

Harvesting Mining Graduates' Potential for Value Added to the Organisation

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Introduction and Background

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 to optimally run the existing operations. The country thus 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 a competitive advantage and once again thrive (Cruise, 2011; Musingwini, Cruise and Phillips, 2013). The research was aimed at aiding the organisation in harvesting the full potential of their mining engineering graduates to add value to the organisation.

Research Rationale

Musingwini *et al.* (2013) state that the traditional career trajectory for a mining engineer is in production with the goal of being appointed in mine management. One can almost say that the terms mining engineer and mine manager can be used interchangeably. The researcher challenged this viewpoint by considering the skills, capabilities and competencies possessed by mining engineering graduates and questioning whether these are being utilised. He also considered that if not, how best they can be utilised to add value to the organisation. This may not necessarily imply that this will be best achieved by them following the traditional career trajectory.

A detailed consideration of the mining engineering curriculum in terms of the technical 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 study that focused on how the organisation could uniquely tap into the knowledge and skills of their mining graduates to the benefit of the organisation for the attainment of its organisational goals.

For an organisation to gain a 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 to optimise the functioning of the organisation (Mphahlele *et al.*, 2018).

Problem Statement, Research Aims and Objectives

The average time it takes a mining graduate to be appointed to a managerial position where he can make a 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, Hadjigeorgiou and Potvin (2009) agree with this statement by reiterating that it takes students approximately 15 years from starting their studies at university until they can complete their training and be able to occupy a managerial role.

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

Research Aim: To aid the organisation to harvest the full potential of its mining engineering graduates by producing a framework for mining engineering graduate utilisation and retention within the organisation.

Research Question: Does the organisation fully utilise the potential of its mining engineering graduates to the extent that they add value to the organisation?

Research 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 determine whether the Graduate Development Programme (GDP) influences the graduates' ability to add value to the organisation through long-term retention.

Research Methodology

The research explored a subject about which little is known in the organisation. A questionnaire was used to collect data from a target population of 53 mining engineering graduates from which a sample of 30 participants was selected. The target population was those mining engineering graduates employed by the organisation under the administration of the organisation's academy and not operations, irrespective of the date of graduation or duration of service. A questionnaire with closed questions on a summated rating in the form of a Likert 5-point scale was used with the following convention: 1 - strongly disagree, 2 - disagree, 3 - neutral, 4 - agree and 5 - strongly agree. Of the 30 questionnaires distributed 17 were returned to the researcher. The research was also approved by the ethics committee at University of Johannesburg.

Literature Study

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 to add value to the organisation (Assirelli, 2015). There are two equally important factors to consider when dealing with the utilisation of graduates. Firstly, the understanding of how engineers process information and secondly, their integration into the workplace through a process of socialisation which allows the graduates to gain a much clearer understanding of their roles, job skills required by their roles and a means of enabling them to be acquainted to the organisation (Riley and Cudney, 2014).

The traditional career trajectory for mining engineers is in mainstream production and mine management. This is a process that can take up to 15 years before a graduate can take up a meaningful position in management (Stacey *et al.*, 2009). This traditional career path is being challenged by the need for specialist skills in the industry, given the ageing profile and expected retirement of specialists currently serving the industry.

According to the SAIMM (nd), mining engineering graduates are quick to leave the country in search of better career prospects within a few years of graduating and after being employed locally. Some of the reasons for their dissatisfaction in the initial years as outlined by SAIMM (nd) and Rooplall (2016) are:

- They have the wrong impression of what they will be doing.
- The responsibilities they are given are not aligned with their abilities.

- They are insufficiently challenged for their intellectual capacity.
- They are not guided into their work environment by means of socialisation, supervision and mentorship.
- They see and follow greener pastures for added career development.
- They are not being given the correct platform to make the best use of their natural strengths and developed to overcome their weaknesses to enable them to best apply themselves.

Factors affecting job satisfaction have been categorised as job factors, organisational factors and individual factors. Job factors include work stress, job security and a skills mismatch. Organisational factors include training and development, management style and organisational culture whereas individual factors include employee motivation and work engagement.

