

https://dspace.org/

Mentorship as a retention stratefy for female engineers in the oil industry in South Africa

Claasen, Ashlene Le-anne

2018
https://hdl.handle.net/10539/32093

Downloaded from a DSpace repository. https://dspace.org/

Mentorship as a retention strategy for female engineers in the oil industry in South Africa

Ashlene Claasen

1594147

A research article submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2018

Protocol number: **(1594147/894)**

(Version February 2018)

Confidential

DECLARATION

I, ***Ashlene Claasen***, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Ashlene Claasen 

Signed at ……Wits Business School Parktown

……

On the ……17th……. day of ……June…… 2019…..

DEDICATION

I dedicate this report to my son, Aiden Luke Claasen. My constant motivation and inspiration to be a better person.

ACKNOWLEDGEMENTS

I would like to thank God for giving my strength to partake and write on such an interesting topic. I would like to thank a few key people, firstly my supervisor Dr Andeline Dos Santos for taking so much time and energy to assist with my research report. It is much appreciated, and I am truly thankful. I would also like to thank my family for all their support and motivation.

SUPPLEMENTARY INFORMATION

Nominated journal: SA Journal of Human Resource Management

Supervisor / Co-author: Andeline Dos Santos

Word count †: 27400

Supplementary files: Interview recordings

Interview transcripts

† Including abstract references, appendices

ABSTRACT

Orientation: There remain significant challenges to gender equality in the engineering industry. Female engineers in South Africa are still in the minority and are facing challenges that affect their retention levels.

Research Purpose: The purpose of this study was to evaluate, through the experiences of female engineers, whether mentorship could be used as a strategy to retain more females in the South African engineering industry.

Motivation for the study: The aim of this study was to understand why the gender gap persists, by analysing the experiences of females in the oil industry. The study sought to ascertain whether mentorship could be used as an instrument to attract and retain women in this industry in South Africa.

Research approach/design and method: The qualitative study was exploratory in nature. The data was collected in the form of in-depth focus groups and analysed through thematic analysis.

Main findings: This study concluded that there were still explicit and implicit organizational practices in the engineering industry which were discriminatory towards females. Females were finding coping mechanisms, such as mentoring, to navigate these biased organizational practices. Female engineers utilised mentoring to try to find a work life balance, to advance their careers, to gauge a firmer technical understanding of the industry and for support, however it did not always lead to retention in the industry. Gender did not have any influence on the effectiveness of the mentoring relationship, however females would recommend having more female mentors to speak to regarding female specific issues.

Practical/managerial implications: The findings will be used to guide organizations on how to implement mentorship initiatives into their organizational policies in order to attract and retain female talent in the organization. It can also be used to create general awareness in the industry around how they can support and motivate women in the industry.

Contribution: This study is part of the body of knowledge which is directed towards evaluating how to improve the gender disparity in previously classified male dominated careers and to retain females in these occupations.

1. INTRODUCTION

1.1 Purpose of Study

The engineering profession in South Africa and in many other parts of the world has been classified as male dominated (Dasgupta & Stout, 2014); Du Plessis and Barkhuizen (2012). The purpose of this study was to evaluate, through the experiences of female engineers, whether mentorship can be used as a strategy to retain more females in the South African engineering industry.

1.2 Context of Study

It has been 24 years since South Africa became a democratic country. During this time expectations were held that the country would move towards an era where gender-related occupational challenges would be addressed. This, however, has not been the case (Padayachee, 2017). There seems to be little progress in this area, particularly in terms of acquiring and retaining females in the engineering industry (Hill, Corbett, & Rose, 2010; Hofmeyr & Mzobe, 2012; Statistics-SA, 2017).

Despite the nationwide public protest in South Africa on the 9th of August 1956, when more than 20 000 women marched to the Union buildings to protest against a non-sexist and non-racist South Africa (Thipe, 2010), today we still find that women occupy less than 50 % of positions of power in male dominated careers such as engineering (Padayachee, 2017). This is considering that women make up more than half (51%) of the South African population, according to the latest statistics from Statistics-SA (2017). Engineering has been identified as having the lowest retention levels of females in the country. This is corroborated by the Engineering Council of South Africa's (ECSA) 2017 latest research results, which show that of the 11% of the total engineers registered with the council, only 4% are female.

In many industries the value of mentorship has been shown to create environments that promote staff retention (Kanaskie, 2006). Mentorship has also

been demonstrated to be a powerful tool for personal learning and growing within an organisation. The tool of mentoring could, therefore, prove fruitful for females adjusting in the engineering profession as they prepare to integrate and take on new responsibilities within this previously male dominated career (Merrick, 2017). This was investigated further in the current study.

1.3 Problem Statement

1.3.1 Main problem

The main research problem related to the retention of female engineers in South Africa. The study endeavoured to explore the experiences of female engineers in order to contribute to knowledge in this area

1.3.2 Sub problem 1

The first sub problem was that we did not have sufficient research that has shown whether and/or how mentoring could be used to address the problem of retaining females in the engineering industry.

1.3.3 Sub problem 2

The second sub problem was that we did not have sufficient understanding of the role that gender-based mentorship could play in the retaining of female engineers in the industry.

1.4 Definitions of terms

- Mentee: A mentee is considered to be someone who is equally valued but who has a specific support need (Nkoma & Thwala, 2014)
- Mentor: The Oxford School of Coaching and Mentoring explains a mentor as someone who supports and encourages people to manage their own learning in order that they may maximise their potential, develop their skills, improve their performance and become the person that they want to

be (Parsloe, 2016). A mentor is someone who guides without any expectations of monetary gain or any other personal gains (Ensher & Murphy, 2011; Nkoma & Thwala, 2014)

- Mentoring: According to Alison Robins, who wrote a book called "*Mentoring in the early years*" (2016), mentoring refers to a more experienced individual assisting a less experienced individual by transferring knowledge and skills. It can also be classified as offering support, guidance and solid assistance, providing non-judgemental support and clarification of goals of mentee from one individual to another. In the literature, many theoretical constructs associated with mentoring are mentioned (Amelink, 2010). Mentoring is aimed at shortening the mentee's learning curve and reinforcing positive work ethics, as well as assisting mentees with a role model (Nkoma & Thwala, 2014). The term mentoring was also classified by Kram and Isabella (1985) in earlier research on the subject, as either career or psychosocial mentoring. This is still relevant due to mentoring not just being exercised in one sphere of life. Mentoring can also be classified under different categories:
    - Career mentoring: This includes coaching, being able to assist the mentee in his/her professional endeavours and career preparation (Amelink, 2010; Merrick, 2017). This type of mentoring includes providing support and giving feedback to the mentee in terms of career plans and interpersonal development (Lyon, Farrington, & Westbrook, 2004)
    - Psychosocial mentoring: This type of mentoring is concerned with assisting the mentee develop a sense of self and being a role model to the mentee (Amelink, 2010). Psychosocial mentoring includes giving personal support, offering friendship and counselling (Lyon et al., 2004)
    - Cross gender mentoring: This is defined as being mentored by someone of a different gender ((Amelink, 2010; Association, 2003; Crutcher, 2007)

