Investigating methods of knowledge transfer in an electricity supplier

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"The single most important investment any country can make is in its people"

REMARKS

The reader is reminded of the following:

The editorial style as well as the references referred to in this dissertation follow the format prescribed by the NWU Referencing Guide (2012). This practice is in line with the policy of the programmes of the Potchefstroom Business School, namely to use the **Harvard Style** in all scientific documents.

ABSTRACT

Title: Investigating methods of knowledge transfer in an electricity supplier

Keywords: Skill, skill transfer, knowledge, transfer models, skill transfer methods, technical skills, power utilities, electrical utility, energy company, ageing staff, training methods, operators, operating, Eskom.

The aim of this study was to evaluate the optimum way of how to transfer skills and knowledge from senior to junior/trainee employees in the workplace. The study was conducted at two power utilities (Lethabo and Grootvlei) within their respective operating divisions at Eskom. A quantitative approach in the form of a questionnaire was used to conduct the research.

One knowledge and skills transfer/learning process questionnaire was administered. A response rate of 98.9% was obtained from a sample of 91 employees.

This study addressed factors affecting skills and knowledge transfer. The general focus was aimed at the four sub-scales, namely skills, motivation of the trainee, workplace/organisational climate, and management support for skills and knowledge.

Limitations of the study were identified and recommendations were made to the benefit of future research. The primary and secondary objectives of the study were successfully attained in this study.

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LIST OF ABBREVIATIONS

BU	Business Unit
CoP	Community of Practice
ETD Practitioner	Education Training and Development Practitioner
GX	Generation
IDP	Individual Development Plan
INO	Initial Notification of Occurrence
KM	Knowledge Management
MNCs	Multinational Corporations
MW	Mega Watt
NQF	National Qualification Framework
OPS	Operating
SAP HR	SAP Module for Human Resources Management
SPO	Senior Plant Operator
SAT	Systematic Approach to Training

CHAPTER 1:   CONTEXTUALISATION OF THE STUDY

1.1   INTRODUCTION

This study focused on the preferred modus operandi used for skill and knowledge transfer from seniors to juniors/trainee employees within the electricity generating utility. It is a relative study of two power utilities belonging to the same company, namely Eskom.

This chapter furnishes the background and overview of the current state of affairs regarding skills and knowledge transfer. The primary and secondary objectives of this study are presented, together with the methodology used, in order to achieve these objectives. The limitations of the study are further highlighted within this paper. This chapter concludes with a concise overview of the structure of the entire study, by briefly detailing the contents of the chapter that follows.

1.2   BACKGROUND

Eskom was established in South Africa in 1923, as a power generating utility. In July 2002, it was converted into a public limited liability company, solely owned by the South African Government.

The new democratic Government of 1994 realised the need for electricity to sustain economic growth, but at the same time, prioritised access to electricity as a basic need for all South Africans. This placed Eskom under huge pressure over the past two decades and has resulted in periods of blackouts and load shedding since 2006.

Eskom is one of the top 20 utilities in the world by generation capacity, and is still growing. Eskom as a power utility consists of three main subdivisions, namely generation, distribution and transmission. The generation division generates 95% of all the electricity that is distributed within South Africa, and is also supplying to customers in the mining, industrial, agricultural, commercial and residential sectors, as well as to re-distributors. Independent power producers generate about four percent, and municipalities about one percent of the balance of electricity in the country.

Eberhard (2005:5310) states that Eskom owns and controls the transmission grid, by supplying approximately half of its electricity generated directly to its customers, whilst the balance is sold to municipalities. They then distribute this electricity, often at an increased price, to both residential and business consumers alike. According to Eberhard (2005:5309), the South African electricity supply industry (ESI) was formed to regulate the price of electricity. In 1995 the South African Government launched the National Electricity Regulator (NERSA or NER) as a replacement for the ESI (Davidson & Mwakasonda, 2004:30).

At the heart of any electricity utility such as Eskom, lays the responsibility to supply the electricity on which modern society depends. Eskom's power stations operate 365 days a year. Like most other power utilities, Eskom's generation group maintains a varied portfolio of power plants, namely gas turbines, hydro-electric, pumped storage and nuclear units, in addition to coal-fired plants.

On 31 March 2014, Eskom had 5,160 technical learners in the pipeline (engineers, technicians and artisans), as well as 4,325 learners being trained to contribute to the socio-economic development of the country's youth (Eskom Annual Report, 2014:12). The construction of new power stations is South Africa's largest capital investment project. The capacity expansion programme employs over 40,000 people, of whom 8,930 have benefited directly from skills training.

Eskom currently has a load capacity of 43,875 megawatts that is generated by 27 power utilities, of which two are currently under construction. Of these power utilities, 13 are coal-fired, six are hydro-electric, two are pump storage, four are gas/liquid fuelled turbines, one is wind energy and one is nuclear powered (www.eskom.co.za). As can be seen from Table 1-1, the coal-fired power utilities provide the bulk of the total power produced in South Africa (37,455 megawatts).

Table 1-1:   Eskom's Power Stations

Name	Location	Capacity (MW)	Date commissioned (First and last unit)
Coal-fired power stations (13)			
Komati	Middelburg	940	1961-1966
Camden	Ermelo	1520	1966-1969
Grootvlei	Balfour	1200	1969-1977
Hendrina	Mpumalanga	1965	1970-1977
Arnot	Middelburg	2352	1971-1975
Kriel	Bethal	3000	1976-1979
Matla	Bethal	3600	1979-1983
Duvha	Witbank	3600	1980-1984
Tutuka	Standerton	3654	1985-1990
Lethabo	Viljoensdrift	3708	1985-1990
Matimba	Limpopo	3690	1987-1991
Kendal	Witbank	4116	1988-1993
Majuba	Volksrust	4110	1992-2001
Medupi	Lephalale	Under construction	n/a
Kusile	Mpumalanga	Under construction	n/a
		Total 37 455	
Gas/Liquid fuel turbine stations (4)			
Acacia	Cape Town	171	
Ankerlig	Atlantis	1338	
Gourikwa	Mossel Bay	746	
Port Rex	East London	171	
Hydro-electric stations (6)			
Colley Wobbles	Mbashe River	42	
1st and 2nd falls	Umtata River	17	
Gariep & Ncora	Norvalspont	362	
Vanderkloof	Petrusville	240	
Pumped storage schemes (2)			
Drakensberg	Bergville	1000	
Palmiet	Grabouw	400	
Klipheuwel (Wind)	Klipheuwe	3	
Nuclear (1)			
Koeberg	Cape Town	1930	
Total power stations (27)		**43 875**	

Source: Eskom Annual Report 2013

All organisations, in almost all the sectors of the economy are dependent on skilled personnel for their existence (Argote & Ingram, 2000:150). It is, however, unfortunate that in the face of major shifts in the talent landscape, it is becoming increasingly difficult for organisations to keep valued employees on board (Lewis *et al.,* 2005:583).

It is public knowledge that there is definitely a general shortage of skills all over the world. Unfortunately South Africa has not escaped this crisis.

Two of the biggest threats facing the service delivery industry are a lack of financial resources and a lack of skills (Victoria, 2005:10). A study done by the Department of Higher Education and Training in 2014 identified the top 100 occupations in the country that are considered to be in short supply. Of these 100 occupations, the top 48 were all technical skills related, and included occupations such as millwrighting, boiler-making, fitting and turning, welding, carpentry, engineering and project management (Department of Higher Education and Training, 2014:14).

According to SAIEE (2008:7), the shortage of skilled workers across all industries in South Africa, is a key issue in resolving and managing the present challenges faced by the South African power utilities throughout the electricity supply chain. This study suggests that the skills shortages and demands are not confined to South Africa, but that it is a global challenge.

According to Breytenbach (2008:6), Eskom should address the shortage of skills, as it has a considerable negative impact on the production of electricity. Additionally, it affects the economy, for example load shedding and blackouts have disastrous effects on mining, manufacturing and plenty other sectors, all of which negatively impact economic growth. Furthermore, Hlongwane (2012:23) estimates that the load shedding that occurred in 2008, cost the South African economy R50 billion.

The skills shortage has not escaped Eskom. Eskom's existence and success relies on keeping and attracting talented and skilled employees from different levels, such as operating, engineering, maintenance and project management.

According to the Eskom Annual Report (2014:16), Eskom is a highly complex business that requires a myriad of distinctive sets of skills, which need to be maintained frequently and consistently developed further, all of which Eskom cannot do without

making training a priority as they build the future. These are skills that Eskom cannot do without, and training remains a priority as they build the future.

Gumede (2012:201) stated that the countries that are currently the least developed or in the developing world, are experiencing a gross turnover of skilled personnel. This state of affairs has been further compounded by the reality of wealthy countries often resorting to attracting skilled individuals with lucrative incentive schemes. Scarcity of skills can be attributed to numerous reasons, including globalization, local history, an ageing skilled workforce that is retiring, the country's education system (i.e. the quality of mathematics and science students produced), and many other factors, such as the morality dilemma caused by HIV and AIDS.

Furthermore, a recent study done amongst the generation coal power utilities' operating section within all 13 power stations revealed that a shortage of skilled operating personnel will be experienced in the next 5 to 10 years. This is due to the demographic trend: the number of ageing skilled workers in the operating department who will be leaving, with no skills transfer model ensuring replacements, and a shrinking pool of young skilled operators who can replace them. Table 1-2 refers to the precise *number of employees* within their respective *age groups.* In relation to Table 1-2, Figure 1-1 provides a visual indication of the *number of employees* within their respective *age groups.*

Table 1.2:   **Generation operating age profile**

Number of employees	Age group
824	30 years and below
995	31 - 40 years old
309	41 - 50 years old
1107	51 - 60 years old
211	61 - 65 years old
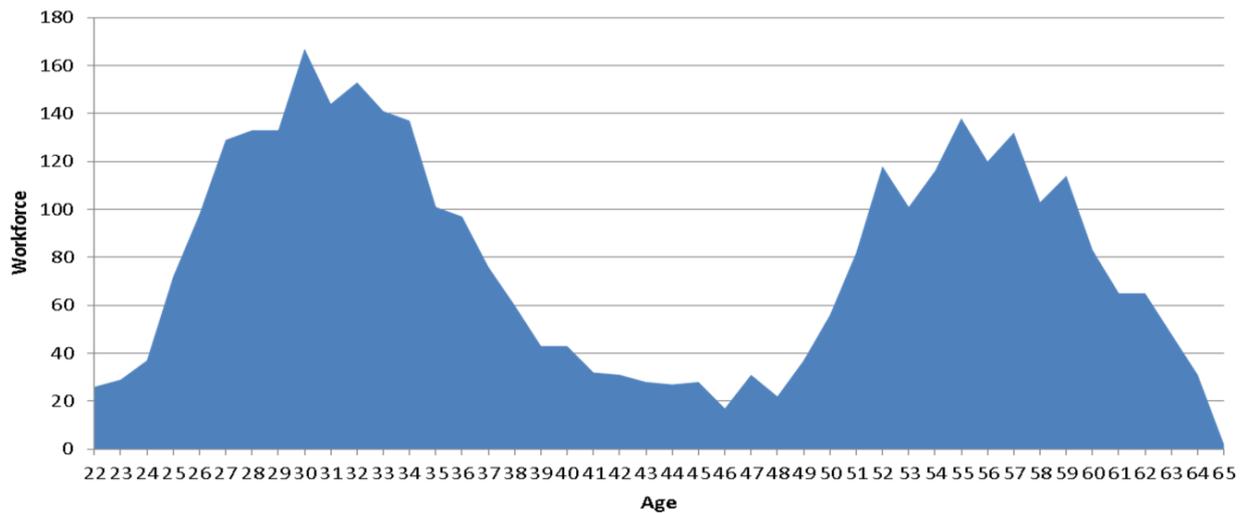
Figure 1.1:   **Generation operating: workforce vs age profile**

Figure 1-1 presents two clear increases (spikes). The first increase indicates a high number of employees between the ages of 22 and 38. The second spike clearly indicates that a large number of employees will be moving into a retirement age in the next five to eight years, which will see a substantial loss of skilled operators.

Many employees born in the late 1940s, up to 1964, or so-called 'baby boomers', are beginning to retire in groups. The problem with this is that it will cause the costly loss of time, skills, experience and relationships every instance knowledgeable workers retire. The graph above indicates that the next five to eight years will see the majority of the operating team approaching retirement. This will beget the requirement to start transferring these valuable skills, knowledge and experience, ensuring that it is not inevitably lost.

Given the time lag between the demand for skills, experience and knowledge, and the inability of the skills transfer system to provide for the need on time, the company will continue to experience a skills shortage in the fast growing technical fields.

The detail below indicates the normal timeframe necessary to train the specific operators required within Eskom's operators division:

- Shift manager: Nine years;

- Senior controller: Eight years;

- Shift supervisor: Seven years;

- Unit controller: Six years;

- Assistant shift supervisor (SPO): Four years; and

- Plant operator: Three years.

This is indicative of the immediate requirement for the successful and timely transfer of valuable skills, knowledge and experience, to moreover groom the up and coming staff within Eskom's operating division.

1.3   MOTIVATION FOR STUDY

The current study is motivated by a vast shortage of skilled operators, which Eskom will be confronted with in the next three to five years. Various research projects were conducted throughout Eskom's operating divisions, all of which further substantiated the immediate requirement of skills transfer from seniors to juniors/trainees, with the sole intent of preventing the loss of these crucial skills. At the same time, cross-examinations were conducted amongst the trainers and operators, as well as the intermediate facilitators, with the intent to objectify and interpret the research from multiple perspectives. This research further validates the competency of the facilitators, who in turn, directly impact the skills transfer process from senior to juniors/trainees, amongst the current operators.

By evaluating the current process and identifying shortfalls in the skills transfer model, the researcher was able to single out and eliminate unnecessary practices, resulting

in a more effective and efficient process to minimize the amount of skills, knowledge and experience being lost as a result of the retiring workforce.

The primary purpose of this study was to establish a skills preservation strategy for Eskom's operating divisions, faced with the threat of losing the valuable skills, knowledge and experience of its current ageing workforce. Surveys were structured with the focus on aggregating imperative research on the current understanding of skills transfer from seniors to juniors through focus groups of current operators and future operating staff/trainees, with the sole purpose of identifying the inherent loss of valuable skills, knowledge and experience. Specific focus was aimed at the training staff and operating managers by means of individual surveys. This research was particularly informative, and as such presented multiple perspectives on the overall understanding of each demographic.

1.4   PROBLEM STATEMENT AND SUBSTANTIATION

The focus of this research was on how to do effective and efficient skills and knowledge transfer from senior employees to junior/trainee employees to ensure the effectiveness and reliability of all operations, as well as to cater for the wide range of needs that are required for the efficient running of the power station within the generation utility's division. It is essential that the operators' training needs are correctly identified in order to meet the business objectives effectively and efficiently at all times.

1.5   RESEARCH OBJECTIVES

Research objectives are divided into primary and secondary objectives.

1.5.1 Primary objective

The primary objective of this study was to investigate the preferred and most optimum way of skills and knowledge transfer from senior to junior/trainee employees within the operators' divisions, and subsequently the electricity generating industry.

1.5.2 Secondary objectives

To achieve the primary objective, the following secondary objectives were identified
- To formulate a hypotheses to determine the links between the different *age groups* and their *period of employment at Eskom*, against the four sub-scales (skills;

motivation of trainees; workplace/organisation climate; and management support for skills and knowledge);

- To critically evaluate the magnitude of the problem that Eskom will face with regard to the availability of skilled and qualified operators; and

- To identify critical restraints within the operators' division that consequently effect successful skills and knowledge transfer.

Also taken into consideration, but outside the scope:

- Transfer climate;

- Transfer reward;

- Continuous learning;

- Motivation to learn; and

- Organisational commitment related to the motivation to learn.

1.6   SCOPE OF THE STUDY

The study involved the process of effective knowledge and skills transfer. It primarily focused on two Eskom power utilities, namely Lethabo and Grootvlei power stations.

Lethabo has a generating capacity of 3600 MW, while Grootvlei's capacity is 1200 MW. Although the generating capacity differs, the manpower per site remains the same. The two power utilities are situated 80km apart, with Lethabo power station in the Free State and Grootvlei situated in the Mpumalanga Province. The research method used for the study is briefly discussed below. In order to reach the above objectives, the following hypotheses will be tested:

The link between the different *age groups* against the four sub-scales (skills; motivation of trainees; workplace/organisation climate; and management support for skills and knowledge) and *period of employment at Eskom*, against the four sub-scales (skills; motivation of trainees; workplace/organisation climate; and management support for skills and knowledge).

1.7 RESEARCH METHODOLOGY

The research methodology used consisted of two phases, namely an empirical study and a literature review. Both were used to conduct the research for this study. A review of the research design and mechanisms used is provided.

1.7.1 Empirical Study

The empirical research set out the research questions, sample, sample size, participants and sample technique. The study also took into consideration the formulation of the hypotheses and measuring instruments. According to Hani (2009:2) empirical research is based on observed and measured phenomena and also derives knowledge from actual experience instead of from theory. Data collected in such a manner is referred to as empirical evidence. Key focus areas examined in the empirical study were the current level of skills and knowledge available, as well as motivation for skills transfer and shortfalls within the current transfer model.

1.7.2 Literature Review

The literature review largely covers peer-review journals from databases and search engines, such as SACat, Nexus, SAePublications, EbscoHost, Premier, Science Direct, Emerald and the North-West University's online library, for conducting open literature.

Some of the proprietary information, such as employee statistics, was used to a limited extent to formulate the research, by identifying the existing shortfalls within Eskom's current skills transfer process, from senior to junior/trainee employees.

1.7.2.1 Research Approach

According to Cameron and Price (2009:213), quantitative data gives insignificant practical advantages, because a researcher can draw conclusions related to a wider sample group.

The methodology used for this research dissertation, was a quantitative approach as opposed to a qualitative approach. The selection of this approach was influenced by the nature and sample of the data. In obtaining data for the study, questionnaires were identified as the most applicable method.

Mansourian and Madden (2007:97) state that quantitative research is research dealing with numbers and figures. Amaratunge *et al.* (2002:24) state that quantitative methods can be used to allow statistical testing of the strength of such a relationship.

This approach offered the researcher the flexibility to use the structured data gathering methods necessary to capture the experiences of people who were involved in the research topic.

1.7.3 Participants

Participants who took part in the study were mainly trainee students and shift workers. The shift workers were employed in the operating department, and were employed by either Lethabo or Grootvlei power stations. Shift workers work on a rotational basis, with three eight hour long shifts plus a ten minute period to do the handover of the shift. This happens during the morning, afternoon and night shifts, each shift covering a 24 hour period. In total there are five shifts, with three shifts covering a 24 hour period, one shift for training/standby and one shift for a rest period. The shift workers can be divided into four groups, namely assistant plant operators, unit controllers, senior unit controllers and shift supervisors. The students taking part in the training were from a group of first year students doing class room training, to final year students in the process of being authorised operators. The participants were a mixture of males and females, and consisted of different ethnic groups.

1.7.3.1 Research Strategy

Permission had to be obtained from both power stations' managers (Lethabo and Grootvlei) to engage with the employees to fill out the questionnaires. A five scale Likert questionnaire was used as a data collection tool in this research.

1.7.3.2 Data collection

Data was collected by means of questionnaires. Questionnaires were distributed to trainee students, operators, operator training staff and two operating managers. The operators' questionnaires were personally handed out to the participant operators at the beginning of the shift and collected at the end of the shift. The questionnaires were handed out to the students during their class room training, and time was allocated to them to fill it out. These were collected immediately. This provided the researcher with

the opportunity to explain the purpose of the study and clarify any questions and concerns from the questionnaires to the individuals.

Amaratunge *et al.* (2002:28) stated that data collected should be a prearranged assembly of information from which results and findings could be drawn. The questionnaires gave the views of the respondents on knowledge and skills shortages and different methods of training.

1.7.3.2.1 Instruments

The instrument used to collect the primary data was a five scale Likert questionnaire. The tool was chosen because of its numerous advantages:

- Each respondent received the same questions;

- The process was identical for each respondent;

- Another advantage of a questionnaire is that it reduces errors made by an interviewer while recording the responses; and

- The questionnaire guarantees confidentiality, therefore the respondents act without any fear of embarrassment or victimization.

The questionnaire was designed to be simple and thus the questions were straightforward. The questions were divided into three segments:

- Section A – General information (demographic information);

- Section B – Multiple choice Likert questions; and

- Section C – Open-ended questions.

1.7.4 Data analysis

SPSS and STATISTICSA statistical programs (SPSS Inc, 2007; Statsoft Inc, 2006) were used to capture and analyse the data in this study with the help of the Statistical Consultation Services of the North-West University. Descriptive statistics (for example, means and standard deviations) are used to analyse data. Cronbach's alpha coefficients are used to determine the internal consistency of the research instrument. Spearman's rho correlation coefficients are used to detail the relationship between the

variables. The correlation is practically significant at (p<0.05). Cohen's effect sizes (1988:15) are used to ascertain the practical significance of the findings. A value of 0.30 (medium effect) and 0.50 for (large effect) are set for practical significance of correlation coefficients. The t-Tests were employed to identify differences between the groups in the sample. For effect sizes, Cohen (1988:15) and Steyn (1999:12) were used in addition to statistical significance to ascertain the importance of relationships. Effect sizes indicate whether results obtained were practically significant.

1.7.5 Strategies employed to ensure quality data

- *Pilot study*

A pilot study was conducted prior to the main study in order to correct any ambiguities, while also presenting an opportunity to refine the questions in the questionnaire. According to Lancaster (2004:310), a pilot study is a small experimental study that is done to test the data that is gathered, to ensure that what is measured is exactly what the researcher wants to measure, before a large study is conducted, so as to ensure that data is accurate and usable. The participants, who took part in filling out the pilot study, also completed the final questionnaire.

- *Transferability*

Through detailed description, the readers were afforded an opportunity to make decisions regarding transferability. This would enable them to transfer information to other settings and to determine whether the findings could be transferred because of shared characteristics. In addition, the sample was extended to the average workforce, allowing the results to be easily transferred to rest of the organisation.

Statistical methods in the form of Cronbach's alpha coefficient and Factor analysis were also used to test the reliability and validity of the data. Oppenheim (1992:51) stated that reliability can be measured in two ways, namely the parallel form method and the internal consistency method. Reliability of data is achieved when results are found to be consistent (Then, 1996:19). Validity can be broken down in two parts, namely content validity and criterion validity. Content validity is a measuring instrument measuring the full content, while criterion validity is when the researcher uses the instrument to predict an outcome which is external to the test (Bless & Smith, 1995:21).

1.7.6 Reporting

A scientific reporting style was used to deliver the findings of this research. Scientific explanations aim to be formal, logical and where possible, mathematical. The report is paradigmatic and logico-scientific in mode of thought.

1.7.7 Ethical considerations

- Participation in the study was voluntary. Participants were given an option to abstain from the study should they wished to;

- Respondents remained anonymous and thus could not be identified;

- Individual information was be kept confidential;

- Participants were fully informed about the research objectives;

- All the possible ethical implications that could have had an influence on the research were considered.

1.8   CONTRIBUTION OF THIS STUDY

The ultimate goal of performing this study within the operating section was to use the findings as a base for the development of a skills and knowledge transfer.