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 employ of mining companies for the long term. Such statistics highlight employee retention as an issue of concern. Employee retention is defined as the effort made by an organisation to encourage employees to remain employed in the organisation in the long term. Retention factors include training and development, supervisor support, career opportunities, job characteristics, work-life balance and compensation (de Sousa Sabbagha, Ledimo and Martins, 2018). The vision, mission, values and policies of an organisation have also been cited as factors influencing employee retention.

Findings and Discussion

The questionnaire comprised 3 sections each containing 5 questions, totalling 15 questions. Section 1 focused on technical knowledge utilisation, Section 2 on job satisfaction and Section 3 on potential to add value. The scores of these sections are depicted in Figure 1.

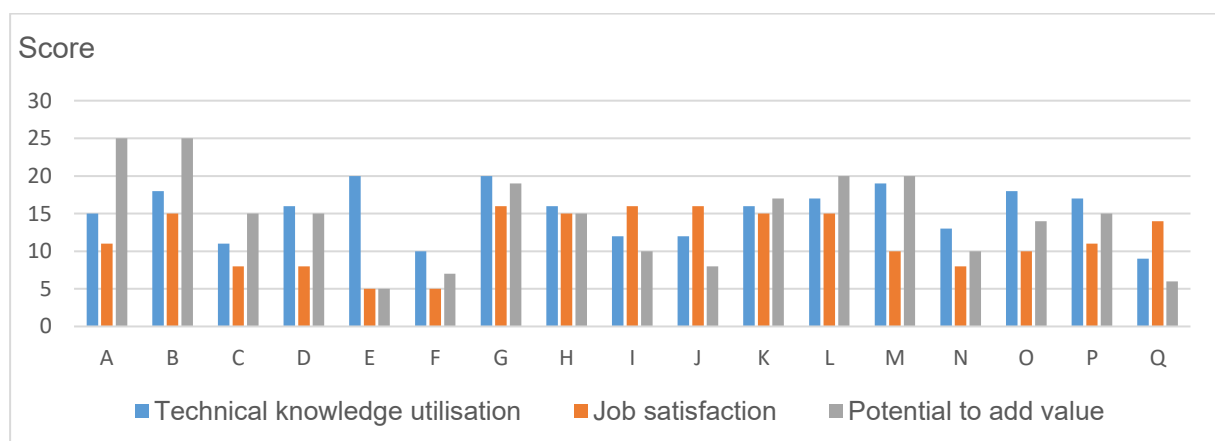


Figure 1: Results obtained for the sections of the questionnaire

A general trend can be observed in Figure 1. The trend is high scores for Sections 1 and 3 and lower for Section 2 as 59% of the sample fit this trend. The highest section total obtained for Section 1 was 20 and the lowest was 9. The lowest total obtained for Section 2 was 5 and the highest was 16. The lowest total obtained for Section 3 was 5 and the highest was 25.

Technical Knowledge Utilisation

This section explored the extent to which the graduates' technical knowledge, skills and capabilities are being utilised in both their current roles and 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 engineering graduates. A negative response to this section implies the opposite namely that the organisation is not fully utilising the skills and knowledge of its graduates. This would then identify a knowledge source that is not being tapped into by the organisation. A neutral response would require further analysis of the individual questions. The BSc graduates responded as follows to this section: 62.5% responded positively and the remaining 37.5% fell in the neutral category. No negative response for technical knowledge utilisation was received from the BSc graduates. The BTech graduates responded as follows: 66.6% rated it positively, while the remaining 16.67% rated it as neutral and 16.67% as negative. For respondents whose qualifications were unspecified, the results were split equally between neutral and negative. The BEng graduate rated this section as neutral. When analysing individual responses, the results were as follows: 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

Job satisfaction is an important factor that contributes towards employee motivation and subsequently performance. The questions included in this section of the questionnaire mostly refer to the work factors itself, rather than the individual factors that contribute to job satisfaction. The questions are derived from what literature states are important work factors that contribute to job satisfaction.

50% of the BSc graduates rated job satisfaction negatively, 37.5% rated it as neutral and only 12.5% rated it positively. Among the BTech graduates, job satisfaction was rated positive by only 16.7% of the respondents while 33.33% of the respondents rated it negatively and 50% provided a neutral rating. For respondents whose qualifications were unspecified, the results were split equally between neutral and negative. The BEng graduate rated it negatively. When analysing individual responses, the following could be deduced: 47.1% of the participants' responses were negative, 35.3% neutral and 17.6% positive. The respondents were dissatisfied with their jobs with the majority rating it as their experience being negative.