  When referring to mentorship for the purposes of this research, the researcher will refer to a mixture of the above mentoring categories

- Mentoring model: The mentoring model refers to the relationship between the mentor and the mentee (Amelink, 2010). With the advent of more women being in positions of power internationally, the conventional mentoring style has changed from the typical hierarchical model where mentors share information and mentees benefit from the information (Walker, 2014) to a more reciprocal mentoring pattern where mentoring is more relational and beneficial for both mentor and mentee (Amelink, 2010; Walker, 2014). This is possibly attributed to the different mentoring styles between males and females
- E-mentoring: Mentoring can also be conducted online or within a virtual community, (Shrestha, May, Edirisingha, Burke, & Linsey, 2009)
- Retention strategy: This refers to any company policies that are incorporated in the business to ensure that employee turnover and attrition are reduced (Conner, 2010)

1.5 Significance of the study

The study is significant because it addressed a key wicked problem within South Africa (Labour, 2005), namely the imbalance of females compared to males in historically male-dominated careers. South Africa is experiencing an enormous skills shortage and is still sourcing skills from abroad (Fouad & Singh, 2011). While a few interventions have been proposed internationally to incorporate women into previously male dominated careers and to promote equal gender opportunities, how these interventions are experienced, as well as their sustainability, have not been explored within a South African context.

Hofmeyr and Mzobe (2012) conducted a study whereby they explored the factors that influence the corporate advancement of women in South Africa in the engineering industry. They assessed the barriers and stereotypes prohibiting women from advancing in previously male dominated careers as well as from becoming leaders in organisations. The findings from this study revealed low retention levels of females (Hofmeyr & Mzobe, 2012). Although prior research has been done on mentoring and how mentoring can assist in retention levels, at Pennsylvania State University (Parsloe, 2016; Sosik & Godshalk, 2000), the

impact of mentoring in a South African context has not been sufficiently evaluated. The findings from this study may act as a guide for South African industries to implement strategic mentorship initiatives for retaining more females in historically male-dominated careers.

1.6 Assumptions of the study

The following assumptions have been made regarding the study:

- It is assumed that participants feedback during interviews will be honest feedback, as a result of complete anonymity and confidentially given, and because participants are volunteers who may withdraw from the study at any time without any consequences
- The oil engineering industry in South Africa was previously classified as male dominated
- The female engineering population for this study will be representative of the greater female engineering population in South African oil industries

1.7 Limitations of the study

The following limitations were identified in this study:

- The female participants represented in this study was only a very small percentage of the oil industry in South Africa. The participants do however give rich information about the research questions posed and aides in addressing the sub problems
- The oil industries represented are but a fraction of the overall industries in South Africa and may not be consistent for all industries, however the fact that both office and plant based female engineers participated, as well as

using oil industries both inside and outside of Gauteng, gave it more credibility and diversity

- Due to the study being conducted in English, this may have affected the ability of participants whose mother tongue was not English when it came to be expressing their experiences and opinions.

1.8 De-limitations of the study

The following delimitations were implemented in the study:

- The study was confined to female participants only, in order to understand why female retention levels are low and continuously declining in the oil industry. Male retention was not part of the scope of the study
- In order for participants to speak as freely as possible and have a more relaxed environment, the number of participants per focus group were deliberately kept to a minimum
- The oil industries in this study was not limited to only Gauteng, but also outside Gauteng in order to get a broader view for South Africa as a whole
- The research questions were limited to the impact of the gender of the mentor only. Factors such as race, age and socioeconomic backgrounds of the mentor were not considered and was not part of the scope of this study

1.9 Research Questions

1.9.1 Research question 1

How do females currently working in an engineering industry in South Africa experience the role that mentorship may or may not have played in their continued presence in this industry?

1.9.2 Research question 2

How do females currently working in an engineering industry in South Africa experience the extent to which having a male or female mentor may have influenced their continued presence in this industry?

The formulation of these research questions is explained in section 2.4

2. Literature Review

2.1 Introduction

This section looks at prior work that were done on this area of study and then highlights how the current research attempted to address some of the gaps. The researcher will first be reviewing literature that recommends mentoring as a strategy to be used for female retention internationally and will also be reviewing different mentorship management theories and models used in organisations. Thereafter, she will be looking at cases where this was implemented successfully. Lastly, she will then be reviewing the impact of successful and unsuccessful gender-based mentoring internationally. These findings will then be used as a basis for reflection on work to be done on female retention in South Africa.

2.2 Background

2.2.1 Mentorship as a retention strategy

Martin and Barnard (2013) conducted a study in South Africa with women in male-dominated occupations in order to discover what coping strategies they used to remain in this profession. The authors found that mentoring was one of the coping strategies employed by females in engineering in order to persevere and attain success in their respective careers. Mentees participating in the study found that mentoring was important if they wanted to achieve success in their engineering career (Bozionelos, 2002; Martin & Barnard, 2013). Mentoring gave females a support system and it assisted with the often-hostile environment that they had to face. Through grounded theory, Martin and Barnard recommend that engineering companies change the current management strategies and practices to adopt cultures which will align to the feminine population as well and to incorporate a mentorship programme into their strategy that is specifically aimed at female integration.

This also substantiates research conducted by Amelink (2010). Amelink suggested that mentoring can assist with career advancement whilst a mentee is being exposed to the technical aspects of the profession by their mentor. Mentoring was found to be associated with an immense increase in self-confidence, self-esteem and job satisfaction for those who were mentored. These findings were also affirmed by Fouad and Singh (2011) in their article "*Why women leave engineering*". They looked at a sample of over 3700 women who had graduated with an engineering degree to understand why women leave the engineering profession. One of the main outcomes of their study was that the women who left the industry did not have any role model or mentors within the industry. Women who had mentors had a higher level of career satisfaction and lower intentions to leave the engineering field.