1.9   LIMITATIONS OF THE STUDY

The study utilised a sample size of only 91 participants, therefore future studies should include a much larger sample in order to increase the validity and reliability of the results. The study methodology used, was quantitative. The following were found to be limitations to the study:

- Unavailability and unwillingness of the operating participants to participate in the study;

- Limited access to secondary data, due to poor data capturing (for example, Human Resources' records for the strategy to pipeline new operators).

1.10   LAYOUT OF THE STUDY

The following layout was used for the dissertation, it comprises of five chapters.

Chapter 1: Introduction and nature and scope of the study

This chapter outlines the foundation of the study. In addition, it discusses the background of the company in which the study was conducted. It includes an introduction, background, problem statement, objectives, research questions, methodology, validity and reliability, significance of the study, limitations and ethical considerations.

Chapter 2: Literature review

Chapter two discusses the definitions of key concepts, followed by a literature review that focuses on skills and knowledge transfer, as well as factors affecting skills and knowledge transfer. It also focuses on the current model that Eskom is using to transfer skills and knowledge, and touches on gaps that have been identified in the current transfer model.

Chapter 3: The research methodology

This chapter outlines the research design, which was based on both qualitative and quantitative analyses. The population on which the research focused, the sample size, the data collection method, as well as the analysis of the data are mentioned. The method of ensuring the validity and reliability of the research is also discussed.

Chapter 4: Research results and discussion

In this section, the empirical findings from the qualitative and quantitative studies that was done in the previous chapter, were interpreted, by using the completed questionnaires. It was further summarized in tabular and graphical formats.

Chapter 5: Conclusion and recommendations

In this chapter, conclusions and recommendations were drawn from the research study, and outlined from the results that were obtained from the questionnaires.

1.11   SUMMARY

An introduction which focused on the nature and scope of the study was outlined, with the purpose of providing a clear understanding of the entire study. The theoretical background, problem statement, research objectives, research methodology, expected contributions, and limitations were further mentioned. In the next chapter the overview of Eskom's current training processes are addressed, followed by the literature review of the study. Thereafter, both are compared and identified shortfalls within Eskom's current transfer process are brought to light.

CHAPTER 2:   LITERATURE REVIEW

The diagram below depicts the structure of this chapter

Eskom's background
and current situation

Role of facilitators:
• Support before, during & after
• Learner readiness
• Motivation to learn

Learning:
• Learning transfer
• Learning in the
  Organisation

**Impact of loss of
knowledge and skills**
with retirement

**Skills and
Knowledge
Transfer**

Knowledge:
• Definition
• Different types of knowledge

Motivating and engaging
a **multi-generational
workforce**

Skills:
• Definition
• Different types of skills

Role of expatriates in
knowledge and skills
transfer

**Factors affecting knowledge and skills
transfer:**
• Other variables
• Socio-centric approach
• Culture-centric
• Knowledge and skills stickiness
• Willingness to share knowledge and skills

Figure 2.2:   Overview of literature review

2.1 INTRODUCTION

The moment experienced employees leave an organisation as big as Eskom, their expert knowledge, skills and accrued experience leave with them as well. Consequently, this further worsens the ongoing challenge the organisation encounters, as it faces a sudden rush in inevitable retirements. It can take many years to successfully transfer these critically imperative skills and knowledge, developed through long years of service and experience on the job, from managerial operators/seniors to their prospective juniors/trainees. It can take up to eight years for an employee of Eskom to develop the necessary knowledge and skills required to become an operations manager. Furthermore Eskom may be anticipating a shortage of knowledge and skills within the operating divisions as the experienced operators reach retirement. The biggest risk of losing these critical skills and knowledge is that, as these employees leave, the possibility of developing the potential juniors/trainees efficiently, also disappears, resulting in weak links in the operators' workforce. This situation then poses potentially dangerous risks to Eskom's capacity generation and the general safety of Eskom's workforce. This chapter explores the different types of skills and knowledge transfers, the current transfer methods and the crucial factors that directly affect a successful transfer process, all of which need to be clearly understood as part of the holistic effort to interpret and further build on a tried and proven transfer model.

The fact that it is no secret that the ageing workforce phenomenon is a universal topic has been explored thoroughly in the previous chapter This chapter further explores the nature and scope of the direct and indirect affects that the loss of valuable skills and knowledge has on the potential juniors/trainees, and how this subsequently relates to their overall efficacy in their everyday environments. Additionally, the researcher focused on minimizing the uncertainty that is created by the threat of these lost skills and knowledge, with the forthcoming retirements and resignations of the current operating managers.

The following topics are explored in this chapter:

Background: To elucidate the problems caused by the lack of available skilled personnel and training processes;

- **Definitions**: General definitions of the operating division designations and their respective responsibilities;

- **Learning:** Learning transfer, styles and gaining experience in the organisation are detailed here;

- **Knowledge and skills transfer:** Definitions, types and classifications, background, other variables, and factors affecting the process - all focusing on the general subject of skills and knowledge transfer; and

- **Common elements identified around skills and knowledge:** From stickiness through to the impact on loss of knowledge and skills with retirement, have been addressed.

2.2   BACKGROUND

Prior to 1970:

Trainees used to be employed from as early as standard eight, regardless of their qualifications or lack thereof. Furthermore, there was no official training system in place at the power utilities. The newly employed individual was placed on a shift with an operator, making it the operator's responsibility to train this individual for taking over a specific job (a specific plant area). A senior shift supervisor and his assistants would test this new employee on a weekly basis until this individual was deemed competent on the plant that he or she would be responsible for - at this stage, shift managers had not yet existed. The individual who trained this new employee would then be promoted or placed in a new plant area where after the entire process would repeat itself.

The drawback of the above system was that the 'hands-on skills' of the operators were high, but their technical knowledge was limited to what their fellow operators had trained them on and how it was done. Normally an operator remained in a specific plant area or position for many years, sometimes even until retirement.

Good performers and suitably qualified individuals were sent to a training centre at Klip Power Utility, for plant training. This used to be run by two ex-managers – of the power station, who did advanced power plant training. On recommendation of this training centre and the local power utility manager, the trainee would then be allowed to be developed as a shift supervisor for a plant area and later as a senior shift supervisor.

1970 to 1994:

Due to the rapid expansion of Eskom's staff, skill requirements became an issue for filling all the gaps. Eskom's training centres were at Klip Power Utility, a simulator at Henley-on-Klip and the Eskom Training Centre in Midrand. When Midrand started operator training, the other two centres closed down.

Power utilties formed their own operator training centres that focused on plant knowledge. *On shift* trainers were appointed to control the quality of *on job* training and these formed part of the competency declaration of an operator.

Station specific job descriptions, minimum skills requirements and job output models were put in place to control the quality of the operating staff. Eskom had its own training recognition board for setting standards (EAITB). During this time Eskom also started to appoint managers and assistants for every section, instead of getting better control, control was lost as the area of responsibility was not clear or properly demarcated.

With the change of Government in 1994:

The shift mentors and coaches disappeared. Minimum job requirements, job output models and specific job descriptions became non-existent. Selection of staff for promotion was not done according to the skill or ability of an individual but rather according to qualification, race and gender. With no shift mentors/coaches on shift, the quality of operators continues to spiral downwards.

The current Eskom training situation

The training comprises of three different phases, namely initial, refresher and future development. Focus was given to the initial and refresher phases, as these were pertinent to the subject of the study.

- **Initial**

  - Initial can be broken down into three sub-phases, namely practical, classroom and workplace experience (6 months). The current operator training process for this phase is included as Appendix B.

- **Refresher**

  - Refresher training consists of a single phase, being the closing of the skills gap resulting in competent operators.

- **Future Development**

  - Future development is the improvement of general management and technical skills to make employees more eligible for promotions.

Learners are recruited form the public sector within the Grootvlei area – Balfour, Villiers, Heidelberg, Standerton, Nigel and in some cases Frankfort, Vereeniging and Brakpan.
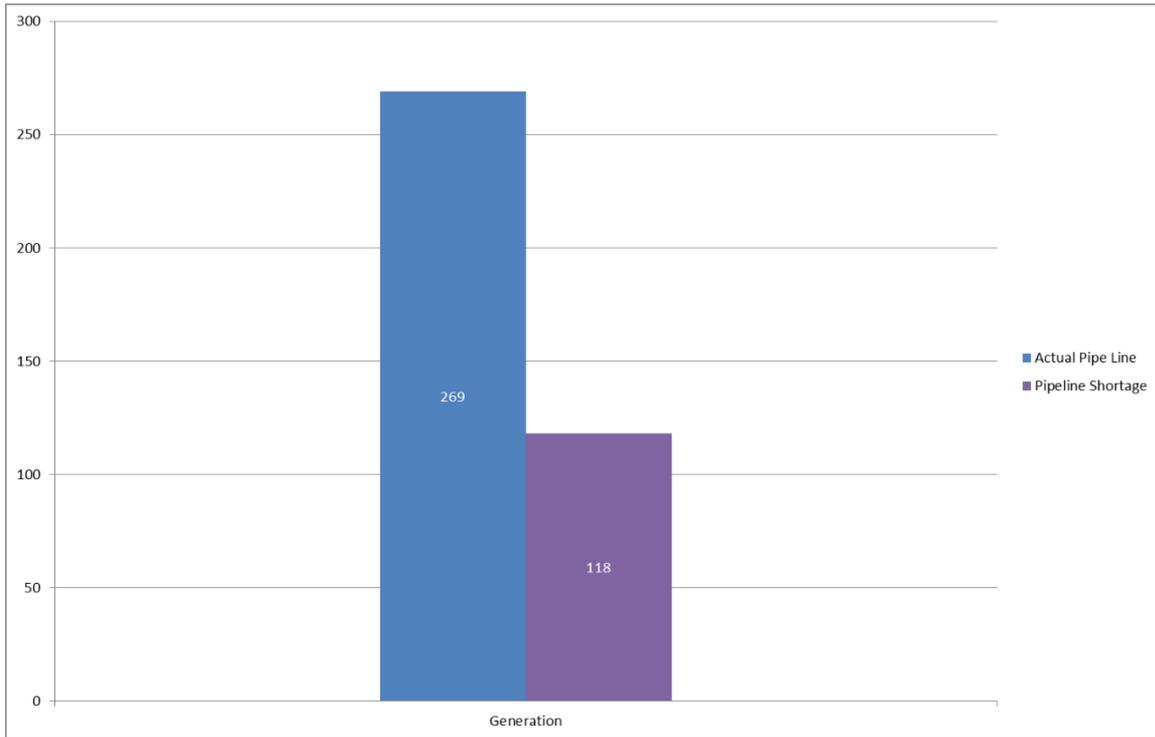
Figure 2.1:   Operating pipelining for generation division

There is a substantial amount of retiring operators on a yearly basis within the generation division of Eskom. This in turn, poses the risk of vacancies which Eskom's generation division cannot afford. As a result, Eskom has devised a pipelining strategy to ensure that these risks of vacancies do not emerge. The result is a perpetual stream of young operators being pipelined for the generation division within Eskom (13 power utilities), with the sole purpose of ensuring a constant amount of operators to run the operating divisions. Figure 2-2 indicates that there are currently 269 operators in the pipeline, with a concerning pipeline shortage of 118 trainee operators for the generation division.
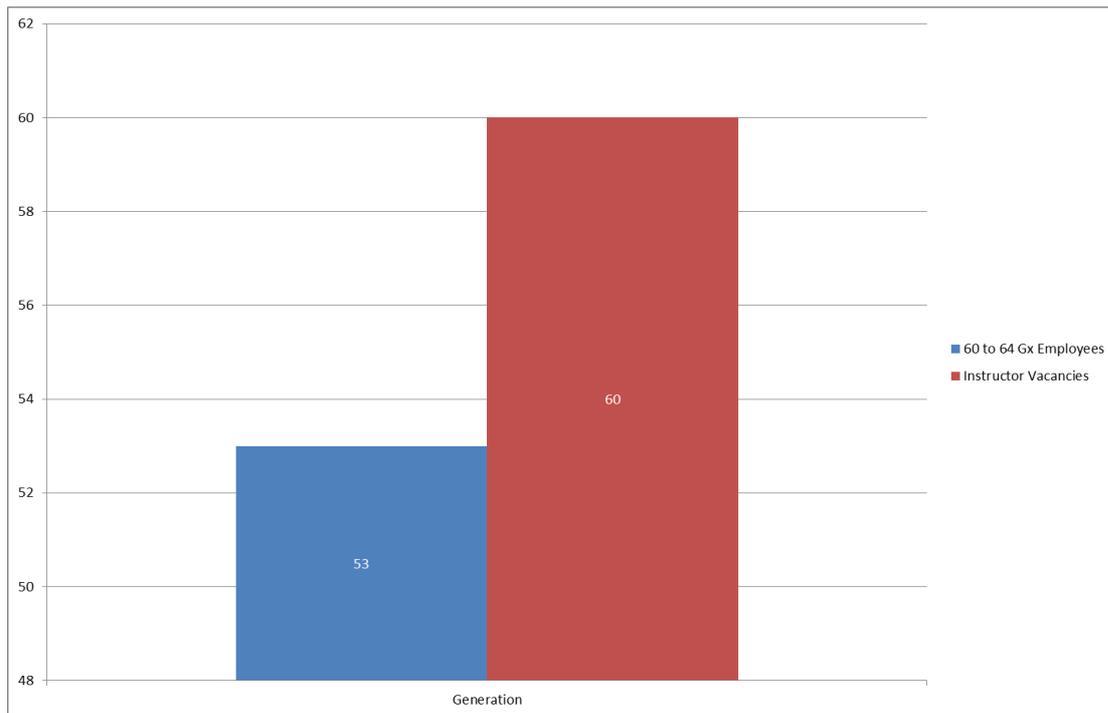
Figure 2.2: Generation facilitators

Figure 2.3 indicates the current facilitator risk that Eskom is facing within the generation division. A total of 53 current facilitators are between the ages of 60 to 64, meaning that they are on the brink of retirement. Subsequently, there are currently 60 facilitator vacancies within the generation division. This is concerning as it plays a pivotal role in the adequate and efficient transfer of skills and knowledge.

2.3   GENERAL DEFINITIONS

Operating manager*:* a person authorized to be accountable and responsible for the competencies of the people under his/her control.

Operating training co-ordinator: a person appointed in the operator training fraternity, who is responsible for the co-ordination of learning delivery and assessment processes and the compliance thereof for accreditation requirements.

Training manager: the person responsible and accountable for the maintenance of the accreditation of the training centre, that all training activities comply with the accreditation requirements, the smooth operation of the training centre, and that the buildings and assets under his/her control are maintained in a good state of repair.

2.4   LEARNING

Learning in general is one phenomena people tend to take for granted. Most people assume that they are aware of the definition of learning and what the scope of learning entails. In the majority of instances, the teacher will impart the information and automatically assumes that the learner has grasped it. Therefore the assumption is made that learning has indeed taken place, while in actuality, no information could have been received by the intended learner. What can then be defined as learning?

According to Wills (2006:1), learning is defined by a process which should ensure that the intended individual is able to increase his/her choices of exhibiting a noticeable change of behaviour that directly benefits him/her. Further, Holton (2005:45) explains learner readiness as the length of which most people are willing to comply and add to in the learning process. Leimbach and Emde's (2011:66) research at Georgia-Pacific also indicate that a learner has to be willing and ready to learn if they want a successful learning experience. In addition, they advise that the training outcomes are revealed to the employees prior to the commencement of the training, as this directly impacts their willingness to contribute to the knowledge and skills transfer process, positively motivating their overall outcome. Maier *et al.* (2001:4) affirms that the general definition of learning can be defined as a process by which somewhat lasting changes occur in behavioural potential as an immediate result of experience.

This definition merges lasting changes in the comportment of a person who has endured learning from experience. A learner's behaviour can further validate the successful accumulation of experience through the learning process. Post going through this learning process, the individual should start to exhibit a different pattern of habit compared to the way he/she had been doing it before. If no noticeable change has occurred, it further implies that the individual has not absorbed anything, and in basic principle the process has been a futile exercise.

For the purpose of this study, the accepted definition of learning is the perception of learning as a process that results in a noticeable change in behaviour. To summarize the principles of learning using Wakwabubi's (2011:120) terms; it poses the need for a holistic approach to be adopted, which further recognizes that employees require an incentive to learn. Therefore organisations need to make provision for constant learning and influential dynamics need to be acknowledged and adequately dealt

with. Internal policies need to appeal and respond to cultural realities on the ground, and more importantly, information flows need to be vigorously supported. Chowdbury (2006:72) indicates the pivotal point that: "Learning is a personal act. We each place our own personal stamp on how we learn, what we learn and when we learn". The basic need to learn has to be innately motivated and the external environment which will add progress to what an individual endeavours to accomplish, has to be monitored.

2.4.1 Learning transfer

Childs and Heavens (2001:309) characterise, learning in terms of processes and outcomes. They maintain that: "Learning refers to both the process of acquiring new knowledge and the outcome. The outcome of learning is the acquisition of a new competence: an ability to apply new knowledge to enhance the performance of an existing activity or task or to prepare for new circumstances and thus change in the future".

The process is just as important as the outcome, in that the process alludes to the system of acquiring the knowledge, be it through perception, tutoring or taught by a facilitator, whilst the outcome is the actual ability or capability one has gained that empowers one to have any kind of effect, either in one's life, in one's surroundings or among those one is interfacing with. The outcome should, in this manner, display the adjustment in one's conduct through what one has realised.

Kirkpatrick (1998:20) defines learning as "the extent to which participants change attitudes, improve knowledge, or increase skills as a result of attending a training program". Steensma and Groeneveld (2010:325) further add to this definition by depicting learning as a precise securing of aptitudes, guidelines, ideas or states of mind that ought to eventually bring out enhanced execution.

Pritchard (2010:308) believes that it is independent of whether associations are looking to expand on individual, group or authoritative qualities, or attending to particular loopholes in information, ability and behavioural applications. Either way the learning procedure ought to be seen as a journey whereby new data is obtained through the basic purposes of the learning engagement.

The propositions discussed in the introduction namely, that business associations require suitably talented and educated workers, both to adjust to innovative

advancements, the business sector or product changes, and to guarantee progress in the rising worldwide business environment. These are all legitimate inspirations for associations to utilise learning as a key operation to guarantee supportable organisational practicality.

While this proposition may seem self-evident, there is a basic idea that learners of regular intelligence hold almost none of what is exchanged to them and do not identify with the adequacy and productivity of learning, or the learning transfer process. It is a perspective held by numerous researchers and theorists - that learning transfer in formal customary classroom training is ineffective and inefficient, to the degree that learners will, in the best case scenario, retain at the most 20% of what they are taught. The veracity of this statistics is however sketchy, despite the fact that the recommendation of this kind of learning transfer is wasteful and hard to disprove. As an outcome, learning exchange as a development, has been incorporated into the default model to test the veracity of articulations.

In conclusion, the idea of making something through learning is also encapsulated in Senge's (1990:14) explication of the essence of learning, when he expounds that: "Real learning gets to the heart of what it means to be human. Through learning we recreate ourselves. Through learning we become able to do something we never were able to do. Through learning we extend our capacity to create, to be part of the generative process of life. There is within each of us a deeper hunger for this type of 'learning'. Linayage (2002:528) provides us with the most exhaustive meaning of learning. She affirms that: "Learning is an interactive process of action and reflection. It also involves acquiring skills, developing technological expertise, knowing the how's and why's of the process and understanding the information and knowledge needed to develop a firm's competencies". The intuitive viewpoint is more educational in that it shows that one must be part of a learning process that includes either different people or gatherings or even innovations, so as to obtain the discovery that one craves. This is a functional definition that emphasizes the utility component of learning inside the setting of the knowledge an organisation processes, thus enhancing its competencies. She further asserts that learning ought to be likewise imagined as an organisation's 'absorptive capacity'. In basic terms, learning shows the degree to which an association is fit for retaining information and using it to its competitive advantage.

2.4.1.1 Different learning styles

Every person has his/her own unique way of learning, resulting in different learning styles. According to Ferriman (2013:2), these learning styles can be divided into seven different types, namely visual, physical, aural, verbal, logical, social and solitary. In reality, we all fall into each of these categories, depending on the learning that is taking place. The seven different types of learning styles are briefly detailed below:

Visual: People who refer to images, mind maps and diagrams;

Physical: This is "learn by doing", using physical objects and some role playing;

Aural: The use of sounds, recordings, rhythms and music;

Verbal: People who prefer to use words, both in speech and writing to assist with their learning;

Logical: People who prefer using their logic to make sense of the training and to understand the reason behind the training;

Social: People who prefer working and studying in groups, and aim to work with others as much as possible; and

Solitary: People that prefer to do self-study and learn on their own.

When learning material is created, emphasis should be on using as many different learning styles as possible, not only will it be helpful for the learner, but it will assist with retention of the learning material.

2.4.2 Learning in the organisation

What constitutes organisational learning? There are different meanings of this phenomenon held forth by different researchers. According to Rick *et al.* (2007:18), organisational learning involves the creation, maintenance and the transfer of knowledge from inside, as well as from outer sources.

The concept of a 'learning organisation' is synonymous with the 'becoming of organisations', as perceived social entities. It has dependably been an adequate actuality that individuals from an association will, at some point, take part in some type of learning. Spencer (2009:38) offers the accompanying clarification about the

centrality of learning in organisations: "Workers have always learned at work, learning at work is not a new phenomenon. What workers learn though has always been diverse – for example, it ranges from learning about the job and how to do the work; to how to relate to fellow workers, supervisors and bosses (the social relations of work); to gaining understanding of the nature of the work itself and how the work impacts on society". Some part of what workers learn is useful to their employers, some of it is useful to themselves some of it is useful to their union organisations while some of it may be useful both to their employers and themselves.

The main perceivable test for this statement is that learning in such a situation is definitely not a cognizant choice made by the organisation, to methodically incite a culture of learning and guarantee that the learning culture is joined by an attending distribution of adequate financial resources, to empower learning. A learning association is relied upon to encourage a spirit of joint effort between all its information resources, and boost the use of its abilities, capacities and advancements in a situation that is not obliged by the ideas of geology, separation, time and space.

Verma *et al.* (2006:7) suggest that preparation in organisatons must result in successful and effective learning so as to guarantee that they benefit from the large investments that they make in the learning procedure. This is on account of the company's interest that learning expands the capabilities of workers, through them acquiring new knowledge and their skills that are adjusted to undertaking the prerequisites of new technologies.

Bhatti and Kaur (2010:670) support this perspective while expressing that learning is comprehended as standing out amongst the most critical human resource techniques that will in general upgrade organisational, and specifically, employee productivity. This statement must be considered in the context of present day associations, functioning in a rapidly developing information-based environment, which causes uncommon difficulties for workers who are always confronted with the need to grow new aptitudes and procure new learning.

Learning in organisations is more commonly viewed as a procedure of enhancing hierarchical performance, through the improvement of skills and knowledge of pertinent workers. It is additionally comprehended that, for the biggest part, employees do not learn in a vacuum, but that the procurement of new knowledge and skills

happen inside the context of a group of employees. This recently procured knowledge and skills become entrenched in the employee by checking the suitability, pertinence and connection of what he or she has learned, and relating the learning through interaction with different employees who have obtained it as well. Employees further conform their learning, in order to adjust it to what different employees have learned, and more particularly through the utilisation of what has been learned, supported by adequate confirmation, in the work environment.

