situation arises.

18. Establishing and Utilising Talents
Utilisation of talents both on and off the field of work should be encouraged. Graduates should be encouraged to pursue the other talents they have besides academic skills to the upliftment of themselves, the organisation and others.

19. Social Integration
It is important that graduates be integrated into both the social and work environments. This will teach them to present themselves well and conduct themselves in a respectable manner and thus should form part of the graduate development programme.

20. Community Development
Graduates should be encouraged to voluntarily partake in community development projects. Especially because mining towns are usually disadvantaged and there is plenty of room for improvement of the livelihoods of the community.

21. Individuality
The programme, although would be generic for a particular company, should contain some form of flexibility in terms of taking into account the sense of individuality of the graduate as well as their particular role in adding value to the company.

3.1.3 Education/ Skills Mismatch?
Mismatch is defined as an interplay between a combination of people’s needs, interests, values and expectations on the one hand, and the characteristics and rewards associated with their jobs and organisations on the other hand (Jonbekova, 2015).

Educational mismatch is the correspondence between the level of education possessed and the level of education required for a given job (Jonbekova, 2015, Betti et al, 2010). It exists when the attained level of education exceeds or falls below the level required for a given job (Jonbekova, 2015). Knowledge is the basic theories, concepts, models that form the core content of an academic discipline (Hennemann and Liefner, 2010) and is for purposes of this report used interchangeably with education.

People are generally classified as being overeducated when their education levels far exceed those required for the job (Assirelli, 2015).

Assirelli (2015) suggests 3 feasible means of determining/ measuring overeducation:

i. Self-assessment of the match between the attained level of education that is required to get the job and for optimal work performance
ii. Determination of job requirements using surveys as a basis. These surveys would be conducted by job analysts and are then compared to the education level of the incumbents

iii. Usage of information on realised matches. The required levels of education are inferred from the mean years of schooling completed by workers in each occupational category. Individuals are then considered to be overeducated if their levels of education are one standard deviation or more above the average

Skills are the ability to master the discipline specific methods used in that discipline (Hennemann and Liefner, 2010). A skills mismatch is a situation that exists when workers’ skills exceed or lag those sought by the employer (Jonbekova, 2015). Underskilled workers have less than the skills required for a job (Betti et al, 2010). The issue of skills mismatch is becoming more common and increasingly complex because organisations are facing the challenge of finding the best yet suitable talent. There is currently a mismatch between the talent that is available and that which is needed by employers (Ohlrich, 2016).

Graduates from more generalised educational backgrounds are more likely to be victims of educational and skills mismatches than those from technical and scientific fields (Assirelli, 2015).

3.2 Job Satisfaction
Job satisfaction has been explained and defined by many authors as having various meanings but is generally understood to be an understanding of how people feel about their jobs overall and how they feel about certain aspects of their jobs. It is simply an assessment of the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs (Kuranchie-Mensah and Amponsah-Tawiah, 2015, de Beer et al, 2016,) and is reflective of the emotional experiences, attitude and personality approaches an individual takes towards their job (including working conditions and work environment) as well as the organisation. It is inclusive of an individual’s appraisal of their work environment (de Sousa Sabbagha et al, 2018). It is often an indicator of organisational effectiveness (Masia and Pienaar, 2011).

Factors that affect job satisfaction could be classified as follows: Factors related to the job or task; factors related to the organisation; factors related to the individual (Thiruchelvi and Supriya, 2009).

i. Job factors
   - Work Stress: As work stress increases, job satisfaction decreases (Masia and Pienaar, 2011).
   - Job insecurity: Job insecurity relates negatively to employee job satisfaction. Job insecurity can be quantitative (this includes concerns about the future of the current job) as well a qualitative which refers to perceived threats of reduced quality in the employment relationship and relates to things such as career progression and salary increases) (Masia and Pienaar, 2011).
   - Skills mismatch: Skills mismatches have a direct bearing on job satisfaction. This would then lead employees to find better employment opportunities where their skills would be better utilised and their job titles and responsibilities would be better
suited to their qualifications and skills (van der Walt et al, 2016). A study conducted by Thiruchelvi and Supriya (2009) indicates that the employees’ perceptions of the suitability between education and employment is an adequate determining factor of job satisfaction.

ii. Organisation-related factors

- Training and development: Employees who received support in the form of job training have, according to a study done by Thiruchelvi and Supriya, (2009) and (Cloutier et al, 2015), reported much higher levels of job satisfaction than those who had no training.
- Management style: Particularly unique to the mining industry is the authoritarian management style, uncaring attitude of managers and a strong focus on production which impact negatively on job satisfaction by causing employee job insecurity. Job insecurity then causes work-related stress which has a ripple effect thereby affecting professional work and personal welfare which in turn results in low organisational commitment, low levels of job satisfaction and increased rates of workplace accidents (Masia and Pienaar, 2011).
- Organisational culture: An organisation should have an efficient communication process. Leadership/management needs to have an understanding and appreciation of the importance of operating within the 5 levels of communication: intrapersonal (communication within oneself which is a result of the interpretation of what one has seen or heard), interpersonal (communication between self and another party), group (communication between 3 or more people), organisational (communication within a social group of people with different strength and characters but a common goal) and intercultural (communication with others whose beliefs, values, standards and norms are different from those of the individual or the organisation) to maintain a healthy and functional corporate culture for its employees (Cloutier et al, 2015).

iii. Individual-related factors

- Employee motivation: It is a widely believed premise that the satisfaction, productivity and retention of workers is a function of how well the individual is motivated (Lord, 2002).
- Work engagement: Moynihan and Pandey (2007); Rothmann and Rothmann, (2010); Scroggins, (2008) consider job involvement as an important employee attitude that positively increases levels of job satisfaction thereby affecting organisational commitment and effectiveness.

Positive levels of job satisfaction among employees has several benefits:

- Employees with high levels of job satisfaction also exhibit high levels of organisational commitment (Masia and Pienaar, 2011).
- Employee satisfaction increases profits, reduces grievances and decreases the rates of occurrences of incidents (Masia and Pienaar, 2011). In addition, job satisfaction was found to be a predictor of safety compliance. Meaning that employees who are satisfied with their jobs are more likely to be safety compliant (Masia and Pienaar, 2011). It can then be argued that an increase in job satisfaction may bring about an increase in safety compliance.
If job satisfaction is not optimal or if the workforce is generally dissatisfied it can have negative impact on the organisation such as reduced commitment, reduced productivity and an inability to retain the talent that is actually very important to organisational success (de Beer et al, 2018).

From a study conducted by Thiruchelvi and Supriya (2009) it was found that analysing graduates as a peer group produced results that indicated a much higher level of job satisfaction. This could possibly be because they form satisfaction levels largely based on how they rank relative to each other which raises the status of the peer group and subsequently the job offer rate.

Job satisfaction has been perceived to be predominantly the responsibility the employer and employees have always taken a passive role towards it. An alternative to this traditional approach has been suggested by de Beer et al, 2018. This is one of job crafting where the employee (re) designs their own work on an individual level. In simple terms an employee designs and decides how best to do their job within the desired time-frames and within the scope of the organisational requirements thereby putting the onus on the employee to remain engaged, productive and motivated at work while achieving the set objectives (de Beer et al, 2018).

3.2.1 Employee Motivation

Motivational theories have been published in literature from the 1900’s. Some of these very broadly include but are not limited to: Abraham Maslow’s hierarchy of needs, Frederick Hertzberg’s 2 factor theory and B.F Slanner’s reinforcement theory (Kuranchie-Mensah and Amponsah-Tawiah, 2015). Employee motivation is the feeling, effort, energy and driving force an employee uses to achieve individual and/or organisational goals (de Sousa Sabbagha et al, 2018). Motivation can be intrinsic or extrinsic. Intrinsic motivation is employees that are intrinsically or internally motivated and do not need any external rewards to perform at their best levels in a job (de Sousa Sabbagha et al, 2018). Extrinsic motivation is motivation that arises due to external factors. Extrinsically motivated employees generally do not look forward to performing daily tasks but are motivated by some reward or another which could be anything from financial rewards to promotion, praise, avoidance of negative consequences and the like (de Sousa Sabbagha et al, 2018).