E-mentoring has been shown to be effective in mentoring young females studying engineering in the US. According to Shreshtha et al. (2009) and prior work done by Muller (1997), it is particularly appropriate due to its convenience and cost effectiveness. With the increase in availability of electronic communications technology, mentoring can be made simpler by building a community online to help guide and assist women and at the same time encourage the retention of women in the engineering fields (Muller, 1997)

It can be seen from the literature mentioned above that mentorship has shown positive results internationally for retaining females' in prior male dominated careers. The aim of this current study is to explore mentoring within a South African context. It should be noted that there have been studies conducted on mentorship in fields such as construction by Yokwana et al. (2016), where they looked at the influence of mentors' gender on the psychosocial and career mentoring of women in South Africa. Another study conducted in South Africa was by Stone and Coetzee (2005) who researched the experiences of women in two organisations and how to reduce barriers to mentoring for women. The current study will contribute to this body of literature by examining the experiences of female engineers in the oil industry in South Africa and, particularly, their experiences of mentoring. As the study was qualitative, the

group of participants was smaller, allowing for a more in-depth analysis of their experiences.

2.2.2 Gender balanced mentorship

A study done by Dasgupta and Dennehy (2015) at the University of Massachusetts, was similar to this study, in the fact that they were also trying to elicit the experiences of female engineers who were mentored. The main difference between this study and their study however was that they specifically wanted to understand the experience of the engineers with respect to the gender of the mentor and how the gender impacted the overall mentorship experience, whereas in this study, the researcher was trying to extract what the overall impact of mentorship was on the lives of female engineers. Dasgupta and Dennehy (2015) found that part of the benefits for women of having a female mentor was that the mentees understood the real challenges faced by women in engineering and felt less anxious and more motivated than those who had no mentor or a male one. The critical point of their study was that female mentees experienced increased feelings of belonging and confidence when they were able to engage with a female mentor, and this reduced the declining attrition rates of female engineers.

Another study was conducted by Lyon et al. 2004, to investigate the influence of gender mentorship for scientists and engineers in Alabama. The results indicated that the mentoring programme was more effective when the mentor and the mentee were of the same gender. This finding was also supported by Martin and Barnard (2013) who observed that female participants in South Africa, who were in previously classified male dominated careers, felt that there were too few female mentors in the field of engineering. A recommendation from this study was that gender balanced mentorship was critical for female retention levels in the engineering industry.

In contrast to this position, Sosik and Godshalk (2000) conducted a study with 200 participants in Pennsylvania, in order to examine whether gender composition affects the degree of career mentoring functions received by a

mentee. The results from their study were that, whilst female mentors could emulate good role modelling to mentees, they could not provide the skills for career development that could be offered by male mentors.

In contrast to both of the above views, a study was conducted by Yokwana et al. (2009), where they looked at the influence of psychosocial and career mentoring on women in South Africa in the construction industry. The study found that gender plays no role in successful mentorship of women, because there was no difference in the mentoring functions provided by male and females mentors to the female mentees (Yokwana, Ndihokubwayo, & Windapo, 2016). A study was conducted by Stone and Coetzee (2015) in South Africa regarding cross gender mentorship, which builds on prior work by Esther and Murphy (1997). This study reached no conclusive result as to whether cross gender mentorship was more effective than female mentorship for females. The results from the study was that cross gender mentorship resulted in more psychosocial benefits, for example, the mentee discovering more about themselves and gaining more self-worth and confidence (Stone & Coetzee, 2005). Themes identified in research on cross gender mentoring by other authors such as Scandura and Williams (2001), were that females usually experienced greater discomfort during the mentoring relationship, whilst earlier research on the subject by Feldman, Folks and Turnley (1999) found that such mentoring relationships may provide less task orientated, career related and social related support. The risk that they identified with cross gender mentoring was that there may be a possible abuse of power and the potential of intimate relationships forming. It should be noted that this research by Feldman, Folks and Turnley is quite old and that gender relations in the workplace have changed since then. In line with Martin and Barnard (2013), Feldman et al. suggested that many of the females who were mentored by a male and who worked in a male-dominated career, adopted masculine characteristics in order to cope and felt the need to become competitive. It again needs to be noted that this statement is not representative of how all females cope and there may be a degree of bias associated with it, since this study may have spoken to a certain era and does not accurately reflect how gender relations in the workplace have evolved since 1999. In opposition to the view by Feldman et al (1999) and Martin and Barnard (2013), cross gender mentoring relationships

were found by Scandura and Williams (2001) to assist females by enabling them to break through the “glass ceilings” when mentored by males, and to position themselves more comfortably within most male-dominated organizations.

2.3 Mentorship Management Theories and Models

There are many theoretical and conceptual frameworks that are utilized when it comes to mentoring from an organizational and management perspective. The relevant theories which relates to this study were separated under categories as defined below:

2.3.1 Developmental Theories

Theories relevant to this study’s problem statement, were the Theory of Generativity, Developmental Theory, i.e. Age and Stage theories, as well as Career Development Theories (Ehrich, 2001; Scandura & Pellegrini, 2007). These concepts and theories articulated the importance of mentorship in an individual’s life and how it can bear fruits for career success and improve quality of relationships. One theory in particular highlighted by Ehrich (2001), refers to Women’s Developmental Stages of Knowing, of which earlier work was also done by Belenky, Clinchy, Goldberger & Tarule, (1986). This theory viewed mentorship as an important phase for women for their personal and career development. This theory also speaks to how females can be developed as part of their mentorship experiences and could prove significant to the outcomes of this study, as it is directed towards females.

2.3.2 Leadership and Management Mentorship Theories

The theories related to leadership and management were the Contingency Theory of Leadership , The Model of Decision-making and The Competing Values framework model(Ehrich, 2001) . These theories explained mentoring in terms of how it can be applied by leaders or mentors in organizations. Change Theory, just like Contingency Theory, tries to explain that mentors can be considered a “change agent”. A change agent in this context is someone who is

able to adapt to the mentee by changing their approach to a particular circumstance. In this way the mentor is seen as helping the mentee learn and develop. Contingency theory is based on the idea that there is no specific formula for mentors to follow when ensuring effective mentoring.

2.3.3 Mentorship Economics based Theories

The theories related to mentorship which fall under the economics category are the Human Capital theory, Leader Member exchange theory, Mutual Benefits model and the Social Exchange theory(Scandura & Pellegrini, 2007). These theories have one commonality that speaks to mentorship allowing for a reciprocal transaction between the two parties involved (Ehrich, 2001; Lee & Nolan, 1998). Its aim is to evaluate the costs and benefits in order to determine if the relationship is viable (Ehrich, 2001). This is significant for this particular study, as the more benefits outweigh the costs, the higher the retention level of both mentee and mentor in the relationship. These theories categorize the relationship between the mentor and mentee as a transaction or a mutual beneficial exchange between individuals (Lee & Nolan, 1998). These theories were in direct contrast to theories which fell under the interpersonal relationship category, which saw mentorship as more of a close personal relationship between individuals (Ehrich, 2001; Thomson & Zand, 2010).