The reason for learning in an organisation, which improves itself by turning into a learning organisation, is that employees assume collective liability for figuring out how to guarantee the transference of indispensable information required for organisational success.

In particular, such an organisation needs to put a considerable measure of accentuation on the strengthening of its human resources in order to have the capacity to adapt to the condition of ceaseless change. Gibson *et al.* (2003:487) clearly state: "The sharing of knowledge, experience and ideas ultimately becomes a habit in a learning organisation". On the other hand, it has been noticed that individual employees from an organisation may learn, but that learning might not relay into a learning organisation. In this way there may be no behavioural change displayed in the organisation (Starbuck & Hedberg, 2001:332).

The embodiment of learning inside an organisation, is to bring together all the knowledge at the organisation's disposal. This is intended to guarantee a steady stream of knowledge that tries to enhance the productivity and viability of the operations of the organisation.

It is indicated by Nikandrou *et al.* (2009:265), that the primary point of learning in organisations is to guarantee that they acquire the important knowledge and skills required to accomplish their objectives of manageability, benefit and global competitiveness. They further need to guarantee that these abilities are implanted in their key assets, specifically their employees. Aligned with the perspective that a definite objective of learning is the securing of knowledge, skills and business related capabilities, and the perspective that learning is reliant on the positive observations and mentalities of both representatives and administration. The reason being that

learning ought to be deciphered into the practical application in the work environment by guaranteeing that doors are opened and support is available for these applications.

2.5 KNOWLEDGE AND SKILLS TRANSFER

Knowledge and skills transfer is characterised as a procedure of recognizing and retaining knowledge and skills that currently exists in the organisation, and obtaining as well as applying it to improve the authoritative execution and supportability in both short- and long-term planning. It incorporates the transfer of knowledge and skills at more dependable levels, for example amongst the facilitators and within the operators' divisions. Knowledge and skills transfer in organisations is the procedure by which a single unit (e.g. group, department or division) is influenced by the experience of another unit (Argote & Ingram, 2000:151). Knowledge and skills transfer is further characterised at the individual level as how knowledge and skills procured in one circumstance, applies or neglects to apply to another. It is contended that despite the fact that knowledge and skills transfer in organisations includes exchanges at the individual level. The issue rises above the individual level to incorporate transfer at larger amounts of examination. This struggle of knowledge and skills transfer is what is alluded to as "knowledge and skills stickiness" as stated by Szulanski (2000:24). This stickiness essentially suggests that knowledge and skills are not a simple process to exchange starting with one individual, then moving onto the next. Stickiness means challenges experienced in the transfer process. Knowledge transfer in organisations shows itself through changes in the knowledge or execution of the beneficiary units (Argote & Ingram, 2000:151). Accordingly, knowledge and skills can be gauged by measuring the changes in knowledge or execution. Nonetheless, it is contended that organisations generally are not aware of all that they know. Von Hippel (1994:89) proposes that this is on account of internal transfers of knowledge and skills as opposed to flexibility, and is regularly "sticky", or hard to accomplish.

2.5.1 Definitions

2.5.1.1 Definitions of knowledge

This study deals with the following key questions.

Firstly, what amount of knowledge has been transferred from the seniors/operators to the juniors/trainees and therefore, to the organisation?

Secondly, in what manner would the organisation be able to extend or widen the knowledge that has been successfully transferred, if just individuals or employees and not the organisation have positively gained from the transfer of knowledge?

These questions are paramount if one considers the connection between the value of knowledge transfer and production of a competitive edge for an organisation.

This sentiment is further asserted in the statement expressed by Cong and Pandya (2003), whereby they confirm that: "As knowledge transfer is increasingly recognized as a source of value creation, organisations have come to identify knowledge management initiatives as strategic facilitators of competitive advantage." Nonetheless, the definition of knowledge transfer is just as important at this pertinent stage.

Knowledge transfer could be characterised as exercises that are attempted with the primary intent to shift knowledge from the individuals who have it to the individuals who need it (Zarinpoush *et al.,* 2007:3). As a result thereof, there is definitely bound to be at least one unit of the organisation that will positively gain from the knowledge that has been moved between the two relevant parties. Ladd and Ward (2002:3) explain this as "nominally concerned with the process of moving useful information from one individual to another person. Notably, in order for this transferred information to have utility, it must be critical in the success of the organisation". Rick *et al.* (2007:01) articulated similar sentiments too. They maintain that: "Knowledge transfer at the organisational level is typically characterised as a situation in which one organisational unit is affected by the experience of another unit". Levine and Gilbreth (1998:12) concur that it is the movement of intelligent ideas from one part of an organisation to others, so as to guarantee its use, and in this way enhance the value of ideas that have additionally been recognized by other researchers. It would without a doubt be perceived in this manner, that at this level of cooperation in this circumstance, it is portrayed by the intra-organisational transfer of knowledge that is of further symbiotic advantage to multiple different units. All of this aids the organisation in its journey to enhance organisational learning, and henceforth overall performance. The degree to which this knowledge is transferable and essentially transferred to the ready recipients, relies to a great extent upon a few components, one of which is the limit of the recipients when it comes to absorbing such knowledge, which Rick *et al.* (2007:3) commonly refer to as the "absorptive and retentive capacity".

This transfer assumes numerous forms and more often than not happens through methods such as internships, apprenticeships, discussions, affiliations, social and interpersonal interaction and simulations. Turban *et al.* (2006:28) and Davenport & Prusack (2000: 370), are all well in favour of unstructured strategies for knowledge transfer (for example, meeting in an organisation's cafeteria and taking part in casual chat), notwithstanding the established methods (for example, the long apprenticeship or encouraging a mentoring relationship), that are intended to guarantee that the receiver is guaranteed the acquisition of a substantial amount of detailed knowledge over an extended period of time. Davenport and Prusack (2000:90) contend that these casual talks are frequently seen by management as time-squandering, since they infrequently spin around sports, governmental issues and other such topics. On the other hand, employees do in the long-run discuss business-related difficulties, and suggestions or resolutions eventually emerge.

Davenport and Prusack (2000:96) similarly argue that organisations really need to think about making provision for spaces to accommodate these unplanned chats in order for them to thrive, as they extend themselves to unexpected findings and could produce smart ideas that have the ability to resolve long-standing issues. They additionally contend that there is an abundance of knowledge in organisations, nonetheless, the significant challenge is the problem that there is no assurance that this knowledge will be utilised or transferred to the individuals who need it most. The individuals, who are intended to directly gain from the process, should assimilate this knowledge, once their ability to grasp and understand it has been developed (basically, once they comprehend the knowledge that is being transferred, and they find themselves able to use it). Instruments that could be utilised to advance knowledge transfer intra-organisationally, incorporate receiving a percentage of the everyday and regularly practiced human resource strategies, for example, training and giving incentives for sharing or transferring knowledge, developing a structure that would encourage and cultivate knowledge transfer, and ultimately, supplying the perfect technology that would accommodate easy to understand methods for knowledge exchange (Levine & Gilbert, 1998:5).

2.5.1.2 **Definitions of skills**

A skill is the capacity to execute a specific task at a sure level of expertise, and therefore becomes a part of knowledge (Shah & Burke, 2005:50). Skills are connected to capabilities through education and training, Shah and Burke, (2005:51) further arrange general skills into common and specific skills. General skills are those standard capabilities that are used in numerous organisations, which can more effortlessly be obtained in the labour market. Particular aptitudes that are more occupation related are required in fewer organisations. The organisations which require particular skills mostly supply training for these skills, as they can only be learned in-house. In this study, the expression "skilled workers" alludes to those people who have a formal capability and no less than 3 years pertinent development of industry experience.

De Corte (2003:143) and Lewis *et al.* (2005:587) explain that skills transfer, is the transfer of knowledge, starting with one individual and moving onto the next, in such a way that it changes the conduct of the respondent productively. Skills are normally learned through perception and impersonation and have a tendency to mirror the exchange of tacit knowledge, e.g. an apprenticeship (Quink, 2008:38). In this study, the terms "knowledge transfer", "skills transfer" and "learning transfer" are utilised similarly, since the interest is with the capacity to perform a job on a particular level of specialised expertise in light of an employee's knowledge/skills and how those skills can be exchanged or shared, instead of the philosophical or epistemological contrasts in definitions. De Corte (2003:145) places skills transfer in two sectors, to be specific, preparation for future learning and productivity of learning results. Henceforth learning is gainful if knowledge can be used and kept up in the work environment (Burke & Hutchins, 2007:280; Bates *et al.*, 2012:549).

2.5.2 Types and classifications of knowledge

Frigo (2006:83) states that in order to study organisational skills and knowledge transfer and retention, the concept of knowledge needs to be explored initially. In the mainstream literature on knowledge management, knowledge is usually divided into two types: tacit and explicit knowledge.

2.5.2.1 **Tacit**

Polanyi (1958:78) refers to the intricate nature of tacit knowledge in this statement. This type of knowledge has a personal quality, meaning that it is difficult to formalise and further communicate - this is knowledge that resides in an intuitive realm. Nonaka (1994:16) indicates that tacit knowledge is derived from personal experiences, it is subjective and again, difficult to formalise. Nonaka *et al.* (2000:2) further explain that tacit knowledge is frequently learned through shared and collective experiences. Obtaining knowledge that is tacit in nature, requires participation, and is therefore more of a "hands-on" approach.

2.5.2.2 **Explicit**

Explicit knowledge can be articulated in words or numbers and shared in the form of data, scientific formulae, specifications, and manuals alike. According to Nonaka and Konno (1998:43), this type of knowledge can be readily transmitted among individuals, both formally and systematically. Knowledge that may be expressed in words and numbers primarily represents the tip-of-the-iceberg of the entire body of knowledge.

2.6 TYPES AND CLASSIFICATIONS OF SKILLS

A skill is the ability to carry out a particular duty at a certain level of expertise, and by doing that, forms a part of knowledge (Shah & Burke, 2005:50). Skills are connected to qualifications through education and training. Shah and Burke (2005:51) further divide skills into general and specific.

General skills are those non-exclusive competencies that are used in numerous companies, and can effortlessly be obtained in the labour market. Particular skills that are more job-related are required in fewer companies. The companies that require particular skills generally provide training for these skills, as they are learned in-house.

Skills levels can be broken down into three categories, namely skilled, semi-skilled and low level skilled. These can again be divided into sub-categories (Statistics: South Africa, 2014):

Skilled: Consisting of three sub-categories, namely managers, professionals and technicians.

Semi-skilled: Consisting of five sub-categories, namely clerks, sales and services, skilled agriculture, craftsmen and machine operators.

Low-skilled: Consisting of two sub-categories, namely elementary and domestic workers.
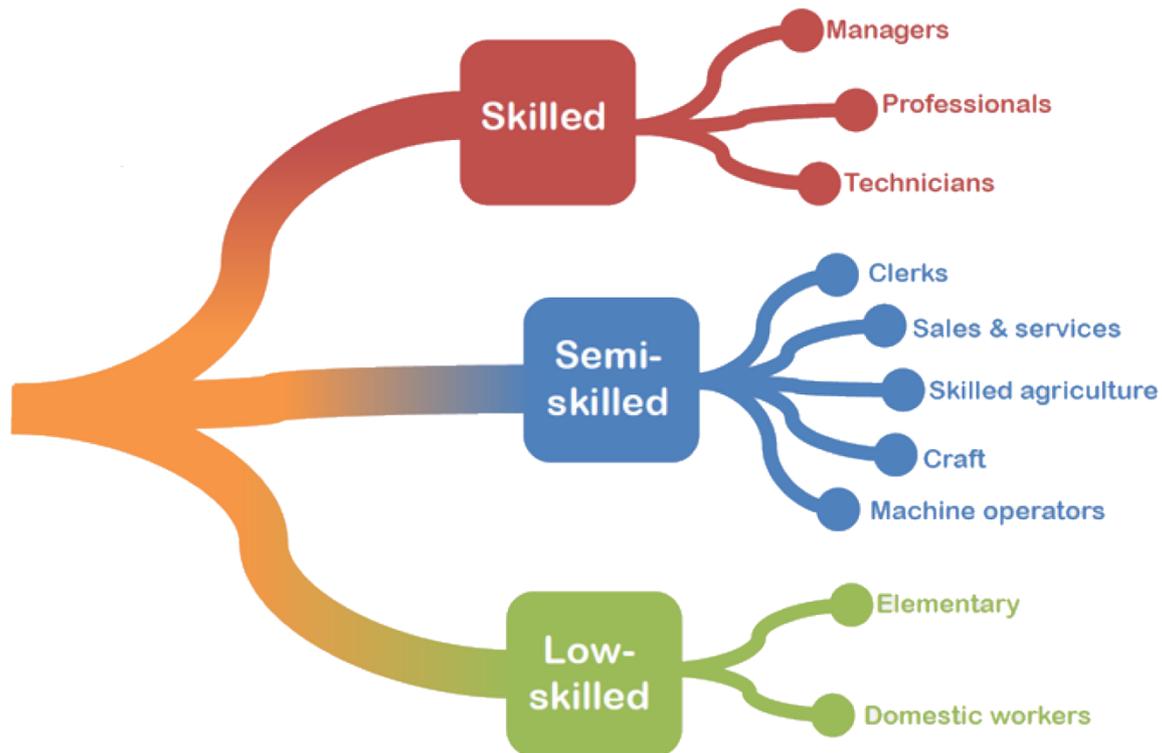
Source: Statistics South Africa, 2014

Figure 2.3:   Breakdown of skills levels by occupation

2.6.1 General overview of current skill levels in South Africa

In 1994 the total number of skilled people in South Africa was 8.9 million, consisting of 1.8 million skilled, 4.2 million semi-skilled and 2.9 million low skilled workers. The picture has however changed and in 2014. Twenty years later, a total number of 15 million people were skilled, consisting of 3.8 million skilled, 7 million semi-skilled and 4.3 million low-skilled workers. If the percentages of the increases in skills levels are calculated, skilled people increased with 108%, semi-skilled people increased with 66%, and low-skilled people increased with only 49% (Statistics: South Africa, 2014).

If the combined skills levels in South Africa in 2014 are examined, it shows that it consists of 25% skilled, 46% semi-skilled and 29% low-skilled workers.

To see a more complete picture of transformation, the trend within race groups need to be explored. If South Africa's black workforce is examined by doing a comparison between 1994 and 2014; skilled people increased from 15% to 18%, semi-skilled 42% to 48%, and low-skilled decreased form 43% to 34% (reduced by 9%). If this is compared to the breakdown for the white workforce according to skill-level, it indicates that between 1994 and 2014, skilled employees increased from 42% to 61%, semi-skilled decreased from 55% to 36% and low-skilled workers remained stable at 3%.
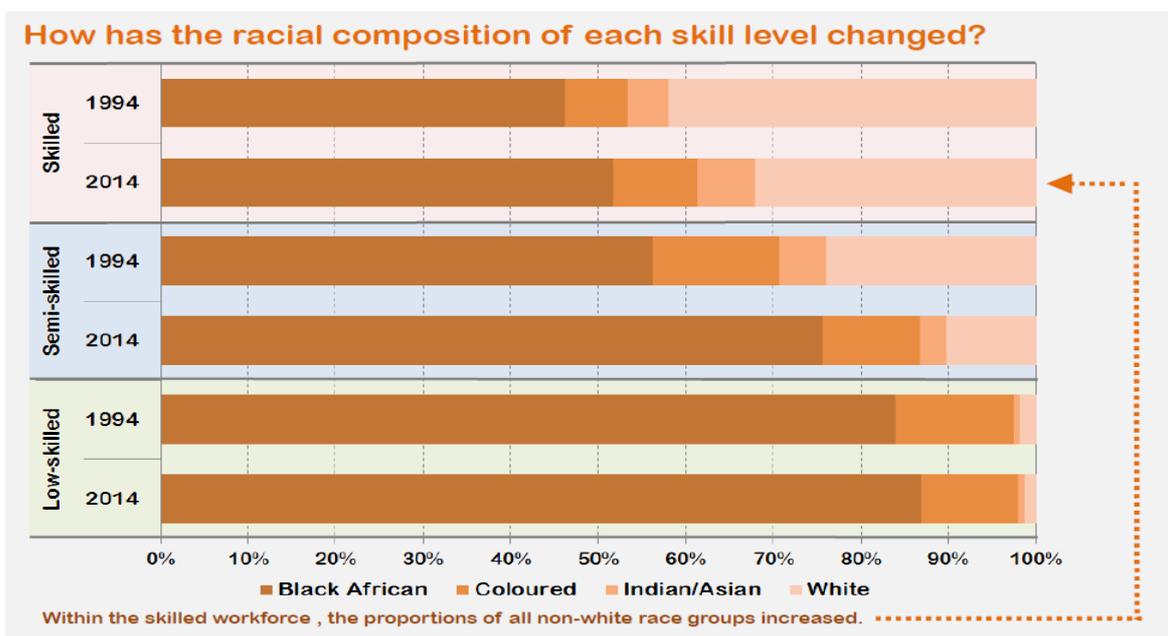
Source: Statistics: South Africa, 2014

Figure 2.4: Change in the racial composition of skills levels

We can conclude that, since 1994 there has been a small shift in the South African black workforce, towards more skilled and semi-skilled employment. Compared to the white workforce, it is noted that there has been a significant shift in the skilled work category.

If this data is broken down further, the following can be noted when examining the percentages of skilled workers in each age group:
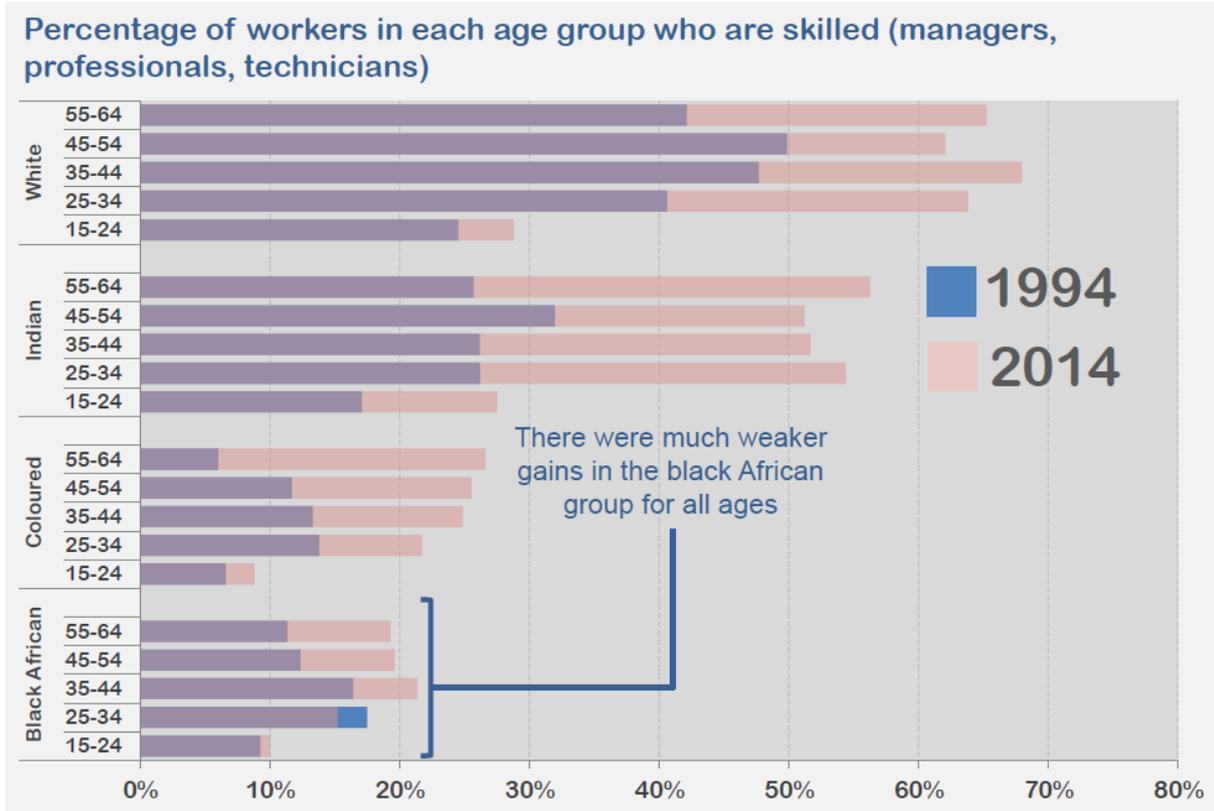
Figure 2-5: Percentages of workers in each age group who are skilled (managers, professionals, technicians)

Source: Statistics: South Africa, 2014

The percentages of workers in skilled occupations increased across all ages and race groups, except for black South Africans aged 25-34, which decreased.

From all the above data, it can be concluded that across population groups, the proportion of all race groups within the skilled workforce increased.

2.7   FACTORS AFFECTING KNOWLEDGE AND SKILLS TRANSFER

According to Sandhu *et al.* (2011:207) knowledge management and knowledge transfer are well-known subjects in the private sector, but the same cannot be said about this subject in the public sector. Syed-Ikhsan and Rowland (2004:101) note that there is a clear difference in the operating processes between the private sector and the public sector. This could lead to, as one would expect, employees reacting differently to knowledge and skills transfer sharing initiatives. Even so, the factors affecting skills and knowledge transfer are not expected to differ radically.

Syed-Ikhsan and Rowland's (2004:103) study found that there is a positive relationship between the culture of the organisation and knowledge and skills transfer. Zheng *et al.* (2010:765) did a study in the human resources field in the United States, which investigated "the mediating function of knowledge management in relation to organisational culture, structure, strategy, and organisational effectiveness". The study concluded that organisations' cultures have the biggest influence on knowledge sharing and transfer. From both studies it is clear that if a positive culture around knowledge and skills sharing is fostered in the organisation, it will enhance the knowledge and skills transfer process.

According to Pidd (2004:276), the level of skills and knowledge transfer to a learner is largely affected by the opportunity and capacity of learners to use and apply the newly acquired skills and knowledge and adapt it to their workplace activities. Broad and Newstrom (1992:114) are of the opinion that theoretical transfer will be enhanced by a co-operative partnership between the trainees and their trainers, supervisors and managers.

Vermeulen and Admiraal (2008:61) highlight that trainees might learn in one way, but may be required to apply the learning in a different context. The capacity to do this successfully introduces a barrier differentiating factor that, if trainees are not able to do this, will alter effective learning transfer. Studies done by Burke and Collins (2005:981) found that in order for learning to be transferred effectively and optimally from one situation to another, the tasks that are being learned, must closely match the practical reality. Furthermore, effective transfer will only take place if there is a correlation between the elements of learning and the task that follows.

According to a study done by Yao *et al.* (2007:60) within the Trade and Industry Department of Hong Kong, it was found that junior employees were very eager to learn and gain knowledge, and share their knowledge, at their own cost and time. A supporting factor was senior level employees being supportive of knowledge sharing, thus creating a supportive culture for knowledge sharing within the company.