Good motivational initiatives for employees can aid organisations to achieve the desired levels of efficiency in order to develop a good organisational culture (Kuranchie-Mensah and Amponsah-Tawiah, 2015) which on its on is to a certain extent a contributing factor towards employee motivation and engagement. Employee motivation refers to the effort made by an individual to the attainment of organisational goals (de Sousa Sabbagha et al, 2018). Employee motivation is at the heart of leadership (Seemann and Seemann, 2015).

Contributing factors towards employee motivation:

- Job crafting (de Beer et al, 2018)
- Rewards systems are forerunners for employee motivation. They can be tangible (monetary, promotion, status) or intangible in the form of recognition of good work,
appreciation, constructive criticism, (Kuranchie-Mensah and Amponsah-Tawiah, 2015).

- Meaningful work: Organisations should seek fulfilling ways of rewarding the contributions and efforts of the employees since their knowledge, skills and abilities are an important factor in their success (Kuranchie-Mensah and Amponsah-Tawiah, 2015; Scroggins, 2008).

3.2.2 Flow

The concept of flow was popularised by a researcher who studied the states of optimal experience. These are the times when people concentrate intensely and are absorbed in what they are doing so much that they get lost in it. This is an intrinsic and highly focused state of motivation (Seemann and Seemann, 2015).

In such a state, people are so immersed in an activity that they lose touch with all things external to the activity (Seemann and Seemann, 2015).

When a state of flow is experienced, emotions are contained, channelled, energised and aligned with the task at hand. The ultimate high point of flow is that the individual in that state feels utter joy while doing the task concerned. Research by Seemann and Seemann (2015), sheds light on how to create conditions that promote and encourage flow in the workplace. These 3 conditions need to exist (enablers) to create a flow environment in the workplace (Seemann and Seemann, 2015):

1. Intellectually stimulating tasks
2. Assignments with clear goals and make provision for short-term feedback on the progress that is being made
3. The possibility of concentrating on the task without interruptions

In a state of flow, the task at hand is just challenging enough for the individual to apply themselves without getting bored and not too challenging such that it justifies the individual to give up on it after one attempt (Seemann and Seemann, 2015).

Employees need to be given tasks that have prospects of successful completion.

The Flow condition occurs when there is just the right balance between the challenges offered by a task/job and the corresponding set of skills possessed by the individual. If these 2 factors are balanced, the individual moves into the flow channel. If this condition is attained, the individual is properly positioned to achieve a level of intrinsic motivation.

3.2.3 Employee Engagement

Employee engagement is employee motivation that arises from employees being in a positive state of mind characterised by high energy levels (vigour), utmost dedication to one’s work and absorption by one’s work (de Beer et al, 2016; Rothmann and Rothmann, 2010). It is fundamentally a motivational concept that has been found to positively affect the motivation, commitment and satisfaction of employees (Mphahlele et al, 2018).

Employee engagement is a 3-dimensional psychological phenomenon with physical, cognitive and emotional components where the physical component involves the physical involvement in a task in a vigorous and positive, affectionate manner. The cognitive deals
with alertness at work and experiencing absolute absorption and involvement in the work at hand. The emotional component involves a connection, dedication and commitment to one’s job and others while working (Rothmann and Rothmann, 2010).

Employee engagement predicts positive organisational outcomes including but not limited to job satisfaction and motivation and in turn shareholder value (Rothmann and Rothmann, 2010). Employees that are granted adequate resources with which to do all their tasks (job resources) and an optimal level of job demands (work characteristics) are motivated and engaged. They are also more likely to be satisfied with their jobs (de Beer et al, 2016; Moynihan and Pandey (2007).

According to a study conducted by Mphahlele et al, 2018 in the mining industry, organisational support in the form of managerial support, role clarity and the extent of work autonomy is a contributing factor towards work engagement. There are other factors as well (particularly job resources in the form of supervisor and co-worker support) that indicated a positive correlation with work engagement.

Mphahlele et al, 2018 approach Perceived Organisational Support (POS) from 2 sides: a deficit and a strengths approach. The deficit approach is based on the premise that training and development of employees in an organisation is undertaken to correct any deficits that might be observed in the employee’s performance, on-the-job conduct or lack of conducting tasks that are required as part of their duties due to a break in their knowledge or skills. Set human resources processes are followed to correct the deficits and organisational or industrial standards are used as the benchmark.

Positive outcomes have emerged from this approach including increased productivity, work engagement and organisational commitment. However, when Mphahlele et al, 2018 considered the critics of this approach, a conclusion was drawn that indeed it is a responsive approach which only treats the situation after it has occurred. The opposite end of this approach is the strengths approach which is actually a more proactive means of motivating employees and encouraging work engagement as it showed even higher levels of job satisfaction and work engagement resulting in increased organisational commitment (Mphahlele et al, 2018).

There are 3 psychological conditions that influence a person’s work engagement; Psychological meaningfulness, psychological safety and psychological availability (Rothmann and Rothmann, 2010).

Psychological meaningfulness refers to the feeling that one gets by getting a return on their investment. This would be measured in currencies such as physical, cognitive or emotional energy. It also refers to the value that a work goal has in relation to the individual’s ideals. If the work has no meaning then disengagement, apathy and detachment from it can arise (Rothmann and Rothmann, 2010).

Psychological safety refers to having the confidence to apply one’s self without having any fear of negative consequences to self-image, status or their career (Rothmann and Rothmann, 2010).
Psychological availability refers to having the physical, emotional or psychological resources enabling the individual to engage at a particular moment. It is an indicative measure of whether an individual is ready and confident enough to engage in their work considering all the other engagements one has in other areas of their lives (Rothmann and Rothmann, 2010).

Employees who were highly engaged in their work were almost twice as likely to remain within the organisation which led researchers to the opinion that perhaps building and promoting employee engagement may be the most challenging task that employers are faced with today (Scroggins, 2008).

Proactive behaviour and the concept of job crafting have, according to a study by de Beer et al (2016) been found to be major contributing factors towards employee work engagement.

3.3 Employee Retention
A report distributed by the Society of Human Resource Management (SHRM) indicates that 75% of employees are seeking alternative employment. 43% are looking for better remuneration, 32% for better career prospects and 22% are dissatisfied with the career opportunities offered by their current employer (Cloutier et al, 2015).

Employee retention is a voluntary move by an organisation to create an environment which encourages employees to remain engaged in the organisation for the long term (de Sousa Sabbagha et al, 2018; Ansari and Bijalwan, 2017). Employee retention is a process by which employees are motivated and encouraged to remain within the organisation for long periods

Retention factors include training and development, supervisor support, career opportunities, job characteristics (including skill variety, job autonomy and job challenge), work life balance and compensation (de Sousa Sabbagha et al, 2018).

Employee retention is emerging as a serious management challenge to attack organisations in the future (Tanwar and Prasad, 2016).

Effective employee retention is a systematic effort made by employers and fosters an environment that encourages current employees to remain employed by having policies and practices in place to address their diverse needs (Ansari and Bijalwan, 2017).

Researchers define employee retention as the strategy required by an organisation to retain not only talented but also skilled employees by understanding the factors associated with employee retention (de Sousa Sabbagha et al, 2018).

Employee retention strategies are an integral part of an organisation’s vision, mission, values and policies (Cloutier et al, 2015). The extent to which an organisation can retain its employees is a direct result of the employees’ levels of job satisfaction. The retention of a talented workforce is important to organisations, given the global economy becoming increasingly knowledge-based. This makes the attraction and retaining of talent a source of competitive advantage for these organisations (de Sousa Sabbagha et al, 2018).
In a study conducted with 40000 subjects, only 17% were found to be highly engaged in their job and to the organisation. The study also revealed strong relations between employee engagement, performance and employee retention (Scroggins, 2008).

Retention is negatively affected when people are employed in spheres different from their educational background. On the opposite end, employees are more encouraged to remain within an organisation where the employer provides training. Greater satisfaction is also a resultant effect of training and development (Cloutier et al, 2015). Training and development is among the key motivators that encourage employee loyalty and the creation of a cohesive workforce (Cloutier et al, 2015).