2.3.4 Mentoring Life Cycle Model

Hay (1995), described the mentoring life cycle in four stages as explained below:

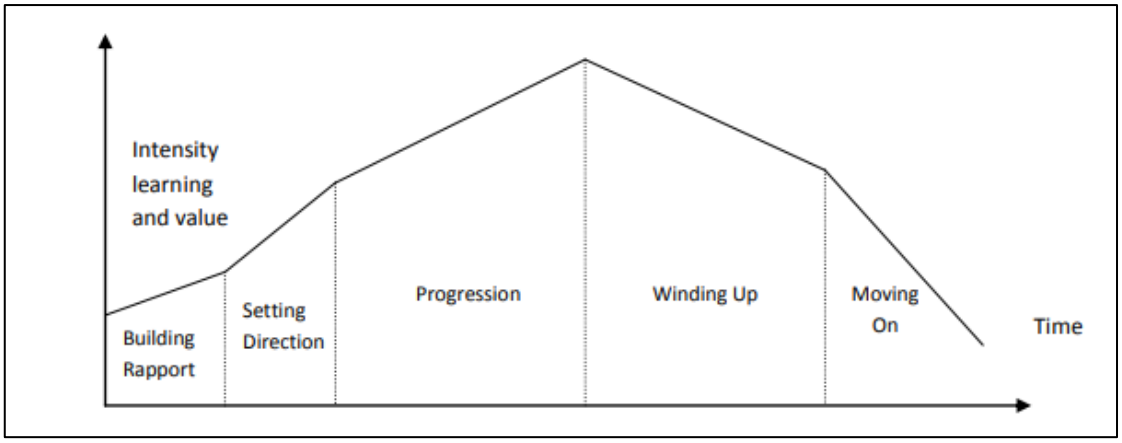


Figure 1: Mentoring Life Cycle Model

- Stage 1 : Initiation, orientation or courtship stage. This stage is about familiarization and forming a bond, as described by Hay (1995). Lewis (1996) describes this stage as setting objectives and creating a contract. Clutterbrook & Lane (2004) refers to this stage as building rapport, the point whereby ground rules are set and where they decide whether they want to progress the mentoring relationship.
- Stage 2 : Getting established. This stage is about gaining some clarity on the aims of each party. It is where the mentor understands the mentees situation by evaluating the skills and knowledge (McKimm, Jollie, & Hatter, 2007). Putting together a plan on how goals will be reached.
- Stage 3 :Maturing or developing independence stage. During this stage the mentor allows the mentee to do reflection and facilitates a deeper learning. Self-reflection is encouraged in this stage and can also be done by using the Johari window model (McKimm et al., 2007). During this stage most of the time and energy will be spent on identifying patterns and themes and generating options of which the mentee will decide which one suits them best.
- Stage 4 :Ending, termination or divorce. At this stage the mentoring relationship has reached its goals and the relationship has grown stale. Both mentor and mentee will reach at stage whereby they will recognize that the relationship value is diminishing, and they will need to close it and move on (McKimm et al., 2007).

2.4 Research Questions Formulation

The literature reviewed indicated that there was a need to further explore the area of mentoring in South Africa, that there is more to discover regarding female engineers' experiences when they undergo a mentoring process. The research questions in section 1.9, were then formulated around these needs by building on what has already been done. Below were the areas of interest:

- Relevance: How relevant is the study? As a result of gender-related occupational challenges still being a concern in South Africa, the study is relevant. Many other countries have faced the same challenges and have made strides in overcoming them. This study focusses on one area of the STEM careers, i.e. engineering and the oil industry, by trying to understand the dynamics and experiences of females in this industry.
- Manageable: This study is manageable and applicable to the researcher mainly because of being part of the engineering oil industry in South Africa for ten years and thereby having easier access to people and information as well as experiencing the industry herself. It makes access to resources and data easier without having to face a hurdle of a new industry and environment.
- Fit for assessment: The research questions allowed the researcher to use qualitative methods to draw inferences and conclusions. A clear methodology is used and substantiated
- Simple and clear: Both research questions which talks to the experiences of females, allows participants to talk to their daily life in the oil industry, it allows them to open up and allow the researcher to gain access to their pains and struggles as well as the positive aspects. This allows for further probing and insights.
- Interesting: The questions posed were aimed to incite reactions from participants. Every experience highlighted was personal and interesting to the researcher because of her involvement in the industry and the passion she has for female development and growth levels within previously male dominated environments.

3. Methodology

3.1 Introduction

This chapter outlines the methodology that was used to conduct the research. This will be followed by an explanation of the research design, the selection of participants, data collection methods and the analysis technique that was used. Ethical considerations will also be mentioned.

3.2 Research methodology

Qualitative research, according to Ospina (2004), can be defined as “a form of systematic empirical inquiry into meaning” (Ospina, 2004, p. 2). Systematic, because of it being “planned and ordered” and empirical due to it being “grounded in the world of experience” (Ospina, 2004, p. 2). Mason (2002) described qualitative research as being based on methods of analysis, explanation and argument building that involve taking into account the context. The emphasis is placed on the meanings, experiences and opinions of the participants involved (Sunday, 2016)

Qualitative research depends on criterion-based sampling (Palinkas et al., 2015; Sargeant, 2012). Qualitative research commonly employs three types of sampling techniques, namely, purposeful sampling, quota sampling and snowball sampling (Alvi, 2016) . Purposeful sampling is the most commonly used sampling strategy and is used where participants have been pre-selected based on the research question. Quota sampling involves the participants quotas being pre-set before the sampling starts. Snowball sampling, also referred to as referral sampling, is where the researcher is referred to other participants by current participants (Taherdoost, 2016). This study used purposeful sampling, due to all the participants being pre-selected based on their mentorship experience (Palinkas et al., 2015).

It is therefore clear that the research methodology has been chosen based on the fact that the researcher is dependent on the opinions and experiences of the participants in the study, which was explorative in nature and will direct the themes of the study. As a result of relying on the participants feedback, the researcher needed to make sure that all participants fit the criteria of purposive sampling in order to gain the most accurate information.

3.3 Research Design

Research design can be categorised into three types, namely descriptive, explanatory and exploratory research (VanWyk, 2015). Exploratory research is suited to studies where there are higher levels of uncertainty and where there is a high degree of flexibility. This study was of an exploratory type mainly due to the limited amount of available research on this research topic in South Africa. Due to the conclusions of the study relying on the experiences of participants, the results might not be conclusive, but certain valuable initial information could be gained in this type of exploratory study that can inform continued research (Manerikar & Manerikar, 2014).