A study done by Ruuksa and Vartiainen (2005:375), highlights the importance of a system that captures all knowledge in documentation and a database, according to a codifying process, and by doing so, creating a knowledge base for the organisation. By having a knowledge base available, the data will be easily accessible and can be

reused. Lopez-Nicolas and Merono-Cerdan (2011:503) state that when knowledge is codified, it is extracted from the person, made independent from that specific person, and reused for various purposes when placed on the databases.

The conclusion drawn from the above is that an unfavourable association atmosphere serves as a hindering component for learning exchange, as well as the aim of the employee to transfer the information to the working environment. Foxon's (1994:02) transfer model conceptualizes the aim of the employee to transfer knowledge as being subjected to repressing and encouraging strengths.
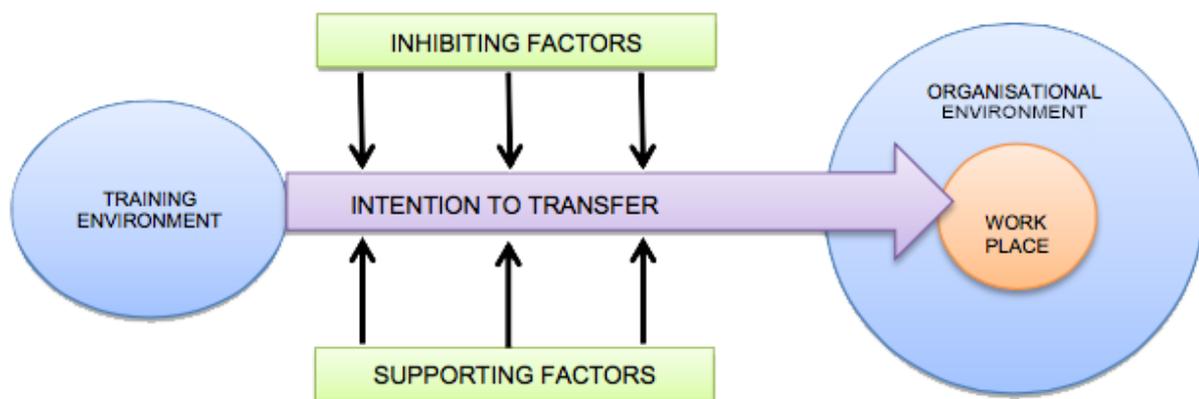
Source: Foxon, 1994

Figure 2-6:   Transfer model (Foxon, 1994)

2.7.1   Other variables affecting knowledge and skills transfer

Nijman *et al.* (2006:547) highlight the significance of approaching learning transfer from a methodical perspective, as opposed to looking at particular connections between single, or sets of components, without in the meantime considering related factors. Their research recognized trainee characteristics, which are incorporated as a development in the default model of this study, as the principal variable after management support that affects learning transfer. They contend that trainee characteristics represent the vast majority of the variability in the learning transfer. The development of trainee characteristics mirrors the understanding that powerful learning transfers will just happen if students are capable and willing to utilise the new knowledge and skills at work. Additionally, Velada and Caetano (2007:291) recognize self-efficacy, apprehension, psychological capacity, locus of control and

industriousness as imperative characteristics of trainees. As indicated by them, an individual must have a desire to learn so as to be able to learn and a learner's motivation straightforwardly impacts his or her excitement for training, thus determining his or her ability to learn. Notwithstanding the characteristics of the learner, Nijman *et al.* (2006:532) perceive that an added factor that deduces compelling and productive learning transfer is the workplace. This space can be partitioned into common characteristics that are moderately reliable, or that have particular significance concerning the learning transfer climate, managerial support, supervisor consent and performance feedback. This is further upheld by alternate researchers in the relevant field of learning transfer, for example Belling *et al.* (2004:252) and Gilpin-Jackson *et al.* (2007:1002), in addition mentioned that distinguished job and role aids as facilitators of learning transfer. It is the final segments specified by Nijman *et al.* (2006:548), which underlie the topic of this investigation. The dynamics mentioned above are upheld by Holton *et al.* (2007:187), who fervently contend that the environmental characteristics directly address management's part and involvement in elucidating performance expectations consequent to training, distinguishing opportunities to utilise new skills, setting reasonable objectives for the representatives and working with the workers on issues experienced in the work environment. They conclude that any supporting of the learner by the manager will negatively affect learning transfer. The extent to which management contradicts the utilisation of new skills and knowledge in the work environment, or gives negative or insufficient input when learners effectively apply learning in it, will determine the adequacy and effectiveness of the learning transfer. As per Gilpin-Jackson and Bushe (2007:994), workers have alluded to the absence of manager support, subsequent to training, as "the bane of training transfer". Egan (2008:320) established that incentives for teamwork, opportunities for progression and understood job significance that gives opportunities for development, are all facilitators of the learning transfer process. The incentive system in the organisation as a facilitator to learning transfer, impacts the amount of learning that will occur. In this setting, the incentive a worker expects for successful training culmination and for the usage of new knowledge and skills at work, may be either monetary or any other suitable type of acknowledgment. Holton *et al.* (2007:189) and Meyer *et al.* (2007) concur that a significant incentive system as a strategy to fortify management support, is useful to the successful transfer of knowledge and skills, and subsequently to the organisation. In spite of the discoveries on the positive contribution of supervisors or

management support to learning transfer, literature recommending that there is no relation between management support and the learning transfer process, is documented by Nijman *et al.* (2006:545), who state that there is a negative relationship between management support and learning in a workplace that is self-governing and less cohesive. They allude to the observational results of research investigations concerning the relationship between management support and learning transfer that do not demonstrate a noteworthy connection along these lines, repudiating regular intelligence. They are further substantiated by Chiaburu (2010:55), who takes the contention a stride further by expressing that co-workers assume a more predominant part in guaranteeing learning transfer, because they are "proximal to their colleagues, in immediate contact with them, and of equal status" (Chiaburu, 2010:53). Ford (2009:95) trusts that if leader managers need subordinates to act and think subjectively in diverse ways, the environment in which they interact must be considerably altered. This remark reinforces the role of management in guaranteeing the viability of learning transfer. It is further believed that management is deliberately positioned to roll out vital improvements to the workplace, if this change is required to encourage learning transfer. Yamkovenko *et al.* (2007:387) concur that the opportunities management offers employees to apply learning in the workplace, must be supported by satisfactory equipment, information, human resources, financial resources, material and supplies. As per Holton *et al.* (2010), the support of managers is an asset to representatives to hone in on what they have learned, and will regularly open doors to new opportunities inside and beyond an existing job role.

2.7.1.1 Socio and culture-centric approach

Intangible assets have the ability to generate more value than tangible or physical assets (Boisot, 1999). It is expressed that three elements identified as intangibles, which comprise of human capital, outside capital and structural capital, are relied upon to produce future advantages and create sustained organisational qualities. Tacit knowledge, which is characterised as verifiable and non-codifiable knowledge, is quite difficult to transfer and keep, and is learnt through experience, by doing and through apprenticeships (Szulanski, 1995:440; Von Hippel, 1994:432; Brown & Duguid, 1998:29). To ensure success in transferring and retaining tacit knowledge, it is important to share it through know-how, which is the procedure of exhibition, and show-how, which includes up close and personal contact between the source and

receiver (Roberts, 2000:439). Basically, the transfer of know-how requires a basic procedure of show-how. For instance, the idea of Community of Practice (CoP) is seen as a viable social activity for sharing and retaining organisational knowledge. The CoP has the impact of advancing human networks, and inspiring individuals to share, create and retain knowledge. Building casual networks of employees who share comparative interests and issues can be a vital method for transferring, and thus retaining knowledge within organisations. Groups of practice generate an environment for socialisation, in which knowledge can be generated and further shared. Interviews, knowledge maps, narrating, video recording, after activity surveys, training and tutoring, are ideally suited for empowering individual workers to change their implicit knowledge into applied knowledge (APQC, 2002:50). Albeit every one of these endeavors can shape the all-encompassing approach of any knowledge transfer and retention strategy, this study does not examine the pros and cons of their utilisation in an organisation. An engaged investigation of their adequacy will be adequate for building up the theoretical and empirical grounding in such a manner. Tutoring and coaching are most likely the best methods to directly transfer critical implicit and implied knowledge, starting with one individual employee then moving on to the next. Mentoring projects produce a means to encourage the transfer of knowledge from experienced workers (i.e. topic specialists) to new employees (APQC, 2002:50).

Generally, mentoring projects have been utilised to train targeted junior employees inside an organisation. For the reasons of knowledge and skills transfer, mentoring and coaching projects are very good for transferring knowledge from a retiring employee to a successor. Both implied and explicit knowledge can then be shared, for instance, implicit knowledge may incorporate orientation towards the organisational culture. The individuals who participated in the APQC study, reported that they utilised mentoring as a primary means for the transfer of knowledge and that they concentrated on mentoring as an approach to transfer soft skills, as well as social and cultural norms (APQC, 2002:50).

Mentoring supports the sharing of the broadest scope of knowledge, from detailed specialized skills and tacit cultural qualities, to career development advice, in a relationship that would ideally permit the expert to monitor the extent to which knowledge is really being absorbed and utilised by the protégé (De Long, 2004:107). It can be an exceptionally beneficial practice for preventing the loss of knowledge, on

the grounds that it is extremely effective for transferring intricate types of information that cause knowledge stickiness.

Organisational culture is a pivotal factor in the achievement of knowledge and skills transfer endeavours. According to Becerra-Fernandez (2004:40), "organizational culture reflects the norms and beliefs that guide the behaviour of the organization's members".

Values, for example trust, individual development and integration, cannot be produced and maintained unless the organisation's systems, procedures and practices are adjusted with the specific aim to support them (Delong, 2004:72). Organisational culture can essentially make or break the entire knowledge transfer process in organisations. A knowledge culture is one of the elements which bring about long-term competitive advantages. In the knowledge and skills transfer and management procedures, a knowledge culture is an organisational way of life, empowering and spurring employees to make, share and utilise knowledge and skills for the organisation, so as to guarantee continued achievement (Bock, 1999:23).

Not only does it lead to a legitimate environment for effective knowledge and skills transfer and further motivates people to share knowledge and skills, but determines which knowledge and skills are worth managing and which not - it characterises the relationship between individual and organisational knowledge (Girduaskiene & Savaneviciene, 2007:43). This is accomplished by distinguishing who should have transferable knowledge and skills, and inevitably, to whom it ought to be transferred - this makes a connection of social engagement, which characterises how knowledge and skills will be applied in particular circumstances, and establishes the procedures bringing about the improvement and conveyance of new knowledge and skills within the organisation. Supporting organisational culture, aids in the persuasion of employees to further share knowledge and skills, and in turn comprehend the advantages of a knowledge and skills retention strategy. Incentive programmes that motivate knowledge and skills hoarding, promotion practices that neglect the development of deep technical expertise over quick advancements to management positions and cost-cutting exercises that dishearten any interest in learning are all practices that repudiate top management's espoused commitment to learning and development. At the point when employees see a shortfall between the qualities touted by top leadership, and those really reflected in management practices, they will

presume that the embraced values of knowledge and skills, sharing and learning, are not considered important by the organisation, and this will undermine management's validity (Rose, 2001). This does not create a fruitful situation or environment for knowledge and skills sharing and retention in the organisation. The properties of an empowering organisational culture, such as motivations that compensate knowledge and skills sharing and transfer, and additionally leadership and management support, help to create an environment that is genuinely helpful to knowledge and skills transfer and retention. Organisations that build up a knowledge culture, which empowers cooperation, coordinated efforts, experimentation and risk assumption, concentrating on crucial values and work models, will generate a great working environment and accomplish better results as far as organisational learning and developing particular procedures that create and sustain knowledge and skills transfer in their business processes.

2.7.1.2 Knowledge and skills stickiness

Knowledge and skills stickiness, which is additionally alluded to as knowledge and skills ambiguity in the knowledge and skills transfer literature, is key to this study. Knowledge and skills stickiness is one of the best indicators of organisational knowledge and skills transfer. According to Szulanski (2003), there are a few reasons as to why knowledge and skills do not flow within an organisation, the main reason being that people "stick" to their knowledge and skills. Implicit knowledge is a struggle, at times incomprehensible to capture, transfer and retain. Brown & Duguid (1998:38) offer conflicting perspectives on knowledge and skills, which they portray transparently or implicitly as something that seems to be "sticky" or "leaky". They further argue that the difference is best determined from the view of practice, which can grasp a solitary system for the sticky and leaky manifestations of knowledge. It is critical for the knowledge practitioners out there to understand that there are clashing perspectives and alternate approaches. Sticky contentions focus essentially on the test of moving knowledge and skills around inside the organisation. This is supported by other studies (Szulanski, 1995:440; Von Hippel, 1994:439). For instance, Von Hippel discusses the understood way of resistance between a company's research labs and engineering, while Szulanski looks at the stickiness which is obvious in efforts to move the knowledge inherent in "best practice", starting with one piece of the organisation then moving on to the next. Such discussions more or less focus on the movement of

knowledge and skills inside of the borders of the organisation. Leakiness and the like, interestingly, for the most part, focus on the outer and undesirable spiral flow of knowledge and skills of outside organisations. Such knowledge and skills, lost beyond the boundaries of the firm to contenders, can possibly debilitate the competitiveness of the firm. Additionally, Liebeskind (1996:107) contends that an organisation's ability to prevent the leaking of knowledge and skills beyond the boundaries of their organisation to its competitors is where its competitive advantage lies.

Table 2-1:   Predictors of stickiness at different points of knowledge transfer

Communication elements	Predictors of stickiness
Knowledge	1. Causal ambiguity
	2. Unproven knowledge
Source	3. Motivation of source
	4. Credibility of source
Recipient	5. Recipient motivation
	6. Recipient absorptive capacity
	7. Recipient retentive capacity
Context	8. Barren organisational context
	9. Arduous relationship between source and recipient

Source: Szulanski (1995)

The issue of stickiness has to do with the implied quality of knowledge and skills. The challenges included in the transfer of inferred knowledge and skills are seen as the reason for the stickiness of knowledge and skills itself. It is contended that, when knowledge and skills are sticky and transfer is difficult, the implications are more strategic and may undermine an organisation's long-term competitiveness, including new enterprise arrangements, the misuse of innovative know-how, and the successful improvement and commercialisation of new products and services (Teece, 1998:75). A few authors have demonstrated an expanding enthusiasm in the phenomenon of organisational learning, which addresses how organisations create, retain and transfer knowledge (Argote, 1999:34). Notwithstanding, one of the discoveries of this emphasis on knowledge and learning, is that the mere ownership of possibly important knowledge in the firm, somewhere, does not necessarily imply that different parts of the firm benefit from this knowledge (Szulanski, 2000:10). This is, to a great extent, in light of the fact that the internal transfer of knowledge and skills is likewise a "sticky"

or unwieldy process to accomplish. Knowledge and skills transfers are regularly laborious, time consuming and troublesome. In difficult transfer circumstances, issues are more likely to be heightened. Though a portion of the transfer related issues will be analysed effortlessly and determined routinely by those straightforwardly involved and responsible for the transfer. Different issues may transcend the resourcefulness of the organisational actors who are typically influenced by and routinely resolve transfer related issues (Szulanski, 2000:10). Innovation relies on knowledge and skills. Firms that create and utilise knowledge and skills can quickly and adequately innovate faster and more effectively than those that do not. It is likewise contended that tacit knowledge and skills transfer boosts innovation in the organisation (Cavusgil *et al.*, 2003:19). The more prominent the degree of tacit knowledge and skills transfer, the more probable the firm is to be able to innovate adequately. This is mostly because tacit knowledge and skills are a lot harder to transfer and deploy to the outskirts of the firm than leaky unequivocal knowledge and skills. Such knowledge and skills are more likely to be uncommon and difficult for the adversary firms to replicate. In this way, it is important to look at the predictors of knowledge and skills transfer, as detailed in the literature.

2.7.1.3 Willingness to share knowledge and skills

Research recommends that successful knowledge and skills transfer and management are dependent upon individual and group flow (Goh, 2002:25; Syed-Ikhsan & Rowland, 2004:250). This can incorporate the ability to teach and learn on both sides. A study conducted by Smith (2004:44), analysed the impact of employee willingness to teach and to learn, related to the transfer and procurement of knowledge and skills. She discovered that American expatriates portrayed a keen willingness to transfer knowledge and skills and that knowledge and skills transfer was in this way more effective. Similar results were also established in additional studies (Gupta & Govindarajan, 2000:480; Steensma & Lyles, 2000:839). Some early research raised the worry that these properties may not regularly be clear in expatriates, since they are more focused on their individual careers, and thus the significance of an efficient mentoring system to guarantee that knowledge and skills transfer does not in fact take place (Rogers, 1999:31).

The current Eskom KM strategy of employing expatriates is prefaced upon a unidirectional knowledge and skills transfer from foreign workers to the locals. Even

so, knowledge and skills transfer happen in numerous directions (Miesing *et al.*, 2004:5). They contend that research into the particular types of relationships and exercises relating to knowledge and skills transfer in various directions is required. Knowledge and skills sharing amongst the local Eskom workers themselves, is another dimension further explored in this study.

2.8   ROLE OF EXPATRIATES IN KNOWLEDGE AND SKILLS TRANSFER

While almost no research has been conducted on knowledge and skills transfer within Eskom's operators division, empirical studies, based on the ideal role of expatriates in Eskom for knowledge and skills transfer, are for all intentions and purposes non-existent. The expression "expatriates" alludes to individuals who are transferred outside their native country to another country, depicted as the "host" country, particularly for employment purposes (Brown & Harzing, 2004:570). Makela (2007:109) characterises expatriate relationships as the interpersonal associations which expatriates share with their host country's employees amidst the project. Brock *et al.* (2008:1294) affirm that expatriates are commissioned to complete a technical prerequisite, or where training is mostly lacking in evolving countries. Expatriates are frequently sent in the basic role of transferring explicit knowledge and skills, and if conceivable, tacit knowledge and skills on-the-job (Smith, 2004:40). A typical longer-term strategic objective of this training role is to supplement expatriates with suitably trained locals within a specific time frame (Smith, 2004:40).

A great amount of the literature on the ideal role of expatriates in knowledge and skills transfer, has primarily focused on their employment in multinational corporations (MNCs) and the so-called adjustment procedure, that determines whether the international assignment is successful (Kraimer *et al.*, 2001:81). Successful deployment infers compelling knowledge and skills transfer from the parent to the subsidiary, and consequently additional value is added to the organisation. Ahmad *et al.* (date unknown:438), propose that for non-benefit organisations for example, the Government, knowledge and skills sharing is a component for constant performance improvements. Thus, a successful KM policy ought to increase the value of an organisation, which could be translated inside the setting of Eskom's service-delivery mandate. This segment of the literature review plots the large factors that have been recognized as affecting knowledge and skills transfer by expatriates. While each exertion has been made to distinguish proper public sector expatriate research

because of the scarcity of the latter, the regular discoveries of research across both public and private sectors will be detailed. It should likewise be noticed that the components recognized in the previous section, as affecting knowledge and skills transfers in general, may also apply to expatriate knowledge and skills transfers.

2.9   IMPACT OF LOSS OF KNOWLEDGE AND SKILLS WITH RETIREMENT

The major concern regarding the retiring of operating personnel involves the loss of skills and knowledge and the gap it will create once these baby boomers retire. Currently the power utility industry is facing a few challenges. One of the top five challenges is the retention of skills and knowledge from senior and retiring operators by transferring it to junior and trainee students before they retire and leave the organisation.

Thus with limited time left to transfer this expertise, the focus should be on a transfer model. In order for this skills and knowledge transfer process to be successful, the process should start immediately.

From Chapter One's discussion, a vast number of operators will be retiring in the next five to eight years, therefore the ones closest to retiring should be the first focus group.

According to Lave *et al.* (2007:77), the success factors for a power utility is far different in the 21st century than those of the 20th century. This can be attributed to massive changes that are imminent in the workforce; financial constraints, technology advances and new regulatory requirements that are permanently changing the industry structure. Concurrently, with the growing digital society, more than ever before, a reliable power system is required (Johnston, 2005:10).

Lave *et al.* (2007:71) also state that the training and recruitment of new workers have become the most essential skills a company can focus on, while at the same time, as much focus should be placed on finding ways to retain the essential knowledge of senior workers before they retire, preventing essential skills from walking out the door.

Over the past two decades, companies reduced their number of employees instead of hiring new employees. This led to a big workforce in their late 40's and 50's, and a missing 30's group. The secondary effect of such an old workforce is that workers with physically demanding jobs may not be able to carry on with their tasks and duties into their 60's.

Delong (2004:38) states that managers cannot afford to lose skills and knowledge if they expect to not only sustain the current performance, but to improve performance within the organisation through innovation and growth.

Lave *et al.* (2007:79) also warns against cloning retiring workers' skills. The needed skills mix for power utilities in the 21th century have shifted and will shift even more rapidly in the future. Workers' skills mix should be based on the power utility's current and future challenges.

The young workers of today are a great deal more adaptable and digitally oriented and not interested in doing the same work in the same manner day after day. To select the desired workforce, organisations will need to alter their public image from one which is static to one that is more dynamic, offering quite demanding careers in an energizing industry.

If today's workforce's skills are not replenished by replacing retired workers with skillful substitutes, skills and knowledge will not be carried over by training or re-training workers, and companies will not be able to keep pace with innovation to guarantee capable substitutes. (Delong, 2004).

The aging workforce not only offers issues but opportunities too. A considerable number of the current workers are not the most suitable employees for the difficulties which the organisation is facing. Having them leave willfully, liberates the organisation from firing them or engaging in costly, maybe insufficient, retraining programs, as opposed to implementing the idea that an organisation must scramble to supplant the resigning workforce.

2.10   MOTIVATING AND ENGAGING A MULTI-GENERATIONAL WORKFORCE

In today's workforce, four generations work side-by-side - veterans, baby boomers, generation X and generation Y. Each has different attitudes and expectations regarding their jobs and careers. As employers have finite resources with which to compete for talent, it is important that they understand these generations, what matters to them most, and what can be done to motivate and engage different generations of workers. The need to make business sense out of the next generation of workers is of

the utmost importance – especially since attracting and retaining younger talent will be critical to organisational success over the next decade.

Table 2-2:   Generational classification

Generation	Years of birth
Veterans	1925 to 1942
Baby Boomers	1943 to 1960-64
Generation X	1961-64 to 1981
Generation Y	1982 and beyond

A number of studies reveal that today's employees expect to receive competitive benefits and salaries, but also that those basic benefits are not the primary motivations for their attraction to, and retention of, an organisation. This is the case particularly with the younger generations. If this is indeed the situation, the following question could be asked: What are the "rewards" that matter most to each of the generations?

An analysis of the body of research conducted by Deloitte (2008:15) in the arena of reward preferences across generations reveals the following high-level trends.

VETERANS: MOTIVATORS AND MOST-VALUED REWARDS

Motivators

- "Your experience is valued here";

- "We want to hear what has and hasn't worked in the past"; and

- "Your hard work and service will be rewarded".

Most valued rewards

- Respect and recognition of experience; and

- Flexibility – part-time hours, temporary employment opportunities.

BABY BOOMERS: MOTIVATORS AND MOST-VALUED REWARDS

Motivators

- "Your contribution is important and unique";

- "We need you"; and

- "You're one of us".

Most valued rewards

- Retirement planning assistance and flexible retirement options;

- Training and development;

- Politically acceptable time off, including sabbaticals.