However, the organisation should also consider the opportunity cost associated with retaining a poor performer. This is most likely when there is a wide variety in the population of potential employees (group employment) (Arlotto et al, 2010).

There are several major factors identified that affect and impact on employee retention:

i. The vision, mission, values and policies of the organisation
Organisations have strategies in place to attain competitive advantage and obtain the best results possible. Governing the intent of the organisation is its vision, mission and policies. This means that all employees are subject to and ought to commit to the values, mission and vision of the organisation (Cloutier et al, 2015; Ohlrich, 2016).

ii. An organisation’s standard of communication
Most organisations operate in a multi-level hierarchy with a complex human resources network (Cloutier et al, 2015). Employees need to know how and where they fit into the organisation and its overall purpose and objectives (Cloutier et al, 2015). For employees to know where and how they fit into the organisation, there should be a standard means of communication linking the employee to the relevant communique from the employer (Cloutier et al, 2015). It is important that the standard means of communication used by the organisation be transparent and effective (Cloutier et al, 2015). The various levels of communication should adequately cater for a diverse audience within the organisation yet should in no way be distorted as the message is brought down from one set of employees to the other (Cloutier et al, 2015).

iii. Employee diversity, inclusion and integration
When an organisation embraces diversity across gender, race, culture and education levels; employees consider it as having growth opportunities and this encourages employee retention (Cloutier et al, 2015).

iv. Employee training and development
Training and development of employees encourages employee loyalty and is critical to any employee retention strategy and can result in the improvement of the quality of performance and output (Cloutier et al, 2015; Thiruchelvi and Supriya, 2009; Arlotto et al, 2010). Cloutier et al, 2015 gives a training and development programmes options model shown in Figure 1.
Figure 2: Training and development programme options (Cloutier et al., 2015, pp 127)
v. Work context and motivation
Work provides a means of living as well as a source of identity, creativity, challenge and it provides meaning, status and access to social networks (Bezuindenhout, 2011). Work is important to the lives of people. It is where people spend most of their time and effort and helps people anchor their lives and gives a sense of focus to some extent (Scroggins, 2008).

Employee motivation and job satisfaction are the main factors that influence employee retention (de Sousa Sabbagha et al, 2018; Tanwar and Prasad, 2016). The level of effort invested by the individual depends on the strengths of their motives as well as their perception and views of the work situation. Work context is an important consideration affecting employee motivation, job satisfaction and retention (de Sousa Sabbagha et al, 2018).

vi. Employer Branding
Employer branding is a strategy that can be used to acquire and retain qualified talent by establishing the organisation as the “employer of choice” within the industry (Tanwar and Prasad, 2016). Employer branding has been identified as a retention strategy (Tanwar and Prasad, 2016). It therefore becomes necessary to explore the possibly existing relationship between employer branding and employee retention. One component of talent management is the creation of a stronger employer brand to attract the best talent to the organisation (Ohlrich, 2016).

3.3.1 Retaining Generation Y Employees
Careers no longer follow the orderly hierarchical progression with a single employer. Rather, they involve a developmental process where employees gain experience in a number of different companies or through various different work tasks or work roles (Bezuindenhout, 2011) and can be characterised as being Protean.

The Protean career has 3 elements: personal identification with meaningful work, personal responsibility for career management and subjective psychological measures of success which are unique to the individual (Oam and Wyganowska, 2008).

Individuals are looking for relatively different work outcomes than was the case 3 decades ago. The current generation of employees wants jobs that have significance and provide a sense of internal satisfaction, meaning and satisfactory rewards (Scroggins, 2008).

A study revealed that meaningful work experiences are critical to employee engagement, performance, turnover and retention. The conclusion of the study was that employee engagement depends on the foundation of meaningful work experiences and that organisations have not been successful in inspiring employees and providing them with the factors that are necessary for meaningful and emotionally rich work experiences (Scroggins, 2008). When a job emphasises core dimensions, it gives rise to 3 psychological states in employees which are critical. These are: meaningfulness of work, responsibility of the work outcome and knowledge of results of work activities. It is said that when these states are experienced by employees then job satisfaction as well as job motivation will be high (Thiruchelvi and Supriya, 2009).
The challenge is for organisations to adapt to and cater for the personality, character traits and work style across the generations of the personal connection (Baby Boomers), self-reliance (Generation X) and the inquisitive or expressive nature of opinions (Generation Y) employees (Cloutier et al, 2015).

Generation Y (born between 1980 and 1994) is the newest generation to enter the workforce (Ohlrich, 2016) is capable of being the most productive workforce in history if managers capitalise on their character, expectations and attitudes (Martin, 2005). They are driven in the workplace and they enjoy if not demand more responsibility and they like being part of making decisions and having input (Wong et al, 2008). In the study done by Ohlrich (2016), the majority of the participants when asked what retains them stated that their retention was based on work/life balance or flexibility and the ability to develop one’s career at the organisation.

The generation Y workforce looks for roles where they can add value and do work that has meaning working in teams with people that are like-minded and as committed to adding value as they are. The generation Y workforce also expects to do this while making plenty of money, building careers and personal lives (Martin, 2005).

The generation Y workforce has the following characteristics:

   They enjoy achieving the desired outcomes but even more so value the freedom associated with figuring out how to do things at their own pace in their own way. Even though they may sometimes need managerial support and guidance they do not reject it but want the freedom to figure things out. They may work well in their individual capacities but they perform even better in collaboration. They are not afraid to make mistakes and management should, when dealing with generation Yers plan time ahead for trial and error.

2. Techno-savvy (Wong et al, 2008)
   They are a highly technological generation that is curious about the application of technological advances in the organisation. The generation Y workforce is a technological generation which is comfortable with change and do not value job security much like the previous generations (Wong et al, 2008).

3. They have a sense of immediacy
   They want things today, now. They are not enticed by the possibility of climbing up corporate or any other ladders, paying dues, achieving long service awards and cashing out on pension funds. Instead they are interested in how they can add value now, how the problems can be solved now and whether the rewards will be given now. This puts organisations with a culture of long-term training, career paths, incentives and work responsibilities at a disadvantage when it comes to the generation Y workforce.

4. They want increasing responsibility with roles that have meaningful work (Wong et al, 2008; Martin, 2005; Ohlrich, 2016; Scroggins, 2008)
   They do not regard responsibility as a burden but rather perceive it as being trusted with something and a means of illustrating their skills and capabilities.
5. They seek flexibility
They are ever ready to adapt to change whether it’s meeting new people, working in new places or even changing circumstances. They constantly seek workplaces where they can move from one project to another, between positions, departments and geographic locations. They are guaranteed to seek opportunities that will give them new knowledge, skills, grow them and play a positive role on their careers in the future. As a workforce they value skills development and they enjoy the prospect of new challenges and opportunities (Wong et al, 2008; Ohlrich, 2016).

Trunk, 2010 suggests that the new workforce is one that job-hops which is good for overall productivity and effective delivery of results. This is because it is reported that over the past 20 years, people are remaining in the same job for fewer and fewer years. The average time spent by someone in their 20’s is a given 18 months and this number has remained unchanged for the past 5 years.

Managers who manage the generation Y workforce will not succeed in managing them unless they change their approach and adopt a leadership role (Mladkova, 2012).

To effectively retain their workforce, employers must be aware of the factors that cause employees to leave the organisation in the first place (Tanwar and Prasad, 2016). Every area where the employees reported some sort of dissatisfaction and a lack of commitment should be thoroughly analysed to get to the root of the problem.

An organisation’s failure to retain competent employees may well result in losses since these organisations spend considerable time, effort and financial resources to train these employees and develop them into being a talented and valuable asset to the organisation (Ansari and Bijalwan, 2017).
Chapter 4: Findings

15 of the research participants all have a formal qualification in mining engineering. 2 of the respondents chose not to specify their qualifications. The proportion of participants with their respective qualifications is summarised in Figure 3. The roles they are currently fulfilling are summarised in Figure 4.