Potential to Add Value

This section of the questionnaire refers to the retention aspect of the research. The intention was to establish what the graduates consider as valuable for retention within the organisation. What would stimulate their interest for a long-term employment relationship with the organisation? Several options were provided as possible reasons why they would be interested in a long-term relationship.

Potential to add value was rated equally negative and positive by the BSc graduate respondents with 37.5% for each, while only 25% of the respondents rated it neutral. Of the BTech graduates 33.33% rated their perceived potential to add value as negative, 50% rated it neutral and only 16.7% rated it positively. For respondents whose qualifications were unspecified, the results were split equally between neutral and negative. The BEng graduate rated it positively. When analysing individual responses, the following result could be deduced: 29.4% rated their potential as negative, 35.3% as neutral, 35.3% as positive. This

result was inconclusive since an equal proportion of respondents was neutral and positive about their potential to add value.

Theoretical Framework

Based on the results obtained from the survey, the researcher proposed a theoretical framework as a means of solving the problem highlighted by the results obtained. The proposed framework is in the form of a 3-step process comprising Talent Management, Competency Development and Retention.

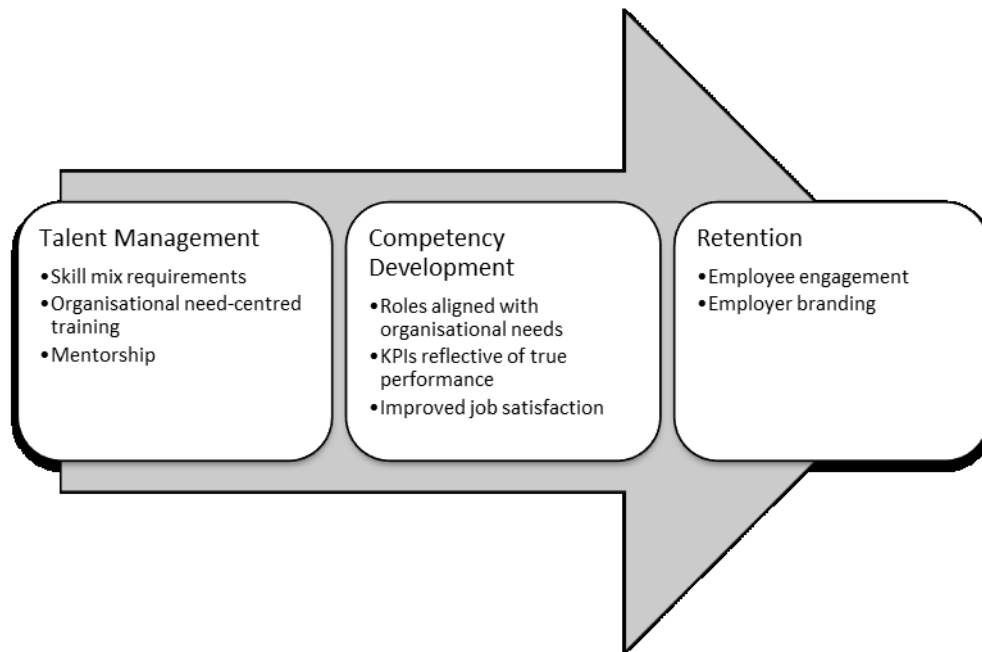


Figure 2: Theoretical framework

Talent Management

Talent management generally refers to a wide range of activities, mainly cyclic in nature, which entails but is 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: Identification of the current manpower and skills requirements of the organisation in terms of the current workforce and the ageing profile of those with specialist skills; identification of the knowledge and skills base of the graduates, provision of organisation-oriented training and effective mentorship (Naim and Lenka, 2018).

Competency Development

Concurring 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 increased by developing the graduates in roles aligned with organisational needs in contrast with the traditional career trajectory, ensuring that the KPIs are truly reflective of performance, improving job satisfaction enjoyed through the socialisation of graduates and ensuring that they adapt to the company culture.