GENERATION X: MOTIVATORS AND MOST-VALUED REWARDS

Motivators

- "We look at your results, not how many hours you are in the office";

- "You do particularly well at this and we want to give you an opportunity to learn and grow"; and

- "We don't take ourselves too seriously and try to have some fun along the way".

Most valued rewards

- Skills development and real time performance feedback;

- Immediate, tangible recognition rewards; and

- Flexible work arrangements and positive work environments.

GENERATION Y: MOTIVATORS AND MOST VALUED REWARDS

Motivators

- "You can make valuable contribution here";

- "We want you to get up to speed quickly"; and

- "You will have the opportunity to work with bright, creative people and mentors".

Most-Valued Rewards

- Learning and development opportunities;

- Credible and positive role models; and

- Work-life balance.

According to Deloitte (2008:18) the four generations are markedly different although their expectations regarding rewards as well as their key motivators are similar. The fact is that the most-valued rewards for all generations are not always "hard-cost"

financially based (tangible) rewards. Many are "soft-cost" (intangible) rewards. At the stage when most companies have a limited amount of capital to invest in reward schemes, the real challenge is to identify and leverage opportunities to motivate and engage the workforce across all generations. Those companies that are able to achieve this in the most innovative and sustainable ways, are likely to emerge as the employers of choice for both current and prospective employees from all generations.

2.11   ROLE OF FACILITATORS

2.11.1 Support before, during and after

In view of their research findings, Brinkerhoff and Montesino (1995) contend that the idea of facilitator support for learning transfer as well as for the learner can be supported by the argument that it can be generated by the common behaviour of the immediate facilitator before, during and after the learning process. In the same manner, the conduct and purposive intervention of the immediate facilitator can influence the factors that distinguish the adequacy of learning transfer for example, the motivation to learn, what affects the learner's idea about conditions encompassing the job (either positively or negatively), and the general employment - particularly the learning climate.

Within the above research, Brinkerhoff and Montesino (1995) examined the theory that there is a connection between the independent variable facilitator support for learning, and the dependent variable, expressed as an effective transfer of learning. They discovered support for this in that the trainees who had received facilitator support reported having encountered a larger measure of learning transfer, rather than the individuals who did not receive the same level of facilitator support before or after the learning intervention. The facilitator support utilised as the independent variable as a part of their investigation, comprised of a brief meeting with the trainee in the week before the training, and another of similar duration in the week thereafter, to further discuss the training. This affirms that even without intricate and extensive inclusion by facilitators, learners will react positively to learning transfer when there is any sort of facilitators support, and this will expand the level of training effectiveness.

2.11.2 Learner readiness

Leimbach (2010:84) portrays learner readiness as the actual level of preparedness of the learners before participating in the learning and information transfer. This part comprises of four elements in particular, namely motivation to learn, intent to use, career goal alignment and self-efficacy. Holton (2005:45) describes learner readiness as the extent to which individuals are prepared to co-operate and contribute in the learning process. Leimbach and Emde's (2011:66) research conducted at Georgia-Pacific Workforce, affirmed that learners need to be keen and prepared to learn if they intend to have an effective learning experience. They further suggest that individuals should be educated regarding the results of the training prior to the beginning of the training, as this could affect their eagerness to add to the knowledge and skills transfer process. In addition, Bakker *et al.* (2011:496) conducted a general research study of seven project venture organisations that intended to examine knowledge and skills transfer in temporary projects and permanent organisations. The focus of the research was on the elements affecting knowledge and skills transfer, which included inter alia different constructs, for example, embeddedness, absorptive limits, and motivation, all directly linked to learner readiness. The authors infer that knowledge and skills transfer inside an organisation is definitely the most effective when the parent organisation directs the training and learning transfer process, as the project manager is restricted to implementing knowledge and skills transfers on site. This finding is significant for most construction organisations, including Eskom, where temporary tasks that are geographically dissimilar from the parent organisation, are the norm. For instance, the Medupi Project, which is Eskom's greatest interim construction project to date, is situated more or less 350 kilometers from Eskom's Head Office. (www.eskom.co.za).

2.11.3 Motivation to learn

A learners' motivation to learn can be greatly expanded through the utilisation of training exercises that convey the significance and definite value of learning. Tabassi *et al.* (2012:216) proceed to detail training as a pivotal plan for organisations to help individuals to ascertain knowledge and skills needed in the workplace. Likewise, from a training point of view, inspiration can affect the readiness of a worker to join and follow a training curriculum. Burke and Hutchins (2007:267) confirm that inspiration is associated with the extent of knowledge and skills transfer. As indicated by Donovan and Darcy (2011:123), not more than 10 percent of knowledge and skills gained amidst

the knowledge and skills transfer process, is transferred back to the work environment because of individual attributes such as ability, personality and motivation. Dwivedula and Bredillet (2010:160) conducted an informative study with 199 active participants who were included in different project management training programmes. The primary reason for this research was to comprehend employee motivation inside the project environment. Multiple elements were hypothesised to impact learner motivation, and henceforth knowledge and skills transfer, including employee improvement, work climate, perceived equality and job stability. Employee improvement, especially inside a construction project environment, happens when individuals are granted the flexibility and the freedom to creatively innovate, as a result of the complex nature of the work. Additionally, Dwivedula and Bredillet (2010:162) discovered that management does not have to be present at an operational level, generating a feeling of ownership and motivation amongst workers, such as the element of job satisfaction. Dwivedula and Bredillet, (2010:162) further identify that independence should be granted to the project team to effectuate the project and be compensated upon effective completion, as a great motivator. With regard to job security, Dwivedula and Bredillet (2010:162), found this to directly depend on the employer.

2.12   CONCLUSION

The literature review carried out in this chapter outlined the full scope of requirements for skills and knowledge transfer to take place. In addition, it has been found that the transfer of skills and knowledge cannot occur without the necessary preparations, exhaustive procedures, lengthy processes, and adequate support required for successful transfer to indeed take place. All of these play a pivotal role in the transfer process from the operators, right through to the trainees. Furthermore, the study revealed a concerning view on the inadequate and ineffective transfer models currently being used within large organisations, such as Eskom, of which most have little to no affect. It has also highlighted probable risks pertaining to the loss of these valuable skills and knowledge and the impact it has on Eskom's operators division as well as the overall organisation alike. In the following section, empirical research in the form of research methodology and results are presented.

CHAPTER 3:   EMPIRICAL RESEARCH METHODOLOGY

3.1   INTRODUCTION

Chapter two discussed the different types and various theories of knowledge and skills transfer. The chapter also discussed factors affecting skills and knowledge transfer, the impact of the loss thereof on the organisation, and the willingness of the employees to share knowledge and skills. This chapter also examined the procedure of the current skills and knowledge transfer process being followed in Eskom's generation division and the associated training systems.

The sole purpose of this chapter is to outline the research approach, research paradigm and research method used in the study. The type of data required in the study is discussed, including data collection and data analysis strategies.

The procedures taken to guarantee the authenticity of the research, for example, pre-testing of the questionnaire and distinguishing its dependability and legitimacy are described as well. It also details the research experience and elucidates the multiple method approach and why it was selected as the chosen mode of study.

3.2   THE RESEARCH PHILOSOPHY

All research depends on pertinent fundamental philosophical presumptions, of which the primary aim is to characterise methods that constitute legitimate research, and outline the appropriate research methods significant to the development of knowledge in a given study (Thomas, 2006:291). Welman *et al.* (2007:6) propose two fundamental approaches to research: the positivist approach and the anti-positivist approach. The positivist approach depends on a philosophical approach commonly referred to as logical positivism. This approach basically subscribes to the regular scientific system of human behaviour research, which indicates that research should be restricted to what can be perceived and measured impartially, i.e. being unaware of the individual sentiments and perspectives. The common scientific approach endeavours to construct laws that are all around substantial. The positivist approach is additionally or otherwise referred to as the quantitative approach.

Then again, the anti-positivist approach maintains that it is wrong to subscribe to stringent natural scientific methods when attempting to understand data. Anti-positivists infer that the natural scientific method is primarily relevant to the study of molecules or organisms, and is in this way, not pertinent to the phenomena that are studied in the human behavioural sciences. The anti-positivist approach is sometimes referred to as the qualitative approach. Table 3.1 details the critical differences between the quantitative and qualitative approaches.

Table 3-1:   Differences between quantitative and qualitative approaches

Orientation	Quantitative research	Qualitative research
Assumption about the world	A single reality that can be measured by an instrument.	Multiple realities.
Research purpose	Established relationships between measured variables.	Understanding a social situation from a participant's perspective.
Research methods and processes	• Procedures established before the study begins; • A hypothesis formulated before the research begins; • Deductive in approach.	• Flexible, changing strategies; • Design emerges as data is collected; • A hypothesis is not needed to begin the research; • Inductive in approach.
Researcher's role	The researcher is ideally an objective observer who does not participate nor influences what is being studied.	The researcher participates and becomes immersed in the research/social setting.
Generalisability	Universal context free generalisations.	Detailed context-based generalisations.

Source: Thomas (2006: 304)

Most of the research conducted in the 20th century was quantitative. Qualitative design only evolved around the 1970s. Until recently, quantitative and qualitative designs have been utilised independently from one another within research. There has been a constant debate with regard to quantitative and qualitative approaches (Caruth, 2013:112). It is generally acknowledged that a more prominent understanding of the

study is gained by using qualitative research than with quantitative research, although quantitative research tends to support better objectivity and generalisability. Mixed methods research (MMR), additionally alluded to as the 'third methodological movement' has turned out to be a progressively acceptable approach of research. MMR has further evolved in the light of impediments of both quantitative and qualitative designs. By mixing both the quantitative and qualitative methods, they complement one another, offering more substantial insights, and further yields additional questions of interest for future studies; qualities of both designs are retained, while highlighting weaknesses of individual approaches.

This study however made use of a quantitative research approach within Section B of the questionnaire, as well as a qualitative research approach within Section C. Quantitative research uses questionnaires, surveys and experiments, resulting in it being more practical in order to characterise data by means of statistical analyses (Thomas, 2006:303). Qualitative research is more theoretical and attempts to interpret social interactions (Litchman, 2006:7). Since the study is illustrative in nature the quantitative approach ought to be most suitable to achieve the objectives of the study.

3.3   RESEARCH DESIGN

A research design is the plan that details divergent processes of research to be taken, beginning with the detailing of hypotheses and the illustration of inferences amidst the research process (Sahu, 2013:25). The research design plainly lays out the steps required within a research activity to achieve particular research objectives. These steps that are to be followed differ according to dissimilar designs. Research strategies come in numerous types of research designs, including survey design, descriptive design, experimental design, exploratory design, and diagnostic design. The research design should be framed in a way that will use the available and accessible resources inside a given timeframe, in the most idyllic way that will ideally achieve the objectives of the study.

This study sought after a very vivid and cross sectional classification of research. The variables that ought to be measured, as well as the method utilised, were clearly detailed in the study. An expressive research design was prepared to safeguard against bias and to expand the unwavering quality of the research. Chapter one clearly defines the objectives of this study. Pretested data gathering instruments are favoured

in a detailed study; hence this study makes use of pretested measuring instruments with special modifications.

3.4   SAMPLING DESIGN

Trochim (2000) explains a general research population as a group that the researcher would like to generalise from and the sample as the group of individuals that are chosen to be in the study. Sekaran (2000:295) further supported this when he characterised a sample as a sub-set of the population under consideration which comprises of a careful selection of members from that specific population. The meaning of the sample is of critical significance, as the results of an investigation are not more reliable than the quality of the population or depiction of the sample.

The target population for this study was the operators of the operating division within the power utility, Eskom (Grootvlei and Lethabo). Eskom is one of the top 20 utilities in the world by generation capacity and still growing. Its power utility consists of three main subdivisions, namely generation, distribution and transmission. The generation division generates 95% of all the electricity that is being distributed in South Africa, and is also supplying to customers in the mining, industrial, agricultural, commercial, residential sector and to re-distributors. The selected target sample is current operators working in the operating division within Eskom's power utility at both Grootvlei and Lethabo power stations. Eskom has about 34 000 employees. Employees from all levels, ranging from operating managers to assistant supervisors, as well as trainees and ex-operating employees within the operating division, were included in the study population. Grootvlei and Lethabo power stations have an average of 110 operating personnel per operating division, per power station. Out of the 110 operating employees, only 70 were eligible to complete the questionnaire. Of the 140 (70 per power station) eligible operators, 90 of the completed questionnaires were successfully collected. A total of 64.3 percent of the operating staff from both Grootvlei and Lethabo power stations, participated in completing the questionnaire. Table 3-2 represents the workstation, gender and job designation of the target population.

Table 3-2: Workstation, gender and job designation of the target population of Eskom's power utilities.

Variable	Category	Frequency	Valid percentage
Work station	Lethabo	46	51,7
	Grootvlei	43	48,3
Gender	Male	70	78,7
	Female	19	21,3
Job designation	SPO - Assistant shift supervisor	11	12,4
	Plant operator	13	14,6
	Unit controller	26	29..2
	Senior controller	2	2,2
	Senior shift supervisor	2	2,2
	Shift supervisor	11	12,4
	Shift manager	0	0
	Operating manager	1	1,1
	Trainee	14	15,7
	Operating facilitator	7	7,9
	Ex-operating employee	1	1,1

3.5 VALIDITY AND RELIABILITY

Validity and reliability are essential aspects to be considered throughout the data collection process (Leedy, 1997:32).

3.5.1 Validity

Validity details the degree to which a measuring instrument accurately represents the notion it claims to measure (Punch, 1998:247). There are two measures of validity, namely external and internal.

External validity addresses the capacity to apply the findings of the study to other individuals and other situations, and guarantees that the conditions under which the study is undertaken are illustrative of the situations and time to which the outcomes are to apply (Burns, 2005:32). The sample of active participants drawn from the population of interest must be illustrative of that population at the exact time of the study. Lastly, illustrative samples should be drawn with reference to pertinent variables

in the study, for example, sexual orientation and age. Internal validity addresses the reasons behind the outcomes of the study, and aids in reducing other, frequently unanticipated, reasons for these results (Black, 1990:200).

There are three approaches to assessing internal validity, namely content validity, criterion-related validity, and construct validity (Bryman & Cramer, 2004:27). Content validity is the weakest level of validity, and is largely concerned with the pertinence and representation of items, for example individual questions in a questionnaire, to the proposed setting. It is especially imperative to measure this if the study is intended to ascertain respondents' knowledge inside a particular field, or to measure individual attributes such as attitudes (Brown, 2011:11). Criterion-related validity is a stronger type of validity, established when a tool, for example a questionnaire, can be contrasted with other comparable validated measures of the same concept or phenomenon (Bryman & Cramer, 2004:28). Nonetheless, where no alternate measures exist, this will not be conceivable. Construct validity includes showing relationships between the notions being studied and the construct or hypothesis that is applicable to them. There are a few methods of demonstrating construct validity.

3.5.2 Reliability

Reliability manages the data compilation procedure ensuring consistency of results. Maree (2007:147) details reliability as the consistency of an instrument. High reliability will guarantee that the same results ought to occur repeatedly on the same sample. In this study, reliability is measured by utilising Cronbach's alpha coefficient. Reliability is calculated by taking a few estimations on the same subjects. A reliability co-efficient of 0.70 or higher is considered as 'acceptable' (Oppenheim 1992:31). As previously indicated, the questionnaire has been self-developed by the researcher completely. The absence of a pre-existing (standardised) instrument can impact reliability. Cronbach's alpha was measured for Section B of the questionnaire, which consisted of skills; motivation of the trainee; workplace/organisational climate; and management support for skills and knowledge, as indicated in Table 3-3.

Table 3-3:   Cronbach's Alpha values for the questionnaire

Section B	Cronbach's Alpha	Cronbach's Alpha based on standardized Items	No of items
Skills	0.727	0.728	9
Motivation of the trainee	0.662	0.684	6
Workplace/organisational climate	0.805	0.815	12
Management support for knowledge and skills	0.903	0.903	5

The reliability score for the entire questionnaire was 0.865 for the 32 items. All of the sub-themes within Section B, except motivation of the trainee, have high reliability scores approximating or exceeding 0.70.

Similarly, skills and workplace/organisational climate both have high scores, indicating a high degree of acceptable and consistent scoring for these sub-themes of the instrument. These high scorings support the main focus of the study.

3.6   MEASURING INSTRUMENTS

The instrument used to gather the data is a multi-type questionnaire. It consists of open-ended and close-ended questions. The questionnaire begins with the following:

Section A - The gathering of general demographic information:

- Workstation;

- Gender;

- Race;

- Age;

- Highest qualification;

- Job designation; and

- Period employed by Eskom.

The general notion behind the construct of the demographical questions used in Section B of the questionnaire, was that the responses that the researcher intended to elicit, would be relevant and pertinent to the focus of the study, and furthermore hosted the most conclusive results. In addition, the aim was to keep the demographical information to a minimum, without the amount being detrimental to the outcome of the research findings, whilst still being able to draw a sufficient conclusion.

Section B – A series of 32 questions addressing skills, trainee motivation, organisational climate and management support. A Likert questionnaire was used as a data collection tool in this research (the questionnaire is attached as Appendix A)

- Skills - nine questions;

- Motivation of the trainee - 6 questions;

- Workplace/Organisational Climate - 11 questions; and

- Management support for skills and knowledge - 5 questions.

Section C – General open-ended questions designed to derive honest feedback and understanding of the current operators within Eskom.

- Do you think a primary reason for knowledge and skills shortages in the operating environment is because the workforce is seeking better job opportunities elsewhere?

- What would you consider to be barriers for successful the knowledge and skills transfer processes?

- As an Operator, would you be willing to do skills and knowledge sharing before you retire – what do you feel will be a fair remuneration (please provide your suggestions); and

- Is there anything else you wish to share regarding the skills and knowledge shortage and how Eskom could address the situation?

Additionally, this tool was selected as it boasts numerous advantages:

- Each individual received the same questions;

- The process was the same for each individual;

- A questionnaire reduces the possibilities of errors made by a facilitator or interviewer, while recording the individual's responses; and

- A questionnaire like this one assures confidentiality, therefore the individuals act without any fear of embarrassment or victimisation.

3.6.1 Knowledge and skills transfer/learning process questionnaire

Adapted from the literature study and previous studies conducted on knowledge transfer, the questionnaires catered for the following variables:

- General skills;

- Current mind set of trainees;

- Overall understanding of workplace/organisational climate;

- Willingness to transfer knowledge and skills;

- Alternative attitudes towards knowledge and skills;

- General perception of management's support;

- Current understanding of the importance of knowledge and skills transfer; and

- Disagreement of retiring operating employees.

3.7   PROCEDURE

3.7.1 Preliminary arrangements and ethical considerations

Permission was obtained from both power station managers at Lethabo and Grootvlei, from where the questionnaires were then distributed. The operating line managers were informed of the questionnaires that had to be handed out and completed by their respective employees. The following ethical considerations were kept in mind throughout the study:

- That the participation in the study was optional;

- That respondents remained completely anonymous and would not be identified;

- That the individual information gathered would remain confidential;

- That the research objectives were made clear to the participants; and

- That all ethical implications that could possibly have an impact on the research were taken into consideration.

3.7.2 Administration of the questionnaires

The questionnaires were handed out at the beginning of each shift and collected at shifts' end. Furthermore, operators were not allowed to take the questionnaires home, in an attempt to avoid any possible influence from family members and to promote the honest perceptions of each respondent. The researcher personally handed out each questionnaire and was available for a period shortly after the commencement of the shift. The purpose of this was to administer the questionnaire and clarify issues or questions pertaining to the questionnaire, but refrained from commenting on the content of the study. Added emphasis was given to each respondent's anonymity for the participation in the questionnaire.

3.7.3 Data capturing and feedback

SPSS and MS Excel were utilised to capture the data once the questionnaires were collected. Feedback was provided to Eskom's operating managers within the operators' divisions of Eskom's power generating utility, including Eskom's sustainability department.

3.8 STATISTICAL ANALYSIS

Statistica and SPSS programs were utilised to conduct the statistical analysis. Descriptive statistics of variables were described additionally and analysed further. Overall constructs were tested for validity and reliability, using statistical methods. Demographic variables were then subjected to the t-Test and analysis of variance, so as to establish whether there was a substantial difference in how dissimilar groups responded to questions.

3.9 CHAPTER SUMMARY

This chapter mentions the methodology, research design and instruments utilised within the study. The selection of the measuring instrument and methodology were justified and the administration of the empirical study further outlined. The analysis and discussion of the results are discussed in Chapter 4.

CHAPTER 4:   EMPIRICAL RESULTS AND DISCUSSION

4.1   INTRODUCTION

In the previous chapter the methodology and techniques were outlined. In this chapter, the results of the empirical study and statistical analysis will be discussed in depth. The chapter to follow will propose recommendations based on the findings discussed. The veracity of the proposed hypothesis will be tested by means of statistical tests.

4.2   DEMOGRAPHICAL RESULTS

Before discussing the descriptive statistics, this section presents the demographical information of the sample study. Demographical information is reported on the following items: work station, gender, race, age, highest qualification, job designation, and period employed at Eskom.

A total of 91 questionnaires were distributed among the operators, of which 90 were collected, representing a 98.9% response rate. Of the 90 questionnaires collected, 89 were considered valid, as one was inadmissible and excluded from all statistical analyses. The population to which the research sample had been distributed was quite small, as permission to conduct the research sample was granted at two power utilities exclusively, namely Lethabo and Grootvlei. In addition, the researcher had easy access to both utilities, making it viable to conduct the study.

The high response rate for the questionnaires can be attributed to two factors:

- The researcher who conducted the study was well acquainted with all the respondents and shared 7 years of combined experience as a colleague;

- A small, edible incentive was attached to each questionnaire in an attempt to motivate participation.

The sample consisted of 89 subjects, with 46 (51.7%) respondents from Lethabo's power utility and 43 (48.3%) respondents from the Grootvlei's power utility. The majority of the participants, 70 (78.7%), were male, while 19 (21.3%) were female, making up the minority of the sample.

Gender
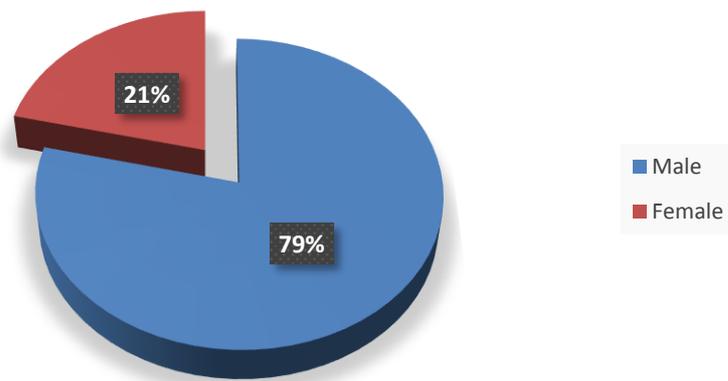
Figure 4-1:   Gender distribution

Regarding *race*, the largest group participating in the study consisted of 54 (60.7%) indicating that they were Blacks. The second largest group consisted of 33 (37.1%), of which were Whites, whereas Coloureds and Indians consisted of only 1 (1.1%) respectively.