3.4 Participants

The participants in the study were all females working as engineers in an oil industry in South Africa. The participants who fitted the selection criteria were issued with consent letters (Appendix B) which had to be signed as acknowledgement that they will be partaking in the interview and agree to being video recorded. Due to this being a purposeful sample, as described under research methodology, all participants were required to have mentoring experience. Before the interviews commenced, the researcher gave a brief introduction of herself. She explained who she was and what her background was, and the motivation behind the study. She also re-emphasised to the group what the purpose of the study was and explicitly stated the aims and objectives.

The participants then partook in a focus group interview which was video recorded, sharing their mentoring experiences. The participants' mentoring

experiences differed in terms of timelines, i.e. some participants were mentored during their undergraduate engineering studies, others were mentored in high school and some were still part of active mentoring relationships. The focus interviews were conducted at three oil companies, namely BP SA, Total SA and SAPREF refinery. BPSA focus group consisted of five participants, Total SA four participants and SAPREF refinery four participants. It was recommended by Mathers et al. (2002) to keep the number of participants in the focus groups manageable. This was to encourage group interaction and to give all participants an opportunity to interact and engage in the discussion. All participants were of South African nationality. Participants were spread across three different oil companies in South Africa, in order to obtain more diverse perspectives and to deduce whether experiences were similar or very different. This then allowed for contrasts to be deduced against the experiences of female engineers in other locations in the world, working in similar male-dominated roles.

3.5 Data collection

The data collection process was conducted through focus group interviews, whereby the researcher asked the participants a few open-ended questions to facilitate the discussion (Appendix C), thereby trying to elicit the experiences of working in a male dominated environment as well as gaining insight into their everyday challenges. The one advantage of focus group interviews, as expressed by Mathers Fox & Hun (2002), was that it allowed for more sensitive questions to be answered and many possible views to be expressed. BP SA and Total interviews were conducted on site at the respective corporate headquarters, with all females present, whereas SAPREF refinery which is situated in Durban, were conducted via telecon.

The video recorded focus group interviews made it easier to engage, fully interact and be “present” with the participants inside the room. It also allowed for all necessary emotion and important information to be captured. As the discussion flowed, if there was any ambiguity in a response, the researcher would try to probe and do reflection or paraphrase what has been said in order to make sure what was captured was correct. This was also done to make sure that responses

which were captured were in fact in line with the research context and objective. The recorded interviews were then transcribed verbatim into Microsoft excel, and this information was relayed to the participants as well (Full transcripts in Appendix D). Participants were also informed at the end of the interview session that once all the findings were collated, they were more than welcome to check if what the researcher had summarized was a true reflection of what was discussed in the interview.

3.6 Data analysis and interpretation

3.6.1 Thematic Analysis

Thematic analysis uses the approach of breaking down the data into its smallest components, also known as codes, and thereafter re-organizing and grouping these codes into categories. Thematic can be referred to as the identification, analysis and reporting of patterns (Barnes & Atfield, 2014) The categories were then further grouped under broader themes (Archer, 2018).

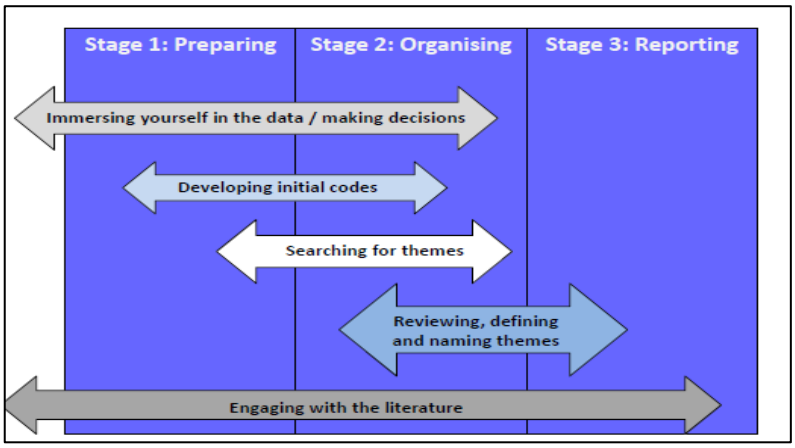


Figure 2: Flowchart of thematic analysis

The method of analysis (thematic analysis) process can be broken down into further categories as described in detail below:

3.6.1.1 Data Reduction and Making Decisions

Data reduction refers to reducing and re-organizing the data into something more meaningful (MatthewMiles, Huberman, & JohnnySaldana, 1994). In this step the researcher immersed herself in the video recordings and the transcripts, examining them as closely as possible. This step also involved having to make decisions regarding which data was useable and which data will be redundant to the research objectives. This step involved a few iterations, i.e. going over transcripts and recordings many times before reaching conclusions.

3.6.1.2 Developing Codes

Coding is defined as the process of organising and sorting out data as a way of trying to understand what is happening in the data (Boyd, 2013). Saldana (2016, p3) refers to a code as a "word or short phrase that symbolically assigns a summative, salient, essence capturing or evocative attribute for a portion of language-based or visual data".

Coding can be classified as inductive or deductive coding (Barnes & Atfield, 2014). Inductive coding, also known as data driven approach, is where there is little or no pre-determined codes and where the themes will be driven by in depth analysis of the data (Barnes & Atfield, 2014; Braun & Clarke, 2006). Deductive coding or theory driven coding is when there is already knowledge and theory on the subject matter being explored (Braun & Clarke, 2006). It is mainly used to test theories. In this study the researcher used the inductive approach, where she went in with the approach that the answers will be extracted from the data itself and did not lean on any pre-determined theory.

The researcher started the coding process by assigning words and phrases to summarize and condense data. Where she started seeing similarities and repetition in the assigned codes, she would group those codes together. The grouping of codes together then re-classified the previous codes into sub codes. A sub code in this study can be classified as a lower order code. Sub codes which belonged to the same family group and which had similar characteristics would be grouped together as one code. A code in this study can be classified here as

a higher order code. The coding analysis she embarked on was an iterative cyclical process, as she would code as a first attempt and go into a second cycle and third cycle or fourth cycle before the real salient features of the data became evident. Some codes would emerge and bring forth more questions than answers.

Once she had identified all sub-codes and codes, she then looked at organizing the codes that had similarities together. The codes would be linked to a certain category or "family", mainly because they all shared the same characteristics and features. These characteristics in the codes had to be inferred by intuition by trying to elicit which codes "looked the same" and "felt the same", as also stated by Saldana (2016). Once she developed categories, she could distinguish clear patterns in the data.

3.6.1.3 Developing Themes

A theme can be defined as a the "clustering of codes into groups sharing similar characteristics which on some level represents meaning or pattern in the tex*t*" (Archer, 2018, p. 9). Themes can be identified within data in two ways: either inductively (from the "bottom up"), or deductively (from the "top down") (Barnes & Atfield, 2014; Braun & Clarke, 2006). An inductive approach was used to elicit themes in the study (Jugder, 2016). The advantage of using this approach was that it summarised extensive data into a brief format and established clear links between the purpose of the research and the findings derived from the raw data.