![Respondent Qualifications](image)

**Figure 3: Respondent qualifications**

![Respondent Current Roles](image)

**Figure 4: Respondent current roles**

The research questionnaire that the respondents were required to fill out consisted of 15 questions equally divided into 3 sections each comprising 5 questions scaled from 1
(strongly disagree) to 5 (strongly agree). The first section (Technical Knowledge Utilisation), second section (Job Satisfaction), third section (Potential to Add Value).
### Table 1: Summary of responses

<table>
<thead>
<tr>
<th>Question</th>
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</tbody>
</table>
Legend:

- B Eng
- BSc
- B Tech
- Unspecified
- Other (shadowing production supervisor)
- Production supervisor
- Unspecified
- Miner
- Other (services department)
- Other (project-time study)
- Other
Figure 5: Chart depicting totals obtained per section
Chapter 5: Discussion of Findings

The questionnaire was divided into three sections each with five questions. The sections are titled Technical Knowledge Utilisation, Job Satisfaction and Potential to Add Value. The analysis analyses each question in terms of its importance to the research, what the respondents’ responses mean as well as its contribution towards attaining the objectives of the research and answering the research question.

Technical Knowledge Utilisation

This section explores the extent to which the graduates’ technical knowledge, skills and capabilities are being utilised in both their current roles as well as potential future roles as has been outlined in the GDP. A positive response to this section of the questionnaire implies the organisation is fully utilising the technical knowledge, skills and capabilities of its mining graduates. A negative response to this section implies the opposite - that the organisation is not fully utilising the skills and knowledge possessed by its graduates; which would then indicate a knowledge gap that is not being tapped into by the organisation. A neutral response would require further analysis of the individual questions since the reasons for it as well as what it would mean has a variety of options. For example, there could be the possibility of a skills mismatch, thus rendering the respondents having a neutral point of view or possibly feelings of indifference towards the question.

Job Satisfaction

Job satisfaction, as discussed in the literature study is an important factor that contributes towards employee motivation and subsequently performance. The questions included here are mostly in reference to the work factors itself, rather than the individual factors that contribute to job satisfaction. The questions are derived from what the literature states are important work itself factors that contribute to job satisfaction, with reference to the generation Y workforce.

Potential to Add Value

This section of the questionnaire pertains to the retention aspect of the research. It is intended at establishing what the graduates consider as valuable for retention within the organisation. It is intended at finding out what it would take for them to be interested in a long-term employment relationship with the organisation. There are several options given for possible reasons why they would be interested in a long-term relationship.

5.1 Descriptive Statistics

The total possible score for each question is the product of 5 points and 17 respondents which is 85. Due to the rating of each score as per the 5-point score system per question, a score of 1 is indicative of strongly disagree, 2 as disagree, 3 as neutral (neither agree nor disagree), 4 as agree and 5 as strongly agree. The questions are phrased such that scores 1 and 2 indicate a negative response to the question, 3 a neutral stance and 4 and 5 a positive response to the question. As a result, the total scores are analysed as follows:

Total maximum negative response= (2×17) =34
Total maximum neutral response= (3×17) =51
Total maximum positive response= (5×17) =85
This implies that the total score ≤34 is negative, neutral is >34 but ≤51 and a positive score is >51 with the maximum being 85.

Coded as follows: Negatives ≤34, neutral >34 but ≤51, positive >51

Table 2: Questionnaire questions with their total score, means and modes

<table>
<thead>
<tr>
<th>Question</th>
<th>Total</th>
<th>Mean</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>i  My technical knowledge, skills and capabilities are being fully utilised in my current role</td>
<td>32</td>
<td>1,5</td>
<td>1</td>
</tr>
<tr>
<td>ii My current role challenges me to a point of continuous learning</td>
<td>48</td>
<td>1,5</td>
<td>2</td>
</tr>
<tr>
<td>iii I am sufficiently qualified, trained and suitable for my current role</td>
<td>63</td>
<td>3,5</td>
<td>4</td>
</tr>
<tr>
<td>iv Potential future roles as outlined by the GDP will fully utilise my knowledge, skills and capabilities</td>
<td>41</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>v  I want to fully utilise my knowledge, skills and capabilities</td>
<td>75</td>
<td>3,5</td>
<td>5</td>
</tr>
<tr>
<td>vi My working conditions are generally satisfactory (physical conditions, working hours, responsibilities, reporting structure)</td>
<td>31</td>
<td>1</td>
<td>1</td>
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<tr>
<td>vii Benefits/incentives/awards that accompany the role are adequate</td>
<td>44</td>
<td>3,5</td>
<td>3</td>
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<tr>
<td>viii The company culture (management practices) encourages me to perform at my optimum</td>
<td>28</td>
<td>1,5</td>
<td>1</td>
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<tr>
<td>ix Set targets are achievable</td>
<td>50</td>
<td>3,5</td>
<td>4</td>
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<tr>
<td>x  Key performance indicators give a true reflection of my performance</td>
<td>45</td>
<td>3</td>
<td>1</td>
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<tr>
<td>xi Flexibility in the GDP allowing deviation from the traditional production management route</td>
<td>50</td>
<td>3</td>
<td>1</td>
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<tr>
<td>xii All-round development giving the ability to switch between roles and departments from time to time</td>
<td>42</td>
<td>3,5</td>
<td>2</td>
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<tr>
<td>xiii Taking up roles where I best apply myself and add value</td>
<td>54</td>
<td>3</td>
<td>5</td>
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<tr>
<td>xiv Involvement in projects to stay abreast with new developments</td>
<td>50</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>xv Prospects of lifelong learning</td>
<td>50</td>
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Questions that received a negative score
- My technical knowledge, skills and capabilities are being fully utilised in my current role

The respondents are occupying different roles within the organisation. These various roles do not require the same application of their knowledge and skills. This question examines whether in the current role occupied by the respondents, their skills are being fully utilised
and whether what they know in terms of technical competencies is being applied in their current role.

41% of the respondents strongly disagreed with this statement, 35.3% disagreed, 17.6% were neutral and only 5.9% of the respondents agreed with this statement.

Majority of the respondents were of the view that their technical knowledge, skills and capabilities are not being fully utilised in their current role.

- My working conditions are generally satisfactory (physical conditions, working hours, responsibilities, reporting structure)

This question evaluates the respondents view of the general workplace conditions. The examples stated are but a vague description of some of the factors that encapsulate workplace conditions. It does not give the respondents the opportunity to specify which part of their working conditions they are satisfied with and which parts they are dissatisfied with but requires them to state in general their level of satisfaction with their workplace conditions.

17.6% strongly disagreed, 35.3% disagreed, 11.8% were neutral, 17.6% agreed and 17.6% strongly agreed with the statement.

Majority of the respondents were generally unhappy with their workplace conditions.

- The company culture (management practices) encourages me to perform at my optimum

Company culture has also been cited as being a valuable component to the generation Y workforce, particularly for engineers. Therefore, the results obtained for this question reflect whether the respondents’ responses agree with the literature that has been studied and presented in the literature study section of the report. In addition, the mining industry is well known for its primitive, top-down management style which might not necessarily be preferred by this generation of graduates. The question aims to evaluate whether this management style remains as effective as it was historically.

47.1% strongly disagreed, 41.2% disagreed and 11.8% had a neutral viewpoint to this statement. None of the participants agreed with the statement. In agreement with the literature, majority of the respondents perceived the company culture as a factor that does not encourage optimum performance.

Questions that received a neutral score

- My current role challenges me to a point of continuous learning

This question assumes that a sufficiently challenging role (as the FLOW concept in the literature study describes) would require one to improve on their current knowledge and deepen their understanding of the subject matter in a broader context by means of continuous learning, whether by formal or informal means. However, the question can also be received in a different light such that it could be understood as if the question implies
that the role being occupied is not fulfilling to a point that one would consider continuous learning as a means of finding an alternative role or career stream altogether.

17.6% strongly disagreed, 35.3% disagreed, 11.8% were neutral, 17.6% agreed and 17.6% strongly agreed with the statement.

Although this question received an overall neutral score, majority of the respondents showed that their current roles do not encourage them to embark on a journey of continuous learning.

- Potential future roles as outlined by the GDP will fully utilise my knowledge, skills and capabilities

This question is directly applicable for those respondents that are currently occupying roles in mainstream production (miners, production supervisors, mine overseer’s and managers) since the organisation has a set programme for mainstream production i.e. the traditional career trajectory. The question refers to the above-mentioned roles being potential future roles that can and will probably be occupied by the respondents and whether or not these future roles will enable them to fully utilise their technical knowledge, skills and capabilities.