Regarding *age,* the age groups were divided into eight sections. The largest age group was from 26–30 years of age, which consisted of 33 (37.1%) participants. The second largest group was from 51–55 years, which consisted of 16 (18%) employees, followed by two groups of the same size, namely 56-60 and 31–35 years of age, of which both consisted of 13 (14.6%) respondents. The fifth group was from 41–45 years of age, which consisted of 6 (6.7%) employees. The sixth group was 61+ years of age, with 4 (4.5%) respondents. The age group from 46-50, consisted of 3 (3.4%) employees. The last group was the age group from 36–40, with only 1 (1.1%) respondent. If a graph is constructed for the age groups versus the number of employees per group, we can take note of the following:

Number of employees vs age groups
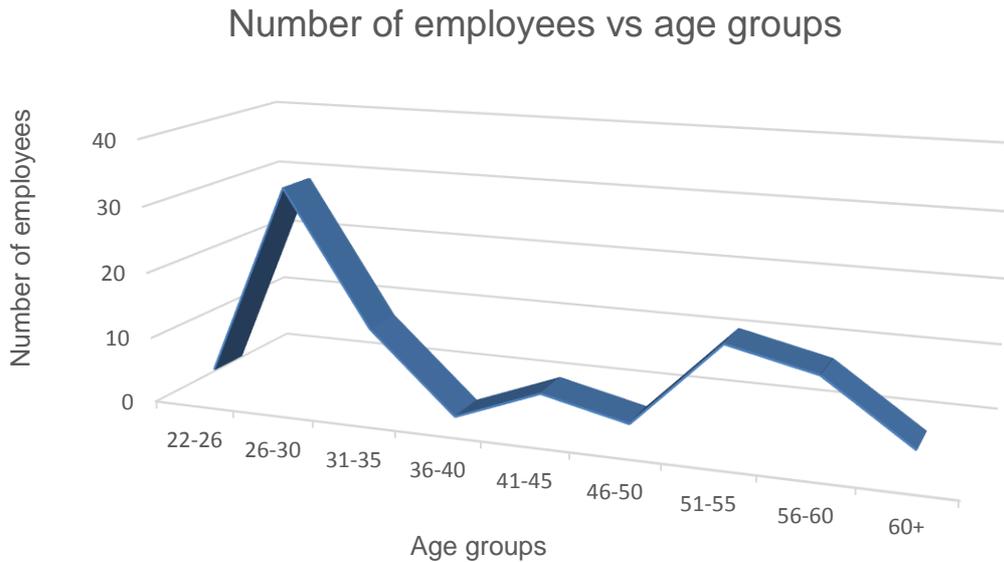
Figure 4-2:   Number of employee's vs age groups

If the above graph is compared with the problem statement, a correlation with the two peaks (young employees and senior employees) and a very low number of employees in the middle age group is noted.

Highest qualification obtained
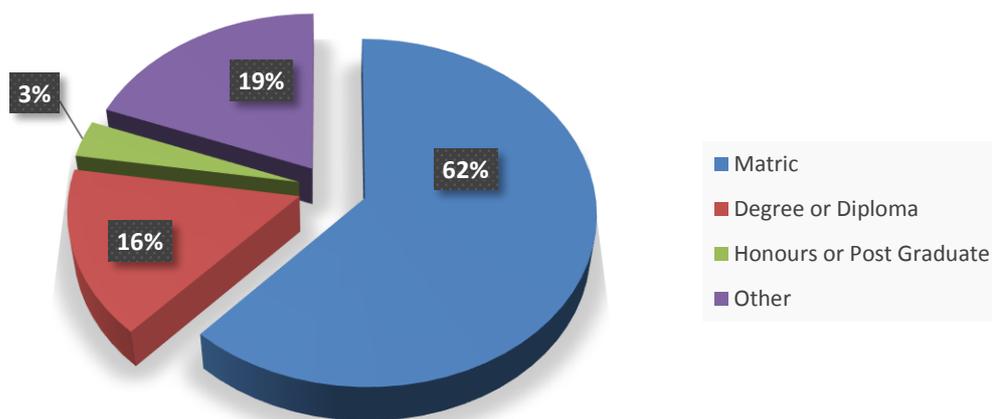
Figure 4-3:   Highest qualification obtained

Regarding *qualification*, the majority, namely 55 (61.8%), of the respondents had matric as their highest qualification, followed by 'other', indicated by 17 (19.1%) employees with mainly N3 and N4 qualifications in electrical and mechanical

engineering. A total of 14 (15.7%) participants indicated that they had a degree or diploma, while the minority, 3 (3.4%) employees, indicated that they had a Honours or post-graduate qualification.

Regarding *job designation*, 11 different designations within the operating section were selected to participate in the questionnaire. In some cases the titles between Lethabo power utilities and Grootvlei power utilities differed, even though the job profiles remained constant. The majority of the respondents (26 individuals/29.2%), were unit controllers operating the control panel, followed by 14 (15.7%) trainees, currently in the process of training to become unit controllers. The trainees are- part of two independent, yearly groups (currently busy with both their second and fourth year training); 13 (14.6%) were plant operators; 11 (12.4%) were shift supervisors/shift managers; 7 (7.9%) were operating facilitators (three from Lethabo power utility and four from Grootvlei power utility); 2 (2.2%) were senior controllers and 2 (2.2%) were senior shift supervisors ('senior' refers to the number of years' experience required to move to a senior position, but essentially the same role as a unit controller and shift supervisor is performed). The minority consisted of 1 (1.1%) operating manager and 1 (1.1%) ex-operating employee who had 51 years of experience in operating (senior employees contracted back via external contracts to act as advisory individuals for the Grootvlei operating section).

Figure 4-4 chart titled "Number of employees vs years employed" with y-axis "Number of employees" (0 to 16) and x-axis "Years employed" (values: 1 2 3 4 5 6 7 8 9 10 12 20 22 26 27 28 30 31 32 33 34 35 36 37 39 40 41 51).
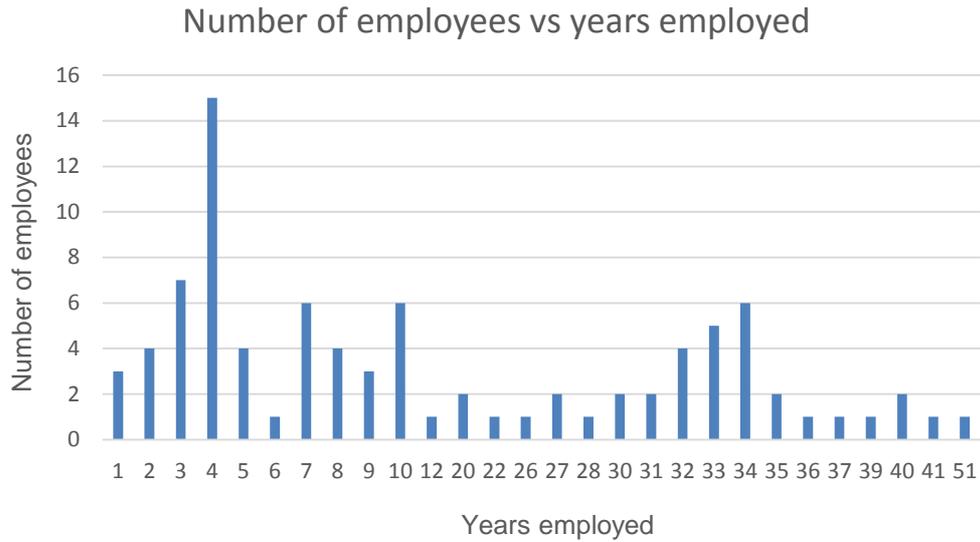
Figure 4-4:   Number of employees vs. years employed

The actual number of employees compared with their years of employment at Eskom within the operating division, is illustrated in Figure 4-4, indicating two main peaks. The initial peak occurs between 3 to 5 years. The second peak can be seen among the mid 30 years of experience.

Table 4-1: **Demographical profile of the respondents**

Variable	Category	Frequency	Valid percentage
Work station	Lethabo	46	51.7
	Grootvlei	43	48.3
Gender	Male	70	78.7
	Female	19	21.3
Race	White	33	37.1
	Black	54	60.7
	Indian	1	1.1
	Coloured	1	1.1
	Other	0	0
Age	26-30	33	37.1
	31-35	13	14.6
	36-40	1	1.1
	41-45	6	6.7
	46-50	3	3.4
	51-55	16	18
	56-60	13	14.6
	61+	4	4.5
Qualification	Matric	55	61.8
	Degree/Diploma	14	15.7
	Honours/post graduate	3	3.4
	Masters	0	0
	Other	17	19.1
Job designation	SPO - Assistant shift supervisor	11	12.4
	Plant operator	13	14.6
	Unit controller	26	29..2
	Senior controller	2	2.2
	Senior shift supervisor	2	2.2
	Shift supervisor	11	12.4
	Shift manager	0	0
	Operating manager	1	1.1
	Trainee	14	15.7
	Operating facilitator	7	7.9
	Ex-operating employee	1	1.1

4.3   DESCRIPTIVE STATISTICS

4.3.1 Skills

Table 4-2 below describes the respondents' current opinions and understanding of skills within the workplace. These results indicate a consensus that the majority of employees believe that they have sufficient skills to perform their duties but realise the importance of sharing knowledge and skills, and that the sharing of such knowledge and skills have positive benefits. Questions 5, 6 and 7 were phrased in a negative context, which was taken into consideration during the conduction of the statistical analysis. The purpose of including these negative questions was to eliminate any possibility of the respondents typically answering in a general pattern, for example, agreeing with each question without reading it in full. There is a neutral sentiment amongst the minority to believe that an incentive is required to share such knowledge and skills.

Table 4-2:   **Skills overview of results**

	SKILLS	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)	Total %	Mean	Standard deviation
				Average %					
1	How would you rate your skills level to perform your duties?	0	1	9	44	46	100	4.35	0.69
2	It is important to share my knowledge and skills.	3	1	7	28	61	100	4.42	0.93
3	Do you believe that sharing your knowledge and skills has positive benefits?	3	1	8	28	60	100	4.39	0.94
4	I would be interested in training new employees myself.	6	4	19	27	44	100	3.99	1.15
5	I need an incentive to share my knowledge and skills with new employees.	6	18	31	25	20	100	3.36	1.16
6	I would like training on how to transfer my current knowledge and skills.	3	16	17	34	30	100	3.72	1.16
7	I need additional training on knowledge and skills transfer.	5	12	21	35	27	100	3.67	1.14
8	I feel that my skill is being adequately utlised.	2	9	14	54	21	100	3.83	0.94
9	I feel that my skill is being valued.	7	15	21	34	23	100	3.53	1.20

In the initial question, it can be seen that 90% of the respondents felt positive about their current skills level for performing their daily duties. Only 9% had a neutral feeling regarding their skills level, while further investigation revealed that of this 9%, 6,6% consisted of trainees from Grootvlei power utility, and the remaining 2.4% was found to be junior operators from Grootvlei power utility. At the same time, 88% of the sample agreed that the sharing of knowledge and skills presents positive benefits. This result validates the general purpose of the study.

A total of 44% of the sample fully agreed that they would be interested in training new employees themselves. In addition, the average shared this general notion with a mean value of 3.99, indicating this high average. A total of 45% agreed that they required an incentive to share their current knowledge and skills with new employees, whereas 24% disagreed, and 31% of the sample feeling neutral. This generated a mean value of 3.36, which indicates an unclear outcome. The sample agreed that their

current skills were adequately utilised and valued, they would however like additional training on how to transfer knowledge and skills.

4.3.2 Motivation of the Trainee

Table 4-3 describes the general motivation of the trainees and their willingness to learn, apply and utilise this training. The majority of the sample shared a consensus that learning is their own responsibility and that they are constantly motivated to learn something new.

Table 4-3:   Motivation of the trainee overview of results

	MOTIVATION OF THE TRAINEE	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)	Total %	Mean	Standard deviation
				Average %					
10	I am responsible for my own learning.	0	3	5	38	54	100	4.43	0.74
11	I am able to work with little supervision after attending training.	0	1	9	51	39	100	4.28	0.67
12	I am always willing to apply the training content when I am back in the office.	0	1	15	51	33	100	4.17	0.71
13	I am always motivated to learn something new.	1	1	7	34	57	100	4.45	0.77
14	I am able to solve work related problems after attending training.	1	0	17	39	43	100	4.22	0.81
15	I depend on training personnel to ensure that transfer of learning takes place.	7	14	34	28	17	100	3.34	1.13

A total of 54% of the sample believed that they were fully responsible for their own learning, whereas 51% believed they did not require any supervision and could work independently post receiving training. The majority of the sample (57%) agreed that they were motivated to learn something new, whilst 51% agreed that they were willing to apply this training, and 43% were able to solve work related problems post training. The sample felt neutral about the respondents having to depend on training personnel to ensure that the transfer of learning takes place.

4.3.3 Workplace/organisational climate

Table 4-4 indicates the general workplace and organisational climate of the transfer of knowledge and skills. The results are indicative of the consensus that the majority believed that their current circumstances at work allowed for the application of training received to add value and make a positive contribution. Questions 17, 18 and 26 were phrased in a negative context, which was taken into consideration during the conducting of the statistical analysis. The results of the study indicate a general average leaning towards neutral, with a mean value of 3.10 for the sample.

Table 4-4: **Workplace/organisational climate overview of results**

	WORKPLACE/ ORGANISATIONAL CLIMATE	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)	Total %	Mean	Standard deviation
				Average %					
16	Circumstances at work allow me to apply the training I received to add value and make a positive contribution.	0	8	21	46	25	100	3.88	0.88
17	I do not have **time** to apply what I have learned from my training.	21	50	18	9	2	100	2.21	0.96
18	I do not get the **opportunity** to apply what I have learned from my training.	17	45	26	9	3	100	2.37	0.98
19	It is the responsibility of management to make sure that I am properly trained to do my work in the office.	5	28	23	25	19	100	3.26	1.19
20	Training is understood as a strategic element in my organisation.	0	7	18	58	17	100	3.85	0.78
21	Eskom invests sufficient funds in knowledge and skills development.	3	14	25	40	18	100	3.56	1.04
22	Eskom's environment is conducive(helpful) for learning to take place.	2	6	27	45	20	100	3.75	0.92
23	The equipment at the workplace is of the same quality as that used during training.	7	15	39	31	8	100	3.19	1.01
24	The equipment available at the workplace is good enough to do the work as required by the training I have received.	4	9	24	55	8	100	3.53	0.93
25	The training materials are relevant and up to date.	2	18	26	47	7	100	3.38	0.94
26	The current training system/method should be changed.	2	22	28	29	19	100	3.42	1.10
27	People are rewarded for sharing skills and knowledge.	46	28	20	5	1	100	1.87	0.97

A total of 71% of the sample believed that they had sufficient **time** to apply what they had learned from training, while 62% believed they had sufficient **opportunities** to apply what they had learned from training. The majority of respondents believed that

it was the responsibility of management to ensure that they were adequately trained to perform their daily duties. A total of 75% of the respondents understood training to be a strategic element in their organisation and a further 58% felt that Eskom invested sufficient funds in knowledge and skills development. A total of 65% of the sample agreed that Eskom's environment is conducive for learning to take place. A total of 39% of the respondents felt neutral regarding the equipment in the workplace; it being of the same quality as that of the equipment used in their training. A total of 63% believed that the equipment available at the workplace was good enough for conducting the work as required in line with the training they received, whereas 54% agreed that the training material was relevant and up to date. Surprisingly, 52% of the respondents felt that the current training system/method should be changed. A concerning 46% of the respondents believed that they were not rewarded for sharing skills and knowledge.

4.3.4 Management support for skills and knowledge

Table 4-5 describes the typical effect that management support for knowledge and skills has on employees within Eskom. The results detailed below indicate a consensus that the majority had a neutral feeling, that there is generally little or no management support for skills and knowledge within Eskom.

Table 4-5:   Management support for skills and knowledge overview of results

	MANAGEMENT SUPPORT FOR SKILLS AND KNOWLEDGE	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)	Total %	Mean	Standard deviation
				Average %					
28	There is a positive transfer of learning because management supports the training and development of employees.	10	20	27	35	8	100	3.10	1.13
29	Management cares about my needs to have, and improve my knowledge and skills.	15	18	26	33	8	100	3.02	1.20
30	Management gives me feedback regarding the way I apply the knowledge and skills I learn from training.	18	26	33	19	4	100	2.66	1.12
31	Management is involved with the selection of the training material that I receive.	15	25	35	22	3	100	2.75	1.07
32	Management understands the way I learn as an individual.	16	29	33	19	3	100	2.65	1.07

A total of 43% of the sample agreed that there was a positive transfer of learning because management supports the training and development of employees, whereas 33% believed that management cared about their needs to retain and improve their knowledge and skills. A further 33% had a neutral feeling towards management providing feedback regarding the way they apply the knowledge and skills learned from training. A total of 40% of the respondents believed that management was not involved with the selection of the training material that they received. In addition, 45%

of the sample felt that management did not understand the way that they learned as individuals.

4.3.5 Validity and reliability of statistics

Table 4-6: Cronbach's alpha of sample

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.865	0.869	32

A Cronbach's alpha for the entire sample of 0.865, was obtained and this value was sufficient for reliability. The sub-scale scores for each section of the sample were calculated to determine their reliability.

4.3.5.1 Skills

Table 4-7: Cronbach's alpha of skills

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.727	0.728	9

A Cronbach's alpha of 0.727 was obtained for the first section (skills), with a total number of nine questions. This value was sufficient for reliability. Table 4-8 describes the sub-scale scores calculated.

Table 4-8:   Cronbach's alpha values when items are deleted

	Corrected item-Total correlation	Squared multiple correlation	Cronbach's alpha if item was deleted
How would you rate your skills level to perform your duties?	0.091	0.186	0.741
It is important to share my knowledge and skills.	0.688	0.774	0.656
Do you believe that sharing your knowledge and skills has positive benefits?	0.702	0.757	0.653
I would be interested in training new employees myself.	0.691	0.692	0.642
I need an incentive to share my knowledge and skills with new employees.	0.102	0.149	0.758
I would like training on how to transfer my current knowledge and skills.	0.576	0.705	0.667
I need additional training on knowledge and skills transfer.	0.431	0.697	0.697
I feel my skill is being adequately **utlised.**	0.264	0.356	0.724
I feel my skill is being **valued.**	0.177	0.371	0.747

4.3.5.2 Motivation of the trainee

Table 4-9:   Cronbach's alpha of motivation of the trainee

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.662	0.684	6

A Cronbach's alpha of 0.662 was obtained for the second section (motivation of the trainee), with a total number of six questions. An alpha value of below 0.7 is also deemed acceptable in social sciences (Field, 2009:675). The alpha score for this section (motivation of the trainee), can therefore be regarded as acceptable for reliability. Table 4-10 describes the sub-scale scores calculated. This Cronbach's alpha value of 0.662 is possibly attributed to the small sample size.

Table 4-10:   Cronbach's alpha values when items are deleted

	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
I am responsible for my own learning.	0.216	0.107	0.674
I am able to work with little supervision after attending training.	0.447	0.419	0.606
I am always willing to apply the training content when I am back in the office.	0.491	0.414	0.590
I am always motivated to learn something new.	0.452	0.321	0.600
I am able to solve work related problems after attending training.	0.543	0.437	0.564
I depend on training personnel to ensure that transfer of learning takes place.	0.302	0.137	0.680

4.3.5.3 Workplace/organizational climate

Table 4-11:   Cronbach's alpha of workplace/organisational climate

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.805	0.815	12

A Cronbach's alpha of 0.805 was obtained for the third section (Workplace/organisational climate), with a total number of 12 questions. This value was sufficient for reliability. Table 4-12 describes the sub-scale scores calculated.

Table 4-12:   Cronbach's alpha values when items are deleted

	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
Circumstances at work allow me to apply the training I received to add value and make a positive contribution.	0.637	0.505	0.775
I do not have **time** to apply what I have learned from my training.	-0.011	0.170	0.840
I do not get the **opportunity** to apply what I have learned from my training.	0.378	0.333	0.797
It is the responsibility of management to make sure that I am properly trained to do my work in the office.	0.722	0.618	0.763
Training is understood as a strategic element in my organisation.	0.655	0.607	0.773
Eskom invests sufficient funds in knowledge and skills development.	0.681	0.575	0.768
Eskom's environment is conducive (helpful) for learning to take place.	0.654	0.567	0.772
The equipment at the workplace is of the same quality as that used during training.	0.267	0.251	0.806
The equipment available at the workplace is good enough to do the work as required by the training I have received.	0.343	0.332	0.800
The training material is relevant and up to date.	0.486	0.469	0.787
The current training system/method should be changed.	0.458	0.333	0.790
People are rewarded for sharing skills and knowledge.	0.342	0.256	0.802

4.3.5.4 Management support for skills and knowledge

Table 4-13:   Cronbach's alpha of management support for skills and

knowledge

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
0.903	0.903	5

A Cronbach's alpha of 0.903 was obtained for the last section (management support for skills and knowledge), with a total number of five questions. This value was sufficient for reliability. Table 4-14 describes the sub-scale scores calculated.

Table 4-14:   Cronbach's alpha values when items are deleted

	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
There is a positive transfer of learning because management supports the training and development of employees.	0.756	0.718	0.881
Management cares about my needs to have, and improve my knowledge and skills.	0.784	0.750	0.875
Management gives me feedback regarding the way I apply the knowledge and skills I learn from training.	0.772	0.612	0.878
Management is involved with the selection of the training material that I receive.	0.723	0.638	0.888
Management understands the way I learn as an individual.	0.751	0.637	0.882

4.3.5.5 **Validity**

The 32 questions in Section B were grouped into four sub-scales, namely skills, motivation of the trainee, workplace/organisational climate and management support for skills and knowledge. All the questions were relevant and pertinent to their respective sub-scales, as can be seen by the calculated Cronbach's alpha values. These calculated Cronbach's alpha values indicate the validity, reliability and relevance each question has to their respective topic (sub-scale).

SECTION C: OPEN-ENDED QUESTIONS:

Section C of the questionnaire consisted of four open-ended questions, of which all four questions focused primarily on skills and knowledge. The participants were requested to provide their honest opinions and suggestions regarding their understanding and overall perspective of the proposed questions. The subsequent findings consisted mostly of definitive answers, all of which were relevant to skills and knowledge, excluding a few indefinite results.

QUESTION 1:

"Do you think a primary reason for knowledge and skills shortages in the operating environment is because the workforce is seeking better job opportunities elsewhere?"