The process of generating themes was iterative and could only be done once the coding process was complete. Theme generation relied heavily on inferences from the categories and patterns that were drawn from the coding process.

3.7 Methodological limitations of the study

- Participants may have been tempted to give socially desirable answers.
- All focus groups sizes were not the same, i.e. the number of participants varied from focus group to focus group

3.8 Research Quality

3.8.1 Trustworthiness, Quality and Rigour of Data

The trustworthiness and rigour of data in qualitative research can be qualified by looking at four criteria, according to Shenton (2004), namely credibility, transferability, dependability and confirmability. It was important to demonstrate rigour in a qualitative study such as this, so that the research findings have integrity and make an impact on practises and policies. As discussed under research methodology, this qualitative research study strived to understand the real-life experiences of participants. The credibility of the research data obtained therefore depended on the ability and efforts of the researcher to obtain data that was a true reflection of what was meant by participants. Below are the criteria of trustworthiness and how they have been applied in the study.

3.8.1.1 Credibility

In this study the credibility of data was addressed through the use of well-established research methods (Shenton, 2004). Due to the study using focus group interviews, one of the methods used to make sure that the findings were credible and carried across as the participants intended, was to do member checking exercises (Korstjens & Moser, 2018). The researcher ran any data which was ambiguous, or which could be interpreted otherwise, by the participants again in order to make sure it was captured as intended. This credibility check was also practised during the focus group interviews whereby she would ask clarifying questions and probe if there was anything which were unclear. Another credibility check utilised was triangulation of data sources (Korstjens & Moser, 2018). Data triangulation was used in the focus groups, whereby different participants from different companies were partaking in all interviews, which allowed me to compare different perspectives from different people in different locations.

3.8.1.2 Transferability

Transferability speaks to how well the results from this study can be related to other situations (Anney, 2014; Korstjens & Moser, 2018). The process was described in detail with a clear explanation of the methodology, details on participant choice, all the research processes, data collection methods etc. This may help and give insights to both researchers performing similar studies and outsiders who could also find it meaningful.

3.8.1.3 Dependability and Conformability

Dependability involves how stable the findings were over time (Shenton, 2004). A strategy used in this study to ensure dependability was an audit trail of findings, i.e. all raw data, interview notes, transcripts, and recordings was collected and held for an auditor to verify. This audit trail was established throughout the study to establish confirmability (i.e. that the data were not fabricated) (Anney, 2014)

4. Results

In this section, the researcher will present the results. This will be preceded by a summary of the participants' profiles in terms of race, age, and experience in the industry. She will then explain how codes were developed and how similar codes were merged and eventually grouped together under various categories. Lastly, she will describe how patterns in the data were identified and how these were used to generate themes.

4.1 Participants' profiles

The figures below show the demographic profiles of the respondents with regard to race, years of employment in the engineering industry, and age.

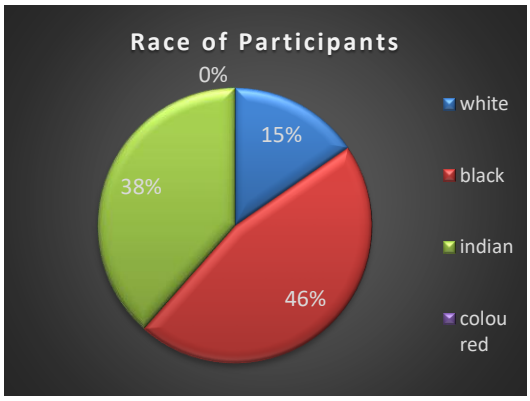


Figure 3: Age of participants

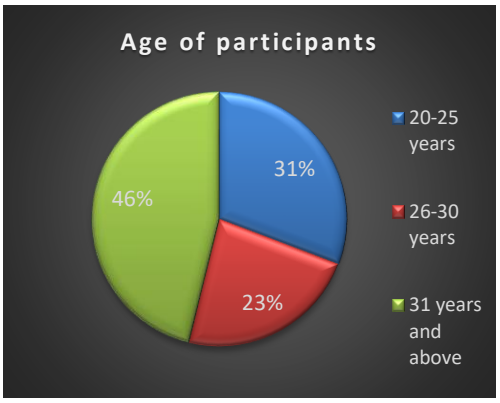


Figure 4: Race of participants

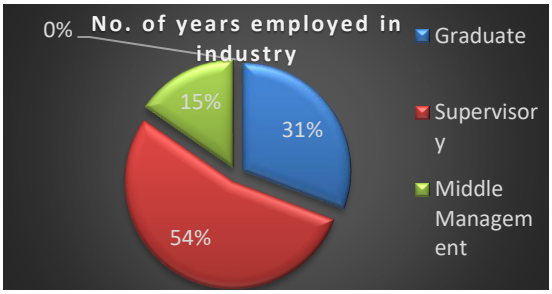


Figure 5: No. of years employed in industry

The demographic profile of the participants included identification across racial groups. A spectrum of age groups was also included, giving insights in terms of how both younger and older females experience the work environment.

4.2 Focus Group Responses

In this section the researcher will be presenting the responses from all three focus groups. She has transcribed all responses verbatim onto a spreadsheet in Microsoft excel. She then grouped the responses from each question together. Question 1 will be presented in detail, showing how the responses were transcribed into excel and how the sub-codes, codes and categories were generated. She will then include a few of the responses for the rest of the questions, and the remaining responses can be found in Appendix D. She will, however, be showing for each question how the sub codes merged into higher order codes and how these were then placed under a certain category.

Table 1 below presents the first question posed to the groups and the responses from the participants. ‘FG1’ refers to focus group 1, ‘FG2’, focus group 2 and ‘FG3’ focus group 3. Keywords were highlighted in yellow. The keywords that were similar, or that had more or less the same characteristics were grouped together to form sub-codes and then grouped to form (higher order) codes. Later on, the researcher goes on to demonstrate how the codes were grouped together to form categories.