29.4% strongly disagreed, 5.9% disagreed, 17.6% were neutral, 29.4% agreed, 5.9% strongly agree and 11.8% of respondents did not respond to this statement. This was the only statement to which no response was given. There was a tie between respondents who strongly disagreed and those who agreed. Therefore the statement was inconclusive in terms of total respondents.

- Benefits/incentives/awards that accompany the role are adequate

Benefits/rewards/ incentives have been regarded by several authors as being an important contributing factor towards job satisfaction. For this reason it was important to explore how the respondents feel about the relevance of the incentives and awards offered to them in their current role.

23.5% strongly disagreed, 23.5% disagreed, 29.4% were neutral, 17.6% agreed and 29.4% strongly agreed with the statement. This statement landed in the neutral rating because the responses were almost evenly distributed.

- Set targets are achievable

Every job has expected outputs/deliverables. Whether these deliverables are realistic or achievable depends on one’s views of the employer’s expectations and various factors such as availability of resources, time-frames, capabilities among others. This question requires the respondents to provide their perception of whether the targets are achievable based on the targets they themselves have achieved in their current roles. It does, however, not give them the opportunity to elaborate on the reasons for the targets being viewed as unrealistic or unattainable if that is the case.
29.4% strongly disagreed, 17.6% disagreed, 23.5% were neutral, 17.6% agreed and 11.8% strongly agreed with the statement. Majority of the respondents were of the view that their targets are not achievable.

- Key performance indicators give a true reflection of my performance

Key performance indicators vary in kinds and forms. The question aims to determine whether the key performance indicator system in place for the graduates is an effective measure or indication of their on-the-job performance.

29.4% strongly disagreed, 17.6% disagreed, 23.5% neutral, 17.6% agreed and 11.8% strongly agreed with the statement. Majority of the respondents felt that the key performance indicators employed by the organisation are not a true representation of their performance.

- Flexibility in the GDP allowing deviation from the traditional production management route would encourage me to engage in a long-term employment relationship with the organisation

The GDP, as it stands, is structured such that it promotes vertical progression in the traditional production stream. It is technically sufficient in that it requires the graduates to undertake goal-orientated tasks that will equip them to occupy supervisory roles. However, it does not consider the other factors that contribute towards one being successful in fulfilling the requirements of the role such as interest, character and personality traits, and their ability to add value to the organisation in the particular role or whether they could perhaps make a more valuable contribution in other roles they could undertake.

35.6% strongly disagreed, 5.9% disagreed, 11.8% were neutral, 23.5% agreed and 23.5% strongly agreed with the statement.

Although the question scored an overall neutral score, the results obtained for the responses was interesting in that the sum of strongly disagree and disagree was 41.5% while that of strongly agree and agree was 47%. This could be interpreted as a majority agreeing with the statement. However, from the guidelines of how the questions scored, the question was scored neutral overall. Therefore, the respondents were overall neutral about whether flexibility in the GDP allowing them to deviate from the traditional career trajectory would encourage their engagement in a long-term employment relationship within the organisation.

- All-round development giving the ability to switch between roles and departments from time to time would encourage me to engage in a long-term employment relationship with the organisation

Development and training on graduates promotes vertical progression in mainstream production (management). As a result, they become developed in that one area only and become heavily dependent on service departments for assistance with issues pertaining to their own work.
29.4% strongly disagreed, 35.3% disagreed, 5.9% were neutral, 5.96% agreed and 17.6% strongly agreed with the statement. The majority of the respondents felt negatively about engaging in a long-term relationship with the organisation if they would receive all-round development which enabled them to switch between roles and departments from time to time.

- Involvement in projects to stay abreast with new developments would encourage me to embark on a long-term employment relationship with the organisation

Projects are the lifeline of mining operations, especially ageing operations that require optimisation. Involving graduates in projects would mean that the organisation would get fresh, new and modern approaches to problem-solving. This would be even more-effective when multi-disciplinary, inter-generational teams are created to tackle some of the challenges that the organisation is facing in these economic conditions.

23.5% strongly disagreed, 23.5% disagreed, 11.8% were neutral, 17.6% agreed and 17.6% strongly agreed with the statement. The majority of the respondents were of the view that not even involvement in projects would encourage their long-term retention in the organisation.

- Prospects of lifelong learning would encourage me to engage in a long-term employment relationship with the organisation

This question seeks to find out if the prospects of lifelong learning would encourage the respondents to engage in a long-term employment relationship with the organisation.

29.4% strongly disagreed, 11.8% disagreed, 17.6% were neutral, 17.6% agreed and 29.4% strongly agreed with this statement. The distribution of responses received for this statement is notable. The respondents responded equally to strongly disagree and strongly agree which is why the question ended up being overall neutral.

Questions that received a positive score

- Taking up roles where I best apply myself and add value would encourage me to engage in a long-term employment relationship with the organisation

The generation Y employee wants to add value. In adding value, the employment relationship is mutually beneficial and moreover encourages retention within the organisation.

23.5% strongly disagreed, 17.6% disagreed, 5.9% were neutral, 23.5% agreed and 29.4% strongly agreed with this statement. This implies that the majority of the respondents are eager to best apply themselves and add value to the organisation.

- I am sufficiently qualified, trained and suitable for my current role

This question intends on finding out the extent of suitability of the respondent to their current role in terms of their qualifications and training obtained. Training in this context refers to in-house training that is provided by the organisation to its employees. Suitability refers to a combination of both the formal qualifications in conjunction with
the personality traits of the respondent versus those required for the role, not excluding the respondents’ interest level in the current role.

5.9% strongly disagreed, 17.6% disagreed, 5.9% were neutral, 41.2% agreed and 29.4% strongly agreed with the statement. Majority of the respondents were positive about their suitability for their roles in terms of their qualifications and training. They felt that they were adequately trained and qualified for occupation of their roles.

- I want to fully utilise my knowledge, skills and capabilities

This question is intended to evaluate the respondents’ overall interest in fully applying their knowledge and skills to their work.

0% strongly disagreed, 5.9% disagreed, 5.9% were neutral, 29.4% agreed and 58.8% strongly agreed with this statement. Well worth noting is the fact that no respondents strongly disagreed with the statement. This implies that the vast majority of the respondents are eager and willing to utilise their technical knowledge, skills and capabilities.

Section totals per respondent
Coded as follows: Negatives ≤10, neutral >10 ≤15, positive >15

Table 3: General section totals per respondent

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>B</td>
<td>18</td>
<td>15</td>
<td>25</td>
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<tr>
<td>C</td>
<td>11</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>16</td>
<td>8</td>
<td>15</td>
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<tr>
<td>E</td>
<td>20</td>
<td>5</td>
<td>5</td>
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<tr>
<td>F</td>
<td>10</td>
<td>5</td>
<td>7</td>
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<td>G</td>
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<td>16</td>
<td>19</td>
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<tr>
<td>H</td>
<td>16</td>
<td>15</td>
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<tr>
<td>I</td>
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<td>16</td>
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<tr>
<td>J</td>
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<tr>
<td>K</td>
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<td>15</td>
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<tr>
<td>L</td>
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<td>M</td>
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<td>P</td>
<td>17</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Q</td>
<td>9</td>
<td>14</td>
<td>6</td>
</tr>
</tbody>
</table>

Technical Knowledge Utilisation: 5.9% negative, 29.4% neutral and 64.7% positive. The respondents were generally satisfied with the utilisation of their technical knowledge, skills and capabilities in their current roles.
Job Satisfaction: 47.1% negative, 35.3% neutral, 17.6% positive. The respondents were dissatisfied with their jobs with the majority rating it as being negative.

Potential to Add Value: 29.4% negative, 35.3% neutral, 35.3% positive. This result is inconclusive since an equal proportion of respondents were neutral about their potential to add value as were those that were positive about it.

5.2 Relationships within the data

Relationship between qualification and role
No relationship can be established between the respondents’ qualifications and their current roles.