The majority of the respondents believed that the primary reason for knowledge and skills shortages in the operating environment is the direct result of the workforce seeking better job opportunities elsewhere. More precisely, 46 (50.6%) of the respondents answered 'Yes', 24 (26.4%) provided inadequate answers, whereas the remaining respondents, 20 (22%), responded with a definite 'No'.
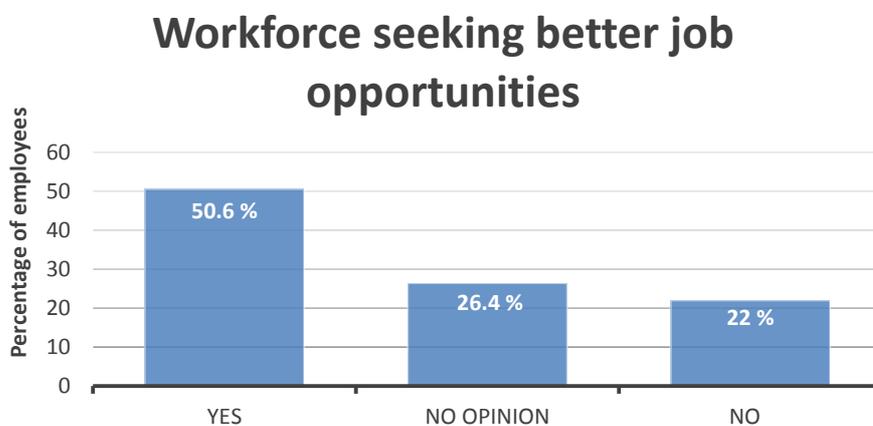
Figure 4-5: Workforce seeking better job opportunities

From the 20 (22%) respondents who answered 'No', the general understanding was that the operating personnel are under paid and usually not valued. In addition, they believed that growth opportunities were vastly scarce and generally slow. All strongly considered 'operating' as a stepping-stone for advancement to a better or higher position, and believed that they were insufficiently remunerated for their current level of responsibility. The respondents shared a common sentiment that there was little or no interest for their situations, neither in the workplace nor from management. Furthermore, they contended that employees were not recognized or encouraged, that knowledge and skills were not used and that there were no growth opportunities for those without any qualifications.

Of the 24 (26.4%) respondents who provided indefinite answers, all believed that there was a partial number of operators who were reluctant to learn, and that there was

insufficient pipelining for 'operating'. A prevalent concern was that the attitude of employees was not right, thus, consequently no skills and knowledge transfer was taking place. Additionally, these newly appointed employees had a 'no-care' attitude resulting in a complete lack of interest when it came to learning. They further mentioned that positions were left vacant for too long and that racial discrimination was present, resulting in the incorrect placement of incompetent individuals.

The 46 (50.6%) respondents who answered 'Yes' believed that employees made use of the operating department as a 'foot-in-the-door', and then seized transfer opportunities to positions offering more substantial remuneration benefits. There was a considerable understanding that a vast minority of individuals believed that they would not remain in their current positions for too long, resulting in a lack of interest in knowledge and skills. A concerning point mentioned, was that females within 'operating' were treated as objects and therefore were not sufficiently competent. All felt that the majority of employees within 'operating' were not willing to work nightshifts as the hours were not very accommodating to most of them, and they had families to take care of. They also contended that they were overworked, with an abnormal amount of responsibility, and little to no recognition for training in general. The majority of the respondents believed that they were under-remunerated, not valued as employees and that their positions were somewhat demoralizing; all of which motivated the seeking of alternative opportunities.

QUESTION 2:

"**What do you consider to be barriers to successful knowledge and skills transfer processes?"**

In general, the respondents considered the overall attitude of employees to be that of the most prevalent barriers to successful knowledge and skills transfer processes. Better remuneration, insufficient experience, racial influence, lack of trust, lack of interest, lack of communication, lack of incentive to conduct training, and little or no management support, were also amongst these barriers. Numerous suggestions that training personnel need to be adequately trained themselves were mentioned, as well as the requirement of skills to enable successful skills and knowledge transfer. The need for training material to be improved arose alongside the concern that young people have little or no respect for their superiors. The majority felt that racial targets

were among these barriers, including the taking on of positions to ensure constant work. A considerable amount of responses gathered that senior operators were just not willing to transfer skills and knowledge and that the 'grey beards (senior experienced operators), should retire post conducting training and refrain from sharing info with operators. Another barrier mentioned was that the idea that an employees must excel in a group, as opposed to individually, was enforced, as the "high flyers" were inevitably held back for this purpose. Lastly, a substantial number of respondents believed that the overall workplace/environment and plant was abnormally dirty and that there were too many procedures to be followed in order for learning and skills transfer to occur, resulting in a hindrance towards the transfer process.

QUESTION 3:

"As an Operator, would you be willing to do skills and knowledge sharing before you retire – what do you feel will be a fair remuneration (please provide your suggestions)"

Of the 90 respondents who answered and provided their suggestions, 70 (77%) said 'Yes', compared to 11 (12.1%) who said 'No', and 9 (9.9%) who had no comment at all.

Would you be willing to do Skills and Knowledge transfer
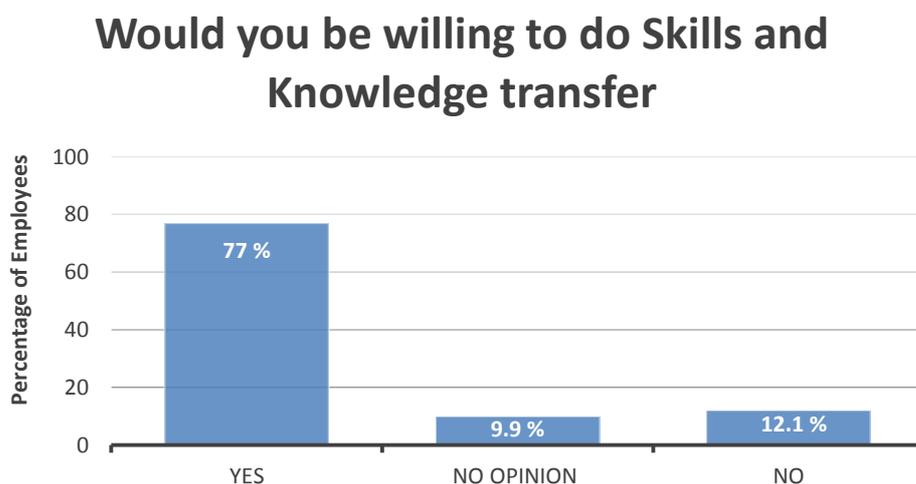
Figure 4-6:   Would you be willing to do skills and knowledge transfer?

The majority who answered 'Yes' (70 employees/77%), insisted that they would be willing to do skills and knowledge transfer on the basis that they had the support of management, they received an incentive by means of remuneration, there was

sufficient time allocated for such training, and training was extended to interested individuals. The 11 (12.1%) respondents who answered 'No', contended that there was no personal benefit for such training, and believed that their experience could not be transferred. One respondent mentioned that he/she was not willing to share his/her knowledge and skills with those whom they felt were not deserving.

QUESTION 4:

"Is there anything else you wish to share regarding the skills and knowledge shortage and how Eskom could address the situation?"

The predominant feedback gathered was that the old operators should facilitate/conduct the training, as they were the most experienced, knowledgeable and generally well-known within Eskom. A few respondents insisted that senior operators should not withhold critical operating information, only to secure their current positions. They further suggested that training should be more readily available, the quality of training needed to be improved, training materials should be up-to-date, and a general sense of responsibility should be brought back. Nearly all the respondents believed that management should stop avoiding important issues and should rather address them. Most felt that the general productivity was extremely low and that individuals without the necessary skills and knowledge were unfairly promoted. They further argued that the recruitment process should be done properly, and deserving individuals should be appointed. As a standard, respondents felt that Eskom did not value their input at all.

4.4 DERIVED DEMOGRAPHIC RELATIONSHIPS

The t-Test and the analysis of variance were conducted to examine whether the responses shifted with the dimensions of the questionnaires. This was done in an attempt to answer the objective of whether there were any meaningful differences, at the $p < 0.05$ level, to the way the participants responded to the questionnaires. P-values and d-values were recorded and are further discussed below.

4.5   T-TEST STATISTICS AND THE ANALYSIS OF VARIANCE

The t-Test statistics and the analysis of variance were used to determine whether there was a significant statistical distinction between the mean and distribution of samples. These tests measured the null hypothesis and probed whether the mean and distribution of the concerned populations were the same (Welman *et al.,* 2007:231). The t-Tests measure the dissimilarity between the means and the distribution of two groups.

A t-Test on age groups and highest qualification was conducted to test whether there was a significant statistical difference in the way the respondents answered the questions.

Cramer's V association of components

Table --15:   Guidelines – Phi and Cramer's V

Guidelines - Phi and Cramer's V	
0,1	Small effect
0,3	Medium effect
0,5	Large effect

Table 4-15 indicates the guidelines that are used in determining the association coefficient effect. Only Cramer's V coefficient values above 0.3 (medium and large effects) were considered in the analysis.

The p-value for **age groups,** compared to the **highest qualification obtained,** is above 0.05, indicating that there is no statistical difference in how the different age groups responded.

Table 4-16:   Comparison between age group and highest qualification obtained

		value	p-value
Nominal by Nominal	Phi	0.451	0.643
	Cramer's V	0.260	0.643
N of Valid Cases		89	

The second comparison made was between the **age group** and the **work station**, being the two different power utilities (Grootvlei and Lethabo).

The p-value for the **age groups** compared to the **work station** is 0.000, indicating that there is a statistical difference in how the respondents from the two work stations answered.

Table 4-17:   Comparison between age group and work station

		Value	p-value
Nominal by Nominal	Phi	0.663	0.000
	Cramer's V	0.663	0.000
N of Valid Cases		89	

The Cramer's V values were found to be 0.663, indicating a large effect.

Three contributing factors were identified:

- In the initial age group (26-30) there were 10 respondents from Lethabo and 23 from Grootvlei;

- In the age group (51-55) there were 15 respondents from Lethabo and only one from Grootvlei; and

- In the age group (56-60) there were 13 respondents from Lethabo and 0 from Grootvlei.

A t-Test was conducted to test whether work station participants responded differently. The p-value and d-value of the t-Test are shown in Table 4-18 below. The questionnaire was completed by 46 Lethabo operating employees and 43 from Grootvlei.

Table 4-18:   Results of the t-Test for work station

Work station		N	Mean	Std. Deviation	Std. Error Mean	Effect size (d)	p-value
Skills	1.0	46	3.8285	.58687	.08653	0.31	.139
	2.0	43	4.0129	.57644	.08791		
Motivation of the trainee	1.0	46	4.0725	.47875	.07059	0.30	.141
	2.0	43	4.2287	.51309	.07825		
Workplace/Organisation al Climate	1.0	46	3.2011	.55069	.08120	0.58	.006
	2.0	43	3.5213	.50921	.07765		
Management support for skills and knowledge	1.0	46	2.4739	.91346	.13468	0.83	.000
	2.0	43	3.2279	.82760	.12621		

From the p-values in Table 4-18 for work station, it can be concluded that for the **workplace/organisational climate** and **management support** for **skills and knowledge,** the p-value is smaller than 0.05, indicating that the participants answered the questions in a significantly different manner statistically. For the other dimensions, skills and motivation of the trainee, the p-values are greater than 0.05, indicating that the participants answered the questions in a significantly similar manner statistically. The effect size for the **workplace/organisational climate,** has a d-value of 0.58, which is smaller than 0.8, but bigger than 0.5, resulting in a medium effect. The effect size for **management support for skills and knowledge** has a d-value of 0.83, which is larger than 0.8, thus resulting in a large effect.

A t-Test was conducted to test whether race participants responded differently. The p-value and d-value of the t-Test are shown in Table 4-19 below. The questionnaire was completed by 33 Whites and 54 Blacks. One Coloured person and one Indian respondent also participated in completing the questionnaire. They were however excluded from the t-Test, due to their minimal effect.

Table 4-19:   Results of t-Test for race

Race		N	Mean	Std. Deviation	Std. Error Mean	Effect size (d)	p-value
Skills	1.0	33	3.6296	.64649	.11254	0.69	.000
	2.0	54	4.0761	.48062	.06540		
Motivation of the trainee	1.0	33	3.9596	.51712	.09002	0.53	.011
	2.0	54	4.2315	.44205	.06015		
Workplace / organisational climate	1.0	33	3.2348	.54145	.09425	0.31	.165
	2.0	54	3.4028	.54339	.07395		
Management support for skills and knowledge	1.0	33	2.7030	.89460	.15573	0.19	.370
	2.0	54	2.8926	.98419	.13393		

From the p-values in Table 4-19 for **r**ace, it can be concluded that for **skills** and **motivation of the trainee,** the p-value is smaller than 0.05, indicating that the participants answered the questions in a significantly different manner statistically. For the other dimensions, namely the workplace/oganisational climate and kmanagement support for skills and knowledge, the p-values are greater than 0.05, indicating that the participants answered the questions in a significantly similar manner statistically. The effect size for **skills** has a d-value of 0.69 which is smaller than 0.8 but larger than 0.5 resulting in a medium effect. Similarly, the effect size for **motivation of the trainee** has a d-value of 0.53, which is smaller than 0.8, but larger than 0.5, also resulting in a medium effect.

4.6   SPEARMAN'S RHO CORRELATION CO-EFFICIENT

The correlation for age groups were calculated and summarized in Table 4-20. These were used to test the hypothesis. The alternative hypothesis was accepted when the p-value<0.05.

Table 4-20: Correlation co-efficients between age groups and Section B dimensions

			Age groups	Skills	Motivation-trainee	Workplace	Management-support
Spearman's rho	Age groups	Correlation coefficient	1.000	-.310**	-.260*	-.083	-.164
		Sig. (2-tailed)		.003	.014	.438	.124
		N	89	89	89	89	89
	Skills	Correlation coefficient	-.310**	1.000	.556**	.279**	.243*
		Sig. (2-tailed)	.003		.000	.008	.022
		N	89	89	89	89	89
	Motivation - trainee	Correlation coefficient	-.260*	.556**	1.000	.402**	.273**
		Sig. (2-tailed)	.014	.000		.000	.010
		N	89	89	89	89	89
	Workplace/organisational climate	Correlation coefficient	-.083	.279**	.402**	1.000	.731**
		Sig. (2-tailed)	.438	.008	.000		.000
		N	89	89	89	89	89
	Management - support	Correlation coefficient	-.164	.243*	.273**	.731**	1.000
		Sig. (2-tailed)	.124	.022	.010	.000	
		N	89	89	89	89	89

The test for first hypothesis H1:

H_{01}: There is no statistically significant relationship between the age groups and skills within the operators division at Eskom.

H_{A1}: There is a statistically significant relationship between the age groups and skills within the operators division at Eskom.

Reviewing Table 4-20, the Spearman's rho correlation was -.310 with a p-value of .003, which was smaller than the level of significance. This meant that there was a significant negative relationship between age groups and skills (negative correlation, practically significant, medium effect). Therefore we accept the alternative hypothesis.

The test for second hypothesis H2:

H_{02}: There is no statistically significant relationship between age groups and motivation of the trainee within the operators division at Eskom.

H_{A2}: There is a statistically significant relationship between age groups and motivation of the trainees within the operators division at Eskom.

Reviewing Table 4-20, the Spearman's rho correlation was -.260 at a p-value of .014, which was smaller than the level of significance (negative correlation, practically significant, small effect). This meant that there was a significant negative relationship between age groups and motivation of the trainee. Therefore the researcher accept the alternative hypothesis.

The test for the third hypothesis H3:

H_{03}: There is no statistically significant relationship between age groups and workplace/organisational climate within the operators division at Eskom.

H_{A3}: There is a statistically significant relationship between age groups and workplace/organisational climate within the operators division at Eskom.

Reviewing Table 4-20, the Spearman's rho correlation was -.083 with a p-value of .438 which was larger than the level of significance (negative correlation). This meant that there was no significant relationship between age groups and workplace/organisational climate.

The test for the fourth hypothesis H4:

H_{04}: There is no statistically significant relationship between age groups and management support for skills and knowledge within the operators division at Eskom.

H_{A4}: There is a statistically significant relationship between the age groups and management support for skills and knowledge within the operators division at Eskom.

Reviewing Table 4-20, the Spearman's rho correlation was -.164 with a p-value of .124, which was larger than the level of significance (negative correlation, practically significant, small effect). This meant that there was no significant relationship between age groups and management support for skills and knowledge.

Table 4-21:   **Correlation co-efficients between the period of employed at Eskom and Section B dimensions**

			Period employed at Eskom	Skills	Motivation - trainee	Workplace	Management - support
Spearman's rho	Period employed at Eskom	Correlation coefficient	1.000	-.308**	-.373**	-.260*	-.280**
		Sig. (2-tailed)		.003	.000	.014	.008
		N	89	89	89	89	89
	Skills	Correlation coefficient	-.308**	1.000	.556**	.279**	.243*
		Sig. (2-tailed)	.003		.000	.008	.022
		N	89	89	89	89	89
	Motivation - trainee	Correlation coefficient	-.373**	.556**	1.000	.402**	.273**
		Sig. (2-tailed)	.000	.000		.000	.010
		N	89	89	89	89	89
	Workplace	Correlation coefficient	-.260*	.279**	.402**	1.000	.731**
		Sig. (2-tailed)	.014	.008	.000		.000
		N	89	89	89	89	89
	Management - support	Correlation coefficient	-.280**	.243*	.273**	.731**	1.000
		Sig. (2-tailed)	.008	.022	.010	.000	
		N	89	89	89	89	89

The test for first hypothesis H1:

H_{01}: There is no statistically significant relationship between period employed at Eskom and skills within the operators division at Eskom.

H_{A1}: There is a statistically significant relationship between the period employed at Eskom and skills within the operators division at Eskom.

Reviewing Table 4-21, the Spearman's rho correlation was -.308 with a p-value of .003, which was smaller than the level of significance (negative correlation, practically significant, medium effect). This meant that there was a significantly negative relationship between the period employed at Eskom and skills. Therefore the researcher accepts the alternative hypothesis.

The test for second hypothesis H2:

H_{02}: There is no statistically significant relationship between the period employed at Eskom and motivation of the trainee within the operators division at Eskom.

H_{A2}: There is a statistically significant relationship between the period employed at Eskom and the motivation of the trainee within the operators division at Eskom.

Reviewing Table 4-21, the Spearman's rho correlation was -.373 with a p-value of .000, which was smaller than the level of significance (negative correlation, practically significant, medium effect). This means that there was a significant negative relationship between the period employed at Eskom and the motivation of the trainee. Therefore the researcher accepts the alternative hypothesis.

The test for third hypothesis H3:

H_{03}: There is no statistically significant relationship between period employed at Eskom and the workplace/organisational climate within the operators division at Eskom.

H_{A3}: There is a statistically significant relationship between the period employed at Eskom and workplace/organisational climate within the operators division at Eskom.

Reviewing Table 4-21, the Spearman's rho correlation was -.260 with a p-value of .014, which was smaller than the level of significance (negative correlation, practically significant, small effect). This meant that there was a significant negative relationship between the period employed at Eskom and the workplace/organisational Climate. Therefore the researcher accepts the alternative hypothesis.

The test for fourth hypothesis H4:

H_{04}: There is no statistical significant relationship between the period employed at Eskom and management support for skills and knowledge within the operators division at Eskom.

H_{A4}: There is a statistical significant relationship between period employed at Eskom and management support for skills and knowledge within the operators division at Eskom.

Reviewing Table 4-21, the Spearman's rho correlation was -.280 with a p-value of .008, which was smaller than the level of significance (negative correlation, practically significant, small effect). This meant that there was a significant negative relationship between period employed at Eskom and management support for skills and knowledge. Therefore the researcher accepts the alternative hypothesis.

4.7   DISCUSSION

The general objective of the study was to investigate the preferred and most optimal way of skills and knowledge transfer from senior to junior/trainee employees within the operators divisions, and subsequently the electricity generating industry. To achieve the general objective, specific objectives were defined and analysed through statistical properties of the measuring instrument, mostly to determine their validity and reliability, including the correlations and to further determine the demographical differences between the sample groups from the way that they responded to the questionnaire.

The descriptive statistics were dominated by the male population from both work stations. Similarly, the responses received were more or less equal in size from both Lethabo and Grootvlei. The participants of the sample were predominantly young and black and between the ages of 26 and 30. The majority of the sample had a matric certificate as their highest qualification and largely comprised of two employee designation groups, namely trainees and control panel operators.

The Cronbach's alpha coefficients showed an acceptable internal consistency for all four dimensions (0.72 for skills, 0.62 for motivation of the trainee, 0.80 for the workplace/organisational climate and 0.90 for management support for skills and knowledge), which is above the acceptable threshold of 0.70, except for motivation of

the trainee. It is however still deemed acceptable in social sciences (Field, 2009:675). It can therefore be concluded that the measuring instrument used is valid and reliable.

In addition, the individual Cronbach's alpha values for each sub-scale questions were calculated. From this their individual reliability could be adequately determined. As a result, should a question be deleted, the effect that this individual question has on the overall reliability of the sub-scale, could be noted.

The participants answered the questions in a significantly different manner where 'management support for skills and knowledge' was concerned. For Lethabo, it was 2.4 and for Grootvlei, 3.2, indicating that Lethabo employees believed that they received little or no support from management for skills and knowledge transfer.

The t-Tests were conducted on the following dimensions to determine how each participant responded:

Work Station:
- From the t-Test conducted on the work station, it was evident that the respondents at Grootvlei (mean value: 3.2), felt more positive about management's support for skills and knowledge, as opposed to those at Lethabo (mean value: 2.4).

- Lethabo attained a mean value of 3.2, whereas Grootvlei attained a mean value of 3.5 regarding the workplace/organisational climate. This indicates that the respondents at Grootvlei felt that the general workplace/organisation climate is conducive for skills and knowledge transfer to take place, more so than those respondents at Lethabo.

- In conclusion, the participants at Grootvlei responded differently to those at Lethabo, generally feeling more positive about their workplace/organisational climate and the management's support for skills and knowledge transfer.

Race:
- From the t-Test conducted on the race of each respondent, it was determined that Blacks (mean value: 4.0) felt that their current skills were more valued and utilised and that they were more willing to share their skills and knowledge, as opposed to their white counterparts (mean value: 3.6).

- Blacks generally felt more motivated regarding the motivation of the trainee, with a mean score of 4.2, whereas Whites felt marginally less motivated than their black counterparts, having attained a mean score of 3.9.

- In conclusion, black participants had a more positive response to their white counterparts regarding both the motivation of the trainee and skills respectively.

The results of the Spearman's rho correlation coefficients of the two constructs (*age groups* and *period employed at Eskom*) are detailed below:

Age Group:
- A negative correlation between the *age groups* and *skills* (practically significant, medium effect);

- A negative correlation between the *age groups* and *motivation of the trainee* (practically significant, small effect);

- No significant correlation between *age groups* and *workplace/organisational climate*; and

- No significant correlation between the *age groups* and *management support for skills and knowledge*.

Period employed at Eskom:
- A negative correlation between the *period employed at Eskom* and *skills* (practically significant, medium effect);

- A negative correlation between the *period employed at Eskom* and the *motivation of the trainee* (practically significant, medium effect);

- A negative correlation between the *period employed at Eskom* and the *workplace/organisational climate* (practically significant, small effect);

- A negative correlation between the *period employed at Eskom* and *management support for skills and knowledge* (practically significant, small effect).

In general, both the *age groups* and the *period employed at Eskom* indicate a negative correlation with their respective sub-scales (skills, motivation of the trainee,

workplace/organisational climate and management support for skills and knowledge), excluding the two dimensions that had no correlation.

4.8 CHAPTER SUMMARY

In this chapter, the results of the empirical study are conveyed and discussed in terms of the qualitative and quantitative findings. One questionnaire was administered, being the knowledge and skills transfer/learning process. This questionnaire was developed to gather demographical data, answers to 32 definitive questions, and four open-ended questions pertinent to skills and knowledge transfer.