Table 1: The best and worst thing about being a female engineer in South Africa

4.2.1 What are some of the best and worst things about being a female engineer in SA?

FG1 Responses	Sub-codes grouped	Code (Higher order)
➢ *Ok I think that one of the best things about being a female engineer is that you are given a lot of opportunities because there is a strong focus on closing the gender gap, so the variety of opportunities that are available are quite vast.* ➢ *I guess one of the negative things about it is that a lot of the industries that female engineers find themselves in are quite male dominated and so it's about equipping a woman, a female engineer with the right tools, and uhm, and I guess mindsets, to rather get out all of the pre-conceptions and misconceptions and biases against women in like a technical field.* ➢ *So yes, the worst things are that you have to prove yourself, when a man doesn't have to in this industry. I've worked with men and they look down upon you like you don't know what you are speaking about, especially when you in a plant environment, they don't take you seriously. So, you have to prove yourself as a woman when a man doesn't have to.* ➢ *So, I always struggle with this question, because I haven't gone that far into my career to have felt the biases that others have spoken about against women. I have never really seen myself as a female in engineering, uhm I only ever think of gender stereotypes in engineering when I hear it from other people, I've never really experienced it myself. Or maybe i never thought about it through that type of lenses, i.e. a gender bias sort of lenses. Uhm so i can't really say what is good about being female and what is bad about being female cos I just have never experienced it.* ➢ *I have experienced the negative side of things where I was working on a plant where probably 95% of the people working on the plant were male. So that was tough, being one of the only females on the plant. Having to navigate sexual harassment, and biases in the plant. So, I think it's better for them cos they have always worked in an office environment, but i feel for female engineers who actually want to work on a plant environment, there are definitely a few more challenges.* ➢ *Can I just add one more thing, I think that I've also experienced that kind of environment, and especially having to navigate the sexual harassment, that is very challenging, especially when you a young female. And I don't think its necessarily associated with being an engineer, but I think it's the nature of the environment, because it is so male orientated. Or rather male dominated. But i do think though that working for companies like BP where there is a strong focus on respect as a value, leveraging diversity, it does tend to create an environment where people want to hear what the new person has to say, regardless of whether it's a male or a female. That has been kind of beneficial as well, and i do think that one of the advantages in the diversity in that women bring is the way that we think and solve problems, even the way we are more in tune with our emotional intelligence kind of topics.* ➢ *Oh and other challenges that I've experienced is that there are limited facilities for women on site. And some of the sites that I have travelled to in remote locations, they actually don't even have female toilets. And so its uhm quite like strange because , and strange isn't even the right word, its quite like, demeaning to use a male toilet when especially it only has a urinal.*	-Females expected to do admin work -Females are expected to work harder than male counterpart -Females expected to prove yourself -Females expected to know more -Unrealistic expectations from female engineers in the workplace -Females work ethic questioned	Unfair treatment of female engineers in the workplace
	-No female restrooms in the engineering workplace -No female change rooms in the engineering workplace -Inadequate female facilities in the engineering workplace workplace	Engineering workplace not suited for female needs
	-Sexual biases against female engineers in the engineering industry -Rude derogatory comments made towards female engineers in the engineering workplace -Insensitivity towards female engineers in the workplace -Unwanted sexual attention towards female engineers in the workplace -Females engineers knowledge undermined in the workplace	

FG2 Responses

- *I think some of the best things are the opportunities, there is so much happening, so much change that is affecting the number of females that are going in. The opportunities for females have increased drastically and there is a relaxation of the stereotype. Because when you say engineer, a female is not the first thing that comes to mind. You think of a guy in his hard hat and his boots. If you are a female and you are in this field, it shows that you are tough enough and smart enough to be here, and with that comes one of the worst things, that is with the industry still being male dominated, especially engineering.*
- *I will agree regarding the opportunities and the challenges. If it is challenging, then it is the best thing to be in.*
- *Worst thing is that you still have to prove yourself as a female engineer and in the engineering field. And that as females we end up having to commit to other things outside of work such as families, we have to work two jobs. Also, if you find yourself in operations, i find it very demanding at times and it tends to like become a bit of a conflict between work and home. You end up struggling between the work life balance (work and family)*

FG3 Responses

- *Oh, right I think, in terms of the corporate, it depends, it's just my thinking, it depends on where you are within the company, or the division that you are in. Because like for me, I am not specifically within the engineering side, I am more in the sales division, however within that it is more of a male dominated environment. So, the challenge within that is that males always say that they don't always take female comments that seriously. It feels like you always have to push yourself, you always have to work more harder than your male counterpart in whatever you do so that you become more relevant and they can get to hear you. That is a challenge. So, any comment that you make, you have to make sure that you are serious so that they can hear you. So that's the bad part of it. And the good side of it is that if you get to be yourself, and not always try to prove yourself, because when you try to prove yourself, it becomes more of a, you are always following on someone's footsteps. So i think for me it is more a matter of adjusting and not just saying "I'm a female". You have to say and believe that you are equal with any other person, regardless if it's a male or a female. And just work as hard as you can without having anyone else set up a standard for you trying to achieve.*
- *For me I will say, basically I report to technical, I'm under the technical team, there's projects and then there's maintenance. I report under projects. I am the only female in the team. The nice thing about it is that I get a lot of support. Sometimes it's really challenging because as you know engineers like to brag about what they know, i know this, i know that, . Another good and bad thing is that I am always put on the spot, in terms of presentations, they always expect you to do it, and those admin things. They expect you to know how to write minutes and reports. So, for me this is my first experience, the company has been good to me. I have a lot of support, everyone is always willing to help me. They treat me special*
- *And another thing if I may add, we have to work ten times harder, you have to deliver more, they always expect more from you, you have to know more. And also emotionally, us sometimes we are sensitive, and men just joke about everything. You need to learn to adapt.*

-Female oppression dependent on type of engineering
-Female oppression related to the culture of the industry
-Female prejudice related to the division of company
-Female oppression related to whether its office or field based

→ Overt negative behaviour towards female engineers in the workplace

→ Female oppression subjected to location/division in company (industrial vs corporate)

-Opportunities available for female engineers
-Engineering is a dynamic industry for female engineers
-Relaxation of female stereotypes
-Surrounded by talented individuals which inspire growth
-Female learn resilience in the industry
Female quotas filled-job opportunities

→ Engineering industry attractive and dynamic for female talent

As demonstrated in table 1, the sub-codes were grouped together when they contained similar material. These groups became the higher order codes. She then grouped similar codes together to form a category, as demonstrated below in Figure 5 below.