Relationship between qualification and responses

Table 4: Section Totals for BSc graduates

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>18</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>C</td>
<td>11</td>
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<td>15</td>
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<tr>
<td>H</td>
<td>16</td>
<td>15</td>
<td>15</td>
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<td>I</td>
<td>12</td>
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<td>L</td>
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<td>M</td>
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<td>20</td>
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<tr>
<td>N</td>
<td>13</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

62.5% respondents responded positively to technical knowledge utilisation. The remaining 37.5% of the respondents landed in the neutral category. No negative response was received for technical knowledge utilisation from the BSc graduates. 50% of the respondents rated job satisfaction negatively, 37.5% rated neutral and only 12.5% rated it positively. However, it is worth noting that the positive rating is only one numerical unit above neutral. Potential to add value was rated equally negatively and positively by the respondents with 37.5% for each, where only 25% of the respondents rated it neutral. It can thus be said that the BSc graduates are rather indifferent about their potential to add value. This can be directly or indirectly related to the low level of job satisfaction reported from their responses.

Table 5: Section totals for BTech graduates

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>16</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>J</td>
<td>12</td>
<td>16</td>
<td>8</td>
</tr>
</tbody>
</table>
66.6% of the respondents rated the utilisation of their technical knowledge as positive, the remaining 33.3% rated it as neutral and negative respectively. Job satisfaction, however was rated positive by only 16.7% of the respondents, 33.33% of the respondents rated it negatively and 50% had a neutral rating. Their view of their potential to add value was that 33.33% of them rated negatively, 50% rated neutral and only 16.7% rated it positively. It can therefore be said that the BTech graduates are of the notion that their technical knowledge, skills and capabilities are being utilised by the organisation in their current roles. Job satisfaction can also be deemed as predominantly neutral among this group and so can their view of their potential to add value.

Table 6: Section totals for unspecified respondents

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>10</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>G</td>
<td>20</td>
<td>16</td>
<td>19</td>
</tr>
</tbody>
</table>

The unspecified group of respondents rated equally on opposite ends of the scale. The 1 respondent rated all sections negatively and the other respondent rated all sections positively. The analysis in this regard is thus inconclusive.

Relationships between the respondents’ roles and their responses

Table 7: Section totals for production supervisors

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>18</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>C</td>
<td>11</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>E</td>
<td>20</td>
<td>5</td>
<td>5</td>
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<tr>
<td>H</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>M</td>
<td>19</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>O</td>
<td>18</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

83.3% of the graduates currently working as production supervisors were of the view that their technical knowledge is being utilised while 16.7% rated it as being neutral. 83.3% of them rated job satisfaction negatively while 16.7% rated it neutral. Potential to add value
was almost equally rated by all respondents since 33.3% rated it positively, 50% neutral and 16.7% negative.

Production supervisors’ technical knowledge, skills and capabilities are being satisfactorily utilised by the organisation. When it comes to job satisfaction, however, the vast majority of production supervisors were dissatisfied with their jobs. In addition, they had a neutral opinion of their potential to add value where 33.3% of them had clear ideas as to how they can add value to the organisation.

*Table 8: Section totals for other roles*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>D</td>
<td>16</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>L</td>
<td>17</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>P</td>
<td>17</td>
<td>11</td>
<td>15</td>
</tr>
</tbody>
</table>

75% of the respondents occupying ‘other’ roles were happy with the extent to which their technical knowledge, skills and capabilities are being utilised by the organisation while the remaining 25% was neutral in terms of technical knowledge utilisation. None of them reported positively for job satisfaction; 50% reported it neutral and the other 50% rated it negatively. 50% were neutral about their potential to add value while the other 50% rated their potential to add value as being positive.

Graduates occupying other roles are generally positive about the utilisation of their technical knowledge, skills and capabilities, their level of job satisfaction resulted in inconclusive results since half rated it neutrally and the other half negatively. Pertaining to their potential to add value the viewpoints are split between positive and neutral thereby rendering it inconclusive but with certainty of no negativity regarding their potential to add value.

*Table 9: Section totals for unspecified respondents*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>10</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>G</td>
<td>20</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>I</td>
<td>12</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>J</td>
<td>12</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>
Respondents whose roles were unspecified rated as follows: 60% neutral for technical knowledge utilisation, 20% positive and 20% negative. Majority 60% respondents rated negatively and 40% positively for job satisfaction. 80% of respondents rated their potential to add value negatively while one rated it positively.

Respondents with unspecified roles were generally neutral about the utilisation of their technical knowledge, skills and capabilities, they were overall dissatisfied with their jobs and negative about their potential to add value to the organisation. This group of respondents do not see how they could add value to the organisation even outside of their current roles.

Table 10: Section totals for miners

<table>
<thead>
<tr>
<th>Participant</th>
<th>Technical Knowledge Utilisation</th>
<th>Job Satisfaction</th>
<th>Potential to Add Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>16</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Q</td>
<td>9</td>
<td>14</td>
<td>6</td>
</tr>
</tbody>
</table>

Miners were equally split between negative and positive ratings for technical knowledge utilisation, both rated their job satisfaction as being neutral while they were, for potential to add value equally split between negative and positive. The only conclusive statement that can be drawn from the miners is their indifference regarding job satisfaction.

Correlations
Correlations were found between the responses to the questionnaire. Those that were found to have correlations between 1 and 0.6 are listed in order of decreasing correlation coefficient as follows:

<table>
<thead>
<tr>
<th>Case</th>
<th>Questions</th>
<th>Correlation coefficient</th>
</tr>
</thead>
</table>
| 1    | Potential future roles as outlined by the GDP will fully utilise my knowledge, skills and capabilities  
        Key performance indicators give a true reflection of my performance | 0.98                    |
| 2    | I am sufficiently qualified, trained and suitable for my current role  
        Potential future roles as outlined by the GDP will fully utilise my knowledge, skills and capabilities | 0.78                    |
| 3    | Key performance indicators give a true reflection of my performance  
        Set targets are achievable | 0.69                    |
<p>| 4    | My technical knowledge, skills and capabilities are being fully utilised |                         |</p>
<table>
<thead>
<tr>
<th>Case</th>
<th>Statements</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The statements are in separate sections of the questionnaire and the correlation coefficient of 0.98 is an indication of the strong positive relationship that exists between the 2 statements and by extension the relationship existing between sections 1 and 2 i.e. Technical knowledge utilisation and Job satisfaction.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Both statements closely correlated are in the Technical Knowledge utilisation section of the questionnaire. It indicates the close relationship between training and job suitability and future roles expectations from the graduates.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The statements both fall in the Job satisfaction section of the questionnaire and are related by the correlation coefficient of 0.69. Perhaps modification of the key performance indicators such that they give a true reflection of the respondents ‘performance could enable the graduates to achieve their set targets and hence change their perceptions of the level of achievability of the set targets. This can in turn, improve the levels of job satisfaction which, as literature suggests, improves retention within the organisation.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Like case 1, the statements are in separate sections of the questionnaire-Technical knowledge utilisation and job satisfaction. The correlation coefficient of 0.68 indicates a positive relationship, although not so strong between the 2 statements and by extension the sections under which they fall.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Both statements are in the same section (Potential to add value). The correlation exists, though it is not strong as indicated by the coefficient of 0.65.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>These are the statements with the lowest correlation coefficient of 0.6 with the statements like cases 1 and 4, are derived from the sections Technical knowledge utilisation and Job satisfaction. This suggests that their utilisation of their technical knowledge is inhibited somewhat by the company culture. Also, because the company culture doesn’t encourage optimum performance, if this aspect is re-worked and improved, then the view of the respondents towards their technical knowledge utilisation will improve.</td>
<td></td>
</tr>
</tbody>
</table>
No correlations were found between section 1 and 3 and between section 2 and 3.

It can be said that a positive correlation exists between technical knowledge utilisation and job satisfaction. However, the relationship cannot be confirmed based on correlation alone for sections 1 and 3 and for sections 2 and 3.

5.3 Findings Considering the Literature

Mining engineering is perceived as an undesirable career choice because of the difficult working conditions and the remote locality of mining sites (Musingwini et al, 2013). This was confirmed in the study conducted as the graduates indicated that their working conditions which received a total score of 31; the company culture with a score of 28; unattainable targets with a score of 50 and KPI’s not depicting their true performance (score 45) were the reasons they were dissatisfied with their jobs. It needs to be highlighted that job satisfaction received an overall negative score where 47.1% of the respondents rated it negative.