Retention

Retention of employees in an organisation is reflective of the employees' commitment 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, or lack thereof, of the work itself. The researcher proposes that retention or intention to remain with 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' level of job satisfaction (de Sousa Sabbagha *et al.*, 2018). The graduates may be retained through effective employee engagement (Bhatnagar, 2007; Naim and Lenka, 2018), the quantification of value added to the organisation perhaps by including it in the KPIs and thereby creating meaningful work experiences and lastly through employer branding (Tanwar and Prasad, 2016). This would align the graduates with the values and culture of the organisation (Weymes, 2004).

Conclusions and Recommendations

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. Technical knowledge utilisation was found to be satisfactory among the BSc and BTech graduates who formed the majority of the sample. The overall score for job satisfaction was negative. Individual responses yielded negative results and so did the collective results. BSc graduates were dissatisfied with their jobs. BTech graduates, on the other hand were neutral towards job satisfaction. The major contributing factor to this negativity is seemingly the company culture which had the lowest overall score of a total of 34 points on the questionnaire. Potential to add value yielded overall negative results which gives an indication of the graduates' lack of intention to remain employed by the organisation in the long term.

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

Recommendations for Future Research

- Determine if a relationship exists between employer branding and employee retention. Should it be found that it exists and is positive, utilise employer branding as a means of employee retention.
- Determine where the graduates are most needed whether it is in mainstream production or technical specialisation roles and placing them accordingly to ensure they serve the needs of the organisation and fulfil organisational goals.

References

- Assirelli, G. (2015). Credential and skill mismatches among tertiary graduates: The effect of labour market institutions on the differences between fields of study in 18 countries, *European Societies*. Vol 17, - Issue 4.
- Bhatnagar, J. (2007). Talent management strategy of employee engagement in Indian ITES employees; key to retention. *Employee Relations*, Vol. 29 No. 6, pp.
- Cruise, J.A. (2011). The Gender and racial transformation of mining engineering in South Africa. *The Journal of the Southern Institute of Mining and Metallurgy*. Vol.111, n.4.
- De Sousa Sabbagha, M., Ledimo, O., & Martins, N. (2018). Predicting staff retention from employee motivation and job satisfaction. *Journal of Psychology in Africa*. Vol 28, - Issue 2.

- Genc, B., & Cawood, F. (2012). The establishment of a mine design laboratory for improved teaching of and learning by mining engineering students: A case study. *The Journal of the Southern African Institute of Mining and Metallurgy*, Vol.112 n.7
- Mphahlele, Pule & Els, Crizelle & De Beer, Leon & Mostert, Karina. (2018). Investigating strengths and deficits to increase work engagement: A longitudinal study in the mining industry. *SA Journal of Human Resource Management*. 10. 10.4102/sajhrm.v16i0.900.
- Musingwini, C., Cruise, J.A., & Phillips, H.R. (2013). A perspective on the supply and utilization of mining graduates in the South African context. *The Journal of the Southern African Institute of Mining and Metallurgy*. 2013, vol.113, n.3
- Naim, M.F., & Lenka, U. (2018). Development and retention of generation Y employees: A conceptual framework. *Employee Relations*. Vol. 40 No. 2, pp. 433-455.
- Riley, T., & Cudney, E.A. (2014). Defensive routines in engineering managers: A case analysis. *International Journal of Engineering Business Management*. <https://doi.org/10.5772/60114>.
- Rooplall, N. (2016). Trends preventing engineers from obtaining professional registration with ECSA in the required time. Masters Dissertation.
- Stacey, T.R., Hadjigeorgiou, J., & Potvin, Y. (2009). Technical skills: A major strategic issue. *The Journal of the Southern African Institute of Mining and Metallurgy*. Vol.109 n.4
- The Southern African Institute of Mining and Metallurgy (SAIMM), nd, Mining and metallurgy best practice graduate development programme guideline. Retrieved May 16, 2018, from <https://www.saimm.co.za/download/SAIMMGuidelineGDPsforEngineeringGraduates07092010.pdf>.
- Tanwar, K., & Prasad, A. (2016). Exploring the relationship between employer branding and employee retention. *Global Business Review*. 17(3_suppl), 186S-206S.
- Weymes, E. (2004). A challenge to traditional management theory. *Foresight* 6(6):338-348.

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