Acceptable Cronbach's alpha coefficients were attained, indicating that a large portion of the variance is explained by the dimensions (Nunnally & Bernstein, 1994).

The findings indicated that the research hypothesis could be accepted and that there is generally a negative correlation between the two constructs (*age groups* and *period employed at Eskom*) and their respective sub-scales (skills, motivation of the trainee, workplace/organisational climate and management support for skills and knowledge). In Chapter Five, an overview of the study, validity and reliability of the research instrument, limitations and recommendations specific to the organisation and future studies, is given.

CHAPTER 5: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The primary purpose of this research was to determine whether the transfer of knowledge and skills from seniors/operators to juniors/trainees within Eskom, is in fact taking place, and to understand the current transfer model as well as the nature and extent of the knowledge and skills being transferred. The researcher also focused on the current retention of skills and knowledge within Eskom. Various functional objectives were formulated for this investigation.

The initial objective intended to develop an accurate understanding of the current transfer model within Eskom's operators division. The second objective was aimed at identifying the noticeable shortfalls/weak points of this transfer model. The third objective was to further build and develop on this transfer model.

5.2 OVERVIEW OF THE STUDY

Chapter 1 of this study presented a descriptive roadmap that was followed to clearly articulate the current problem and to define primary and secondary objectives. A theoretical overview examining current skills and knowledge transfer was presented in Chapter 2. In Chapter 3, the methodology used to carry out an empirical study was presented. A pilot study was conducted in order to correct any ambiguities, while presenting an opportunity to refine questions in the questionnaire. Measuring instruments modified from existing questionnaires were used to collect data. Chapter 4 dealt with the analysis and discussion of results obtained from the study. In Chapter 5, conclusions were drawn, limitations discussed, validity and reliability of instruments mentioned, as well as recommendations for further studies presented.

5.3 VALIDITY AND RELIABILITY OF THE RESEARCH INSTRUMENT

The statement made by Denscombe (2007), that a research instrument, generally a questionnaire in one form or another, can be said to be valid and reliable on the bases that it can be showed to have gathered the particular data that it was initially designed to collect, was considered when the instrument was created. Denscombe (2007) continues by mentioning that the instrument is reliable if it somehow managed to

produce the same findings when the investigation, utilising this instrument, was to be replicated. Numerous alternative criteria for determining the validity of research instruments are further set by the author, while stating that such an instrument ought to be economical regarding the cost of administration, both as far as the expenditure and time constraints that it presents amidst data collection, and research administration. The responses evoked furthermore ought to be standardised and consistent.

The findings of the statistical analyses of the data gathered by means of the five point Likert type measuring scale, indicated that all the research variables obtained a Cronbach's alpha value of .865, which indicated support for the validity and reliability of the research instrument, as well as the data collected by means of this instrument.

The aforementioned findings affirm that the research instrument, including the measurement scales utilised as a part of it, indicates a scientifically acceptable standard of validity and reliability. From these discoveries it could, by extrapolation, be deduced that the data collected and the conclusions drawn from the statistical analysis of that data, were both valid and reliable.

5.4   CONCLUSIONS DRAWN FROM THE DESCRIPTIVE ANALYSIS

The descriptive statistical analysis further revealed that the feedback obtained from the research sample, were distributed normally. From these responses, it could be understood that there was a mutual, positive feeling that the respondents felt adequately skilled in their current positions, as well as that the majority possessed a positive feeling about their current workplace/organisation climate. Similarly, the respondents shared an optimistic sentiment regarding the motivation of the trainee, whereas the common findings of management support for skills and knowledge presented a general insufficiency amidst the employees.

This normality of the distribution of the feedback to the various items in the research questionnaire, permitted the conclusion to be drawn that the employees felt significantly confident with their current skills and knowledge, and shared a promising willingness to transfer these skills and knowledge, however there was a sizeable lack of initiative, taking lead, and support of management for skills and knowledge.

5.5   LIMITATIONS OF THE STUDY

The following limitations were identified in this study:

- The Eskom generating division consists of 13 power utilities of which only two were included in the study (Lethabo and Grootvlei). This primarily limited the overall reach and extent of the study to both Lethabo and Grootvlei utilities, allowing the research to be conducted amid 15% of Eskom's entire operating divisions within the organisaton.

- The operators within Eskom's operating division are required to maintain a high level of concentration on the control panel, constantly monitoring parameters. This resulted in the need to develop a short questionnaire in an attempt to allow for little to no distraction of the operators, whilst making provision for sufficient time to complete the questionnaire.

5.6   RECOMMENDATIONS

Recommendations pertaining to Eskom's operating division, as well as recommendations for further research, are made in this section.

5.6.1 Recommendations for the Organisation

- The general mind-set and attitude of the operating personnel needs to be adjusted. The seniors/operators have a preconceived idea or notion that the juniors/trainees are undeserving of their skills and knowledge, and prefer to be 'spoon-fed' rather than to undergo the necessary training. Consequently, the juniors/trainees retain an adverse notion that the seniors/operators are not willing to transfer these skills and knowledge that they require, resulting in a general negative association with training and skills transfer in general. This is a direct result of a simple yet unfortunate communication gap between the seniors /operators and the juniors/trainees. If this communication gap is closed it will result in a plethora of attitude related issues, as well as the general mind-set of both seniors/operators and the juniors/trainees being positively adjusted for the benefit of a successful skills and knowledge transfer process. A further recommendation would be to create teamwork activities structured around the operating division with the

purposeful intention to motivate positive interaction amongst the seniors/operators and juniors/trainees.

- It is recommended that general training material ought to be updated on a regular basis and made available to employees by means of easy access, as this directly impacts the willingness to learn with each employee regardless of race, age or designation. In addition, the training material needs to be that of interpretable context and not of a superior or higher level, as mentioned by a substantial sum of participating respondents.

- Control room operators commonly lose out on a significant amount of employee benefits, as they are divisionally excluded from the general internal activities or events. This is largely because they are required to be on duty from when their shift begins to when it comes to an end. Incentives or specific motivational activities outside their shifts need to be devised and implemented to assist in making the control room operators feel more positive. This approach can be focused on the overall operating division simultaneously.

- Given the unfortunate, deteriorating state of the power utilities and the current electricity demand, a large amount of strict attention to maintain a constant generation and supply of electricity without any downtime (tripping of units), has resulted in an abnormal amount of stress being added to management, which in turn is passed on through to the operators. As a result, a sense of fear is driven more strongly than one of a more supportive role from management.

- When the open-ended question 'I need an incentive to share my knowledge and skills with new employees' was asked, the majority of the participants (60% on average) responded that they would expect remuneration for the sharing of their skills and knowledge. Similarly, this question obtained a mean score of 3.36, indicating an average consensus to the need for an incentive or remuneration. It

is therefore recommended that an attractive incentive program or remuneration structure be implemented to motivate the willingness to share and transfer skills and knowledge to newly employed individuals.

- All operating personnel retain a prerequisite clause in their employment contracts, which states that 5% of their job profile consists of the requirement to facilitate training, however most of the operators are not aware of this clause and therefore do not take heed to such a requirement. Eskom should create more awareness of this standard so as to instil a sense of accountability within the operators to consequently engage in the transfer of skills and knowledge on a more independent level. Another recommendation would be to include an additional clause in the operator's job profile that this 5% training prerequisite needs to be carried out two years prior to retirement so as to ensure an adequate timeframe that allows for the successful transfer and retention of these skills and knowledge. Alternatively a process can be created to facilitate this transition.

- As per the general feedback received, the operators maintained a keen interest in completing the questionnaire. As a result, a recommendation to Eskom would be that more opportunities are awarded to the operators to provide feedback pertinent to their daily activities or current workplace. This motivates a positive feeling amid the operators and the operating division alike.

In order to encapsulate the recommendations for the current training process, as well as to elucidate the situation pertinent to this process, the following model is proposed as a recommended approach. This recommendation ought to be motivated/pursued by management within Eskom's generation division.
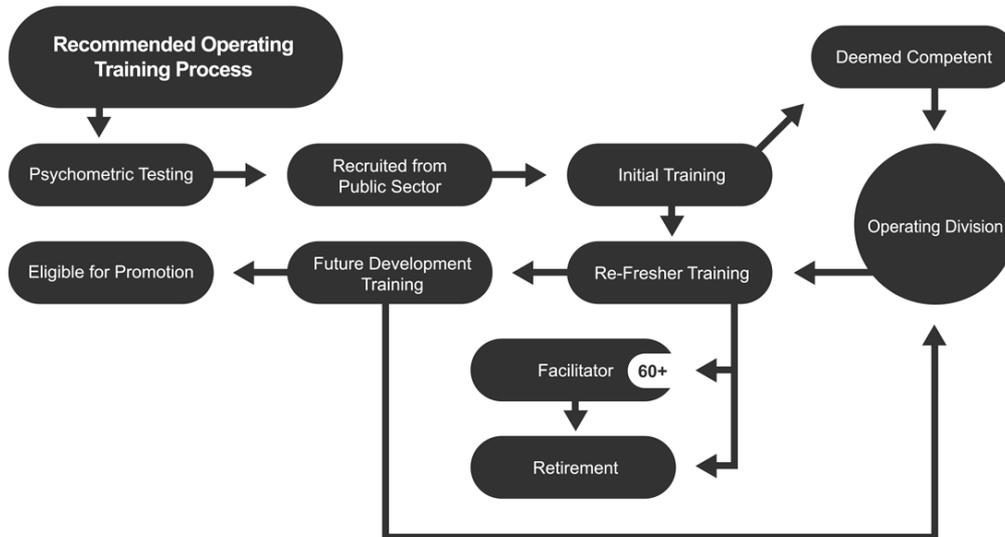
Figure 5-1:   Recommended operating training process

1: Psychometric testing

A large amount of the respondents mentioned that the newly employed operators make use of operating as a stepping stone to gain experience or as a foot-in-the-door to better positions within Eskom. The recommendation to conduct psychometric testing will determine the general interests or technical incliniation prior to the individual being recruited for the operating division, ensuring that the individual would not have ulterior motives and thus preventing the placement of uninterested operators.

2: Recruited from the public sector

After the psychometric testing, the individual will be recruited from the public sector and sent for initial training.

3: Initial training

At this stage, Eskom and similar organisations need to induce individual employee ownership of their own training, for new and existing employees. This will result in the understanding that continual training is no longer an expectation for advancement, but rather an essential requirement for keeping their jobs. This is particularly important and just as pertinent to the operators within Eskom's generation division, as the

majority of respondents believed that it is the responsibility of management to ensure that they are properly trained to perform their daily duties.

4: Deemed competent

Once newly employed individuals received their initial training, they are deemed competent and are subsequently placed in the operating division.

5: Refresher training

Operators should be sent on refresher training with the primary purpose of closing the current skills gap. This training not only closes the skills gap, but retouches on fundamental training required by the operators. The most substantial feedback gathered from the questionnaire pertaining to training in particular, was that most of the respondents felt that the training material was either out-dated, on a too high level, incomprehensible, that it is not relevent or specific to their division or equipment and that general training material is not made available as readily required. Therefore it is recommended that Eskom maintains a constant observation on the training material's relevance and accessibility. Furthermore, the development of sufficient material specific to each division within Eskom's generation division, are necessary.

6: Facilitator or retirement

After receiving refresher training, it is recommended that the opportunity to be transferred to the training department to become a facilitator, needs to be awarded to the current operators once they reach a certain age (60 plus years). This will address the underlining issue of operators not willing to transfer their knowledge and skills when they reach the retirement age, and furthermore build on the quaility of facilitators within the training division.

7: Future development training

If an employee is in fact eligible for promotion and has not either retired or been transferred to become a facilitator, they could undergo future development training.

In addition, other feedback acquired from the questionnaire pertinent to training, was for a central database or information repository, whereby the operators receive exclusive access to general information, training material, resources and assistance aids; made available and accessible to the operators.

5.6.2 Recommendations for future studies

The following aspects for future research that will positively affect the successful transfer of skills and knowledge are recommended below:

- Development of fair remuneration and retention strategies;

- Employment selection process of trainees;

- Post training competency validation;

- Engagement of retiring operators in knowledge transfer activities; and

- Investigate the current training process in the nuclear plant (Koeberg).

The development of fair remuneration and retention strategies will ensure the retention of skilled and knowledgeable operators, and prevent them from being poached by competitors, as well as secure the willingness to transfer skills and knowledge. Another recommendation for future studies is the appropriate employment of qualified and self-inclined, ardent, candidates to assume trainee positions. This aids the transfer of skills and knowledge, as these trainees are willing to learn, and furthermore do not possess ulterior motives for employment, such as assuming occupation with the primary intention to attain a 'foot-in-the-door'.

Post training competency validation, is a strong recommendation as this confirms whether the transfer of skills and knowledge has indeed taken place amid the trainees, resulting in the successful grooming of future operators. The engagement of retiring operators in knowledge transfer activities ought to be investigated as this poses numerous beneficial attributes to skills and knowledge transfer. Examples of such activities would be retaining them on ad-hoc contracts to transfer these skills and knowledge as required. Lastly, an investigation of the current training process within Eskom's nuclear plant (Koeberg) is recommended, as this could propose possible

opportunities to further develop training within Eskom's coal-fired utilities, because these employees adhere to stricter rules and regulations, due to the plant presenting a more severe risk associated with the daily duties in comparison to the average coal-fired utility.

5.6.3 To the respondents of both power utilities

Results will be made available to all the participating respondents of the research sample from both power utilities (Lethabo and Grootvlei), who participated in this study. Results of this study will provide informative feedback on how their fellow colleagues feel about skills and knowledge transfer in the operators division within Eskom's two power utilities.

5.7   MEETING RESEARCH OBJECTIVES

The primary objective of this study was to investigate the preferred and most optimum way of skills and knowledge transfer from senior to junior/trainee employees within the operators' divisions, and subsequently the electricity generating industry. The findings of the questionnaire, research sample and population presented numerous flaws in the current skills and knowledge transfer process, all of which were accurately considered and further included in the research by means of the descriptive statistical analysis. Recommendations for the organisations were then compiled and through this, the primary objective was achieved.

Secondary objectives were:

To formulate a hypothesis to determine the links between the different *age groups* and their *period of employment at Eskom*, against the four sub-scales (skills; motivation of trainees; workplace/organisation climate; and management support for skills and knowledge); a hypothesis was formulated and conclusions were drawn in chapter four.

To critically evaluate the magnitude of the problem that Eskom will face with regard to the availability of skilled and qualified operators; through the gathering and analysis of data around the current operating structure and general profile of the operating division, this objective was achieved.

To identify critical restraints within the operators' division that consequently effect successful skills and knowledge transfer; this objective was successfully reached by

the research findings and structuring of the open-ended questions posed in the questionnaire.

5.8   CHAPTER SUMMARY

This chapter discusses the conclusion, limitations of the study, validity and reliability of instruments and recommendations for further studies. Conclusions were drawn based on the primary and secondary objectives. In general, the study has successfully addressed the problem statement and all the primary and secondary objectives have been achieved.

The focus of this study was not solely addressed at *technical skills* in particular, but rather at technical skills and knowledge, as they posed similar contextual relations.

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APPENDIX A

Questionnaire – Knowledge & Skills Transfer / Learning Process

Dear Respondent,

As part of my MBA research at the University of North West, I am conducting a survey that investigates the" Knowledge and skill transfer from Senior to Junior/Trainee". The information that will be deduced from this investigation will assist Eskom to provide support in the planning and execution of operator training, at the same time, look at remuneration process for senior employees for doing/assisting with training. Your anonymity when completing this questionnaire will be upheld at all times. Individual responses will not be shared with any person or persons within the organisation. No one will be identified in any written report and only the group data will be presented. A request is made to complete the questionnaire during this shift, and that all sections and questions are answered.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at 083 753 0259. If you have any concerns about your rights as a participant in this study, you may also contact the course administrator Mr Johan Jordaan.Johan@nwu.ac.za or by telephone (018) 299 1415.

Please let me know if you would like a summary of my findings. To receive a summary, please request the summary by e-mailing me at: *Marxf@eskom.co.za*

Please indicate with an **X** or write the information as required in the given space.

Section A: General information

1. Work Station:

Lethabo		Grootvlei	

2. Gender

Male		Female	

2. Race:

White		Black		Indian		Coloured		Other	

3. Age:

Age Category	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61+

4. Highest Qualification obtained:

Matric	Undergraduate Degree/Diploma	Honours/Post Graduate Diploma	Masters	Other (please state)

5. Current Job designation at:

SPO - Assistant Shift Supervisor	
Plant Operator	
Unit Controller	
Senior Controller	
Senior Shift Supervisor	
Shift Supervisor	
Shift Manager	
Operating Manager	
Trainee	
Operating Facilitator	
Ex Operating employee	

If other, please describe_____

7. Period employed at Eskom _____ Years

Section B:

Please indicate the extent of your agreement or disagreement by marking with an **X**

1 – Fully Disagree   2 – Disagree   3 – Neutral   4 – Agree   5 – Fully agree

	SKILLS	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)
1	How would you rate your skills level to perform your duties					
2	It is important to share my knowledge and skills					
3	Do you believe that sharing your knowledge and skills has positive benefits					
4	I would be interested in training new employees myself					
5	I need an incentive to share my knowledge and skills with new employees					
6	I would like training on how to transfer my current knowledge and skills					
7	I need additional training on knowledge and skills transfer					
8	I feel my skill is being adequately **utlised**					
9	I feel my skill is being **valued**					

	MOTIVATION OF THE TRAINEE	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)
10	I am responsible for my own learning					
11	I am able to work with little supervision after attending training					
12	I am always willing to apply the training content when I am back in the office					
13	I am always motivated to learn something new					
14	I am able to solve work related problems after attending training					
15	I depend on training personnel to ensure that transfer of learning takes place					

	WORKPLACE/ ORGANISATIONAL CLIMATE	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)
16	Circumstances at work allow me to apply the training I received to add value and make a positive contribution					
17	I don't have **time** to apply what I have learned from my training					
18	I don't get the **opportunity** to apply what I have learned from my training					
19	It is the responsibility of management to make sure that I am properly trained to do my work in the office					
20	Training is understood as a strategic element in my organisation					
21	Eskom invests sufficient funds in knowledge & skills development					
22	Eskom's environment is conducive(helpful) for learning to take place					
23	The equipment at the workplace is of the same quality as that used during training					
24	The equipment available at the workplace is good enough to do the work as required by the training I have received					
25	The training material is relevant and up to date					
26	The current training system/method should be changed					
27	People are rewarded for sharing skills and knowledge					

	MANAGEMENT SUPPORT FOR SKILLS AND KNOWLEDGE	Fully disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Fully agree (5)
28	There is a positive transfer of learning because management supports the training and development of employees					
29	Management cares about my needs to have, and improve my knowledge and skill					
30	Management gives me feedback regarding the way I apply the knowledge and skills I learn from training					
31	Management is involved with the selection of training material I receive					
32	Management understands the way I learn as an individual					

Section C:

Do you think a primary reason for knowledge and skills shortages in the operating environment is because the workforce are seeking better job opportunities elsewhere?

_____
_____
_____
_____

What do you consider to be barriers to successful knowledge and skills transfer processes

_____
_____
_____
_____

You as senior Operator, would you be willing to do skills and knowledge sharing before you retire – what do you feel will be a fare remuneration (Please come with suggestions)

_____
_____

Is there anything else you wish to share regarding the skills and knowledge shortage and how Eskom should address the situation?

Thank you for participating in this research.

APPENDIX B

Current operating training process for *Initial phase.*

CURRICULUM/PROCESS FLOW CHART

```
                    ┌─────────────────────────┐
                    │      RECRUITMENT        │
                    └─────────────────────────┘

                    ┌─────────────────────────┐
                    │     GVL NQF LEVEL 3      │
                    │        66 WEEKS         │
                    └─────────────────────────┘

                    ┌─────────────────────────┐
                    │  GVL NQF LEVEL 4 (UNITS) │
                    │        74 WEEKS         │
                    └─────────────────────────┘

┌──────────────────────┐          ┌──────────────────────────┐
│ GVL NQF LEVEL 5 (PPC)│          │ GVL NQF LEVEL 4 (ELECTRICAL)│
└──────────────────────┘          └──────────────────────────┘

┌──────────────────────┐          ┌──────────────────────────┐
│ POSSIBLE SKILLS      │          │  NQF LEVEL 5 (NATIONAL)  │
│ PROGRAM PLANT        │          │                          │
│ MAINTAINER           │          │                          │
└──────────────────────┘          └──────────────────────────┘
```

NQF LEVEL 3

GVL INDUCTION/ MEDICAL **1 WEEK**		BEARINGS	5 days
		PUMPS	5 days
NVE CAPE TOWN TRAINING **36 WEEKS**		INSTRUMENTS	5 days
		LUBRICATION	5 days
GVL FUNDAMENTAL TRAINING **11 WEEKS**		SOLID TRANSFER SYSTEMS	5 days
		INT COMB ENGINES	5 days
		VALVES	5 days
		COMPRESSED AIR	5 days
		POWER TRANSMISSION	5 days
		ENG PRINCIPLES	5 days
		SHIFT COMMUNICATION	5 days

11 WEEKS

OHSA	1 week
FIRST AID LEVEL 1	3 days
BASIC FIRE FIGHTING	3 days
MPUMELELO FUNDAMENTAL TRAINING	3 Weeks

6 WEEKS

3 weeks allocated for leave in this period

GVL PLANT TRAINING **48 WEEKS**

COAL PLANT	5 days
COMPRESSED AIR PLANT	5 days
FUEL OIL PLANT	5 days
ASH PLANT	5 days
CW PLANT	5 days
PRACTICAL ON JOB	35 Weeks
PRE AND FINAL ASSESSMENTS	8 Weeks

Shift Responsibility to give them On Job training on Common Plant and to rotate them on Common Plant for a period of 7 months. Shift responsibility to prepare candidate for final; assessment before contract expires.

45 WEEKS

APPLICATION FOR QUALIFICATION

TOTAL WEEKS IN TRAINING

104 WEEKS

NQF LEVEL 4

GVL PLANT TRAINING

BOILER INTRODUCTION	5 days
BOILER PLANT	8 Weeks
TURBINE INTRODUCTION	5 days
TURBINE PLANT	8 Weeks

TOTAL	18 Weeks

Shift responsibility to release candidates after rotation of 7 months on Common Plant, to attend Boiler and Turbine training

On Completion of Theoretical Training, candidates need to do Practical On Job on shift. Need to apply for final assessment within 3 months after attended theoretical course

On Completion of Final Assessments, the interventions will be scheduled again, to give the students the opportunity to either do the Boiler or Turbine, and the entire process starts again

GVL FUNDAMENTAL TRAINING

HEAT EXCHANGE EQUIPMENT	5 days
PSR 1&2	10 days
ORHVS 1	3 days

TOTAL	18 Days

LEADER SHIP DEVELOPMENT

SELF MANAGEMENT	3 Days
TRANSFORMATIONAL LEADERSHIP	3 Days
COMPUTER TRAINING	3 Days

TOTAL	9 Days

TOTAL WEEKS IN TRAINING

23 WEEKS

APPLICATION FOR QUALIFICATION

ON COMPLETION OF NQF LEVEL 4 CANDIDATE QUALIFY FOR SPO APPOINTMENT