Contrary to literature which suggests that employees who received support in the form of training reported higher levels of job satisfaction than those who did not (Thiruchelvi and Supriya, 2009 and Cloutier et al, 2015), the study conducted revealed otherwise - that even though the graduates were happy with the training received, the job and organisational factors such as the company culture were not enough for them to remain in the organisation in the long-term. Their satisfaction with the training received and suitability to their roles received the second highest score in the questionnaire of 63 where their long-term retention was overall inconclusive and job satisfaction remained negatively rated.

A study conducted by Thiruchelvi and Supriya, 2009 revealed that analysing graduates as a peer group produced results that yielded higher levels of job satisfaction.

Only 15% of mining engineering graduates remain in the employment of mining companies in the long term (Stacey et al, 2009). The SAIMM best practice guideline states that graduates commonly leave the employment of their mining companies for several reasons: they have the wrong impression of what they will be doing, they are given responsibilities not aligned with their competence, they are not sufficiently challenged for their intellectual capacity and they are not guided into the work environment (SAIMM, nd). In agreement with literature, majority of the respondents implicitly indicated very little interest in remaining employed by the organisation in the long term.

It is said that graduates from more generalised educational backgrounds are more likely to experience educational and skills mismatches than graduates from technical and scientific fields (Assirelli, 2015). The study conducted agrees with this author as the graduates were not victims of educational/skills mismatches as they were suitably qualified, trained and suited to their roles.

5.4 Summary of the Findings

*Individual Questions*

Majority of the respondents responded as follows to the individual questions:
– their technical knowledge, skills and capabilities are not being fully utilised in their current role
– general dissatisfaction with their workplace conditions
– their current roles do not encourage them to embark on a journey of continuous learning
– neutrally about whether future potential roles would utilise their skills, knowledge and capabilities
– neutrally about whether the benefits/incentives offered were adequate for the role
– targets are not achievable
– key performance indicators employed by the organisation are not a true representation of their performance
– neutrally about whether flexibility in the GDP allowing them to deviate from the traditional career trajectory would encourage their engagement in a long-term employment relationship within the organisation
– negatively about engaging in a long-term relationship with the organisation if they would receive all-round development which enabled them to switch between roles and departments from time to time
– not even involvement in projects would encourage their long-term retention in the organisation
– neutrally to the idea of whether the prospects of lifelong learning would encourage them to embark on a long-term employment relationship with the organisation
– eagerness to best apply themselves and add value to the organisation
– eagerness and willingness to utilise their technical knowledge, skills and capabilities
– positively about their suitability for their roles in terms of their qualifications and training. They felt that they were adequately trained and qualified for occupation of their roles
– the company culture does not encourage optimum performance

Section totals
The respondents were generally satisfied with the utilisation of their technical knowledge, skills and capabilities in their current roles.

The respondents were dissatisfied with their jobs with the majority rating it as being negative.

This result is inconclusive since an equal proportion of respondents were neutral about their potential to add value as were those that were positive about it.

Responses per qualification
Majority of the BSc graduates are of the view that their technical knowledge, skills and capabilities are being utilised in their current roles. No negative response was received for technical knowledge utilisation from the BSc graduates. It can therefore be said that job satisfaction is not optimal among the BSc graduates. The BSc graduates are rather indifferent about their potential to add value. This can be directly or indirectly related to the low level of job satisfaction reported from their responses.
It can therefore be said that the BTech graduates are of the notion that their technical knowledge, skills and capabilities are being utilised by the organisation in their current roles. Job satisfaction can also be deemed as predominantly neutral among this group and so can their view of their potential to add value.

The analysis for those respondents who chose not to specify their qualifications could not be conclusive since the 50% rated all sections negatively and the other 50% positively.

Responses per role
Production supervisors’ technical knowledge, skills and capabilities are being satisfactorily utilised by the organisation. When it comes to job satisfaction, however, the vast majority of production supervisors were dissatisfied with their jobs. In addition, they had a neutral opinion of their potential to add value where 33.3% of them had clear ideas as to how they can add value to the organisation.

Graduates occupying other roles are generally positive about the utilisation of their technical knowledge, skills and capabilities, their level of job satisfaction resulted in inconclusive results since half rated it neutrally and the other half negatively. Pertaining to their potential to add value the viewpoints are split between positive and neutral thereby rendering it inconclusive but with certainty of no negativity regarding their potential to add value.

Respondents with unspecified roles were generally neutral about the utilisation of their technical knowledge, skills and capabilities, they were overall dissatisfied with their jobs and negative about their potential to add value to the organisation. This group of respondents do not see how they could add value to the organisation even outside of their current roles.

Miners were equally split between negative and positive ratings for technical knowledge utilisation, both rated their job satisfaction as being neutral while they were, for potential to add value equally split between negative and positive. The only conclusive statement that can be drawn from the miners is their indifference regarding job satisfaction.

A positive correlation exists between technical knowledge utilisation and Job satisfaction. However, the relationship cannot be confirmed based on correlation alone for sections technical knowledge utilisation and potential to add value as well as job satisfaction and potential to add value. The BSc and B Tech graduates
Chapter 6: Theoretical Framework

This section of the report seeks to present a proposed solution to the problem by means of a theoretical framework postulated by the researcher for the organisation. The framework is in the form of a process comprising of 3 components: Talent management, competency development and retention.

Talent Management

Talent management generally refers to a wide range of activities, mainly cyclic in nature which entail but are not limited to recruitment, employment, training, mentorship and retention. For purposes of the framework proposed by the researcher only the content specified in this section is to be included in talent management. The researcher proposes that it is done as follows:

1. Identify the current manpower and skills requirements in terms of the current workforce (the generation X and Baby Boomers) as well as their ageing profiles. Consider their areas of specialisation as well as the time-frame required to train and equip their successors

2. Identify the knowledge and skills base currently possessed by the graduates

3. Provide organisation-oriented training that thoroughly addresses the needs of the organisation and bridges the gap between what the organisation needs and what the graduates are already capable of doing. The organisation has been cited by peers in the industry as an exceptional provider of training. This has been confirmed as well in the study undertaken where majority of the respondents agreed that they were adequately qualified, trained and suitable to their roles. This is an area the organisation can and should capitalise on in terms of providing training that is not merely focused on the traditional career trajectory in mine management but that which is laterally extensive as well, serving the current and future skill/ specialisation skills that will possibly be required by the organisation in the near and distant future. Thereby enabling graduates to fill out these gaps while at the same time providing them with roles that have meaning and add value to their organisations as well as fostering career progression. In modern organisations, the contribution that individuals make towards the organisation as well as on overall corporate performance (Weymes, 2004) is vital.

4. Mentorship can be used as a vehicle through which the graduates can adapt to the company culture since the company culture was cited as one of the factors contributing towards poor job satisfaction among survey participants. Changing things like the company culture in an industry as primitive as the gold mining industry is a stretch-something that will take a long time to achieve. Mentorship (active mentorship) can and should be used as a tool to help them get to know all they need to know about their roles, required competencies as well as how to navigate through the system (Naim and Lenka, 2018).
Competency Development

In agreement with several authors about generation Y employees, Naim and Lenka, 2018 add that these employees have work ethics, values and working styles that are different from those of generation X and Baby Boomers. They are ambitious, creative, goal-oriented, self-assured as well as confident in what they can do and the contributions they can make when given a chance. Their competency can be developed as follows:

1. Develop the graduates in roles that are aligned with organisational needs such that they can add value to the organisation. Potential to add value yielded negative individual results with only those with unspecified roles being negative. This is an area where the organisation can improve on. Douglas McGregor challenged scientific management theory X which was of the notion that people are motivated by external rewards where in fact they are also or can also be intrinsically motivated by work that is within itself interesting and fulfilling (Weymes, 2004).

2. Key performance indicators (KPI’s) need to truly be reflective of the graduates’ performance such that their progress can be fairly judged and promote their progress. They crave and desire honest and rapid feedback on their performance as well as rewards in accordance to their performance (Naim and Lenka, 2018). The performance of organisations, whether modern or primitive remains practically apparent through its KPI’s (Weymes, 2004).

3. Job satisfaction has been identified as a problem area in the organisation based on the study conducted. It has been attributed to factors such as workplace conditions and company culture. Physical workplace conditions cannot be changed, they are subject to ambient environmental conditions, however, the overall work environment can be influenced by factors such as work engagement, working relationships and sufficiently challenging work and this certainly will improve levels of job satisfaction.

Retention

Retention of employees in an organisation is reflective of the employees’ commitments to organisational goals. In the study, the graduates did not appear keen on embarking on a long-term employment relationship with the organisation for reasons pertaining to their roles and the meaningfulness of their work itself. The researcher proposes that retention or intention to remain within the organisation be improved by means of employee engagement, value-adding and employer branding. The extent to which an organisation can retain its employees is a direct result of the employees’ levels of job satisfaction (de Sousa Sabbagha et al, 2018).

1. Employee engagement is key to the retention of talented individuals in an organisation (Bhatnagar, 2007). Levels of engagement can be quantified, finding a system through which they can be quantified, monitored and continuously improved upon. Lack of engagement is an issue not just among generation Y employees (Naim and Lenka, 2018).
2. Value added to the organisation to be quantified in terms of a value, perhaps it could be included in the KPI’s as an index. It is critical in a high-performance organisation that all employees add significant value (Weymes, 2004). Meaningful work experiences are cited as being critical to employee retention.

3. Employer branding is critical, the values and culture of an organisation need to be such that it attracts talented individuals. The people in the organisations need to subscribe to the values of the organisation (Weymes, 2004). Employer branding is a strategy that can be used to acquire and retain qualified talent by establishing the organisation as the employer of choice within the industry (Tanwar and Prasad, 2016).
Figure 6: Theoretical Framework
Chapter 7: Conclusions and Recommendations

Mining engineering is perceived as an undesirable career choice because of the difficult working conditions and the remote locality of mining sites (Musingwini et al, 2013). This was confirmed in the study conducted as the graduates indicated that their working conditions which received a total score of 31; the company culture with a score of 28; unattainable targets with a score of 50 and KPI’s not depicting their true performance (score 45) were the reasons they were dissatisfied with their jobs, with 47.1% of the graduates having rated job satisfaction negatively.

Contrary to literature which suggests that employees who received support in the form of training reported higher levels of job satisfaction than those who did not (Thiruchelvi and Supriya, 2009 and Cloutier et al, 2015), the study conducted revealed otherwise- that even though the graduates were happy with the training received (with training having scored the second highest on the questionnaire at 63), the job and organisational factors such as the company culture were not enough for them to remain in the organisation in the long-term, indicated by the indifferent rating that retention received.

Only 15% of mining engineering graduates remain in the employment of mining companies in the long term (Stacey et al, 2009). The SAIMM best practice guideline states that graduates commonly leave the employment of their mining companies for several reasons: they have the wrong impression of what they will be doing, they are given responsibilities not aligned with their competence, they are not sufficiently challenged for their intellectual capacity and they are not guided into the work environment (SAIMM, nd). In agreement with literature, majority of the respondents implicitly indicated very little interest in remaining employed by the organisation in the long term.

It is said that graduates from more generalised educational backgrounds are more likely to experience educational and skills mismatches than graduates from technical and scientific fields (Assirelli, 2015). The study conducted agrees with this author as the graduates were not victims of educational/skills mismatches as they were suitably qualified, trained and suited to their roles.

7.1 Concluding Statements

The research was undertaken to establish whether the organisation fully utilises the technical knowledge, skills and capabilities of its mining engineering graduates to add value to the organisation. This was done by means of a survey where a population of 53 mining engineering graduates are employed and currently undertaking various roles within the organisation. A total of 30 questionnaires were distributed and 17 were returned to the researcher.

Technical knowledge utilisation was found to be negative in terms of individual responses. However, collectively satisfactory among the BSc graduates, BTech graduates, production supervisors and those undertaking ‘other’ roles. Among miners and those with unspecified qualifications the results were inconclusive.
The overall score for job satisfaction was negative. Individual responses yielded negative results, so did the collective results. BSc graduates, production supervisors and those with unspecified roles were dissatisfied with their jobs. B Tech graduates, those with other roles and miners were neutral towards job satisfaction. The major contributing factor to this negativity is seemingly the company culture which had the lowest overall score on the questionnaire of 34.

Potential to add value yielded negative individual results with only those with unspecified roles being neutral.

A positive correlation exists between technical knowledge utilisation and job satisfaction. However, the relationship could not be confirmed based on correlation alone between technical knowledge utilisation and potential to add value as well as between job satisfaction and potential to add value.

In conclusion, the organisation does utilise the technical knowledge, skills and capabilities of its mining engineering graduates. However, this utilisation does not add value to the organisation as is evident in the high reported levels of job dissatisfaction and the graduate’s reluctance to engage in a long-term employment relationship with the organisation.

7.2 Recommendations for Future Research

- Conducting of a job satisfaction study on individuals and a separate one on graduates as a peer group. It has been suggested that analysing graduates as a peer group yields much higher levels of job satisfaction as suggested by Thiruchelvi and Supriya, 2009.
- Determination of whether a relationship exists between employer branding and employee retention. Should it be found that it is positive, utilise employer branding as a means of employee retention.
- Determining where the graduates are most needed whether it be in mainstream production or technical specialisation roles and placing them accordingly such that they serve the needs of the organisation and fulfil organisational goals.
Chapter 8: References


Kies, L., 2018, Supervisor ETD, Sibanye-Stillwater Academy [Personal communication with the researcher]


University of the Witwatersrand Website, nd, Available at https://www.wits.ac.za/course-finder/undergraduate/ebe/mining-engineering/ [Accessed: 26/03/2018]


Appendices

Research Questionnaire: Harvesting Mining Engineering Graduate’s Potential for Value Added to the Organisation

Background
This questionnaire is part of a research survey being undertaken by Mabatho Gaula in part fulfilment of the requirements of the MEng in Engineering Management Degree at the University of Johannesburg. The researcher is currently working as a production supervisor in the organisation and has completed the Graduate Development Programme.

The research topic is “Harvesting Mining Engineering Graduate’s Potential for Value Added to the Organisation”. It is aimed at producing strategies for mining engineering graduate utilisation and retention within the organisation. In this research the researcher questions whether the organisation fully exploits the potential of its mining engineering graduates.

The research has 4 main objectives namely:

- Exploring and assessing job satisfaction among the graduates
- Painting a current picture in terms of the roles they currently occupy in light of the Graduate Development Programme
- Highlighting trends and observations in the industry
- Exploration of possible alternatives that will enhance retention of graduates in a manner that adds value to the organisation

The researcher is hereby requesting your participation in this survey by the completion of the questionnaire. Please note the following:

Participation in the survey is completely voluntary and anonymous and all responses will be accessed and used by the researcher only. As such, the survey poses no risk of any form of harm to you as a participant in any manner. The questionnaire does not require you to disclose your identity or answer any questions you are not comfortable answering. You have the right, as a participant to decide to discontinue your participation in the survey if you wish to do so. There is no immediate direct benefit to you as an individual. However, since the results obtained will be representative of the population, strategies will be produced and recommended for implementation to the organisation and employment relations and career development will be improved. Should you wish to be informed about the findings of the survey, they will be made available to you.

The questionnaire consists of 15 questions and will take no more than 20 minutes to complete.

Please answer as many of the questions as truthfully as you possibly can. Please indicate your preferred choice with a × in the relevant box provided.

Thank you for participating.
Please provide the following information by selecting the correct box

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<th>Academic Qualification</th>
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<th>BEng (Mining)</th>
<th>NDip (Mining)</th>
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<th>3 Neutral</th>
<th>2 Disagree</th>
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<td>My current role challenges me to a point of continuous learning</td>
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<td>I am sufficiently qualified, trained and suitable for my current role</td>
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The company culture (management practices) encourages me to perform at my optimum

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<td>Key performance indicators give a true reflection of my performance</td>
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