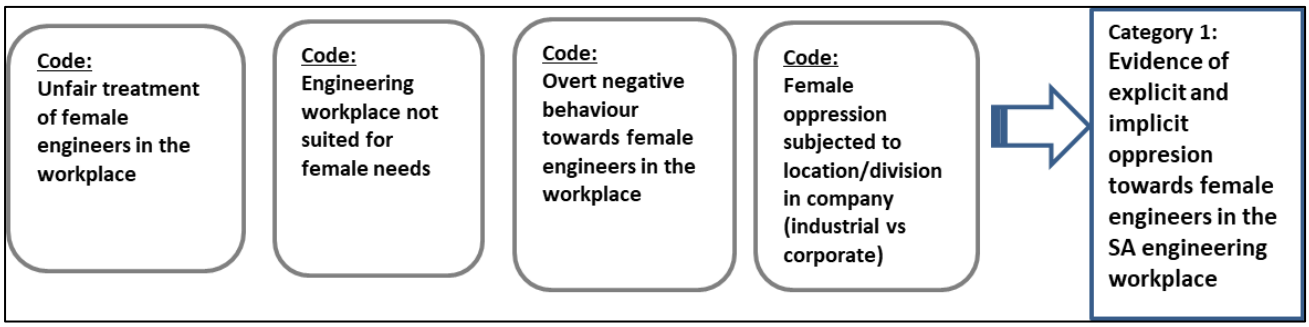


Figure 6: Category showing evidence of explicit and implicit oppression towards female engineers in the SA engineering industry

Once all the categories were identified, the researcher generated themes through noticing patterns amongst the categories. She will be explaining how the categories developed in response to the different questions and will only be discussing the generation of themes at the end of the chapter.

The codes developed from question 1 refer mainly to the negative stereotypes of the industry when it comes to females. In the participants' reflections on the benefits and challenges of being a female engineer in South Africa, their comments ranged from identifying structural deficiencies in the engineering workplace that do not cater to the needs of females e.g. the lack of female toilets or change rooms, to highlighting the implicit and explicit negative behaviours to which they are still subjected. The implicit behaviours they identified included the manner in which females were still expected to do administration work, whereas male counterparts were not; the way in which a female engineer would need to prove her worth and would have her work ethic questioned whereas a male engineer would not be required to do so. Explicit behaviours towards females included rude, derogatory comments, unwanted sexual attention and sexual harassment. (The benefits of being a female engineer were not included in the above category, as they fell under a different category that will be explained below)

4.2.2: What was the major contributing factor that influenced your decision to go into the oil industry?

Table 2: Factors influencing decisions to go into engineering

Some of the Focus Group responses	Sub-codes	Codes
FG1 ➢ I think it's about how dynamic it is and the fact there is a lot of moving parts to the value chain ➢ And as an engineer, I agree with the love of maths and science, you also get to do a lot of analysis especially with the job that I'm in. I really enjoy that part of it.	-The love of maths and science -Flexibility industry offers -Dynamism of the engineering industry -Complex and challenging industry -Practical knowledge learnt -Exposure in the industry	Personal love and appreciation for the oil industry
FG2: ➢ For me I was bursar, sponsored by an oil and gas company. So as part of the contract I signed I was going to work in the oil and gas industry also I didn't see myself wanting to go into any other industry. ➢ For me there wasn't much opportunity for me to choose to go somewhere else because of my bursary conditions. I think I am glad I ended up where I am, I find it most complex and challenging. ➢	-Opportunities available for female engineers -Engineering is a dynamic industry for female engineers -Due to a relaxation of female stereotypes -Surrounded by talented individuals which inspire growth -Female learn resilience in the industry Female quotas filled-job opportunities	The many opportunities and dynamism that the oil industry has to offer
FG3: ➢ I went into it because it was a job that was available and relevant to what I studies as a qualification. ➢ For me with a chemical engineering background, I always wanted to be in a refinery, so this for me was good. I consider myself lucky to get in.	-Engineering job was resultant (not intentional) -Good salary for females -It was an available job -Bursary sponsored job in engineering --Female engineers were oil and gas industry sponsored recipients	Externally driven factors driving females into engineering

(For full transcripts please see Appendix D, Question 2.)

The responses to this question could be clustered into three main higher order codes. The first higher order code related to what the engineering industry could offer in terms of opportunities, growth and an exciting future. Most of the participants had been optimistic that the stereotypes of women in the engineering workplace would fade away and hence decided to enter the industry. Other responses were directed towards the nature of the industry itself and how it can prompt personal change, e.g. it taught resilience and affords individual growth.

The second higher order code identified concerned the participants' personal motivation for entering the industry. Personal motivations that were mentioned included responses such as "the love of maths and science drove me to engineering" and "the flexibility that the industry offers". Many females translated this into many

opportunities presented in the engineering industry as a result of the dynamism the industry offers, which was an attraction to the industry as well.

The last higher order code concerned externally driven factors which attracted and drove females into the industry, such as the good salary associated with engineering jobs. Many of the participants were already sponsored by oil companies on tertiary level and were preparing themselves for that after their studies. There were also other participants who mentioned that they ended up in the industry mainly because it was a job that was available at the time, and it coincided with the type of undergraduate studies they did.

Figure 7 below presents the higher order codes for the second question and how these were grouped into a category:

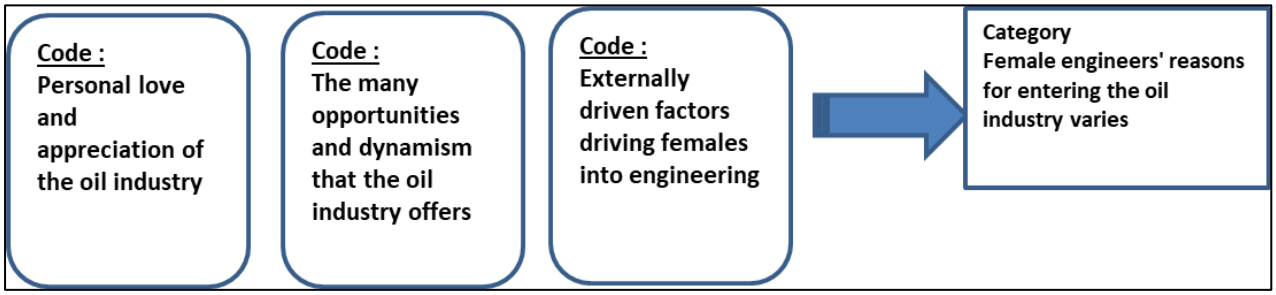


Figure 7: Category showing that female engineers enter the oil industry for various reasons

4.2.3. What prompted you to undergo mentoring? How were you introduced to your mentor?

Table 3: Female engineers' reasons for undergoing mentoring

Some of the Focus Group responses	Sub-codes	Codes
FG1 ➢ For me I wouldn't say it's a formal mentorship relationship, but there are people in my life that I consider as my mentor, even if they don't know formally	➢ Informal mentoring relationship ➢ "Ghost mentorship" (when the mentor is unaware that he is a mentor) ➢ Life coaching type of mentorship ➢ Technical mentoring ➢ Career mentoring	Female engineers are involved in different types of mentoring relationships
FG2: ➢ I have also been lucky to have a mentor, as I came through the graduate programme, so I have a mentor for not only work but also a life coach. I also have a technical coach. So I've had someone on a technical basis who assisted in terms of my competency levels to assist in my engineering career and beyond		
FG3: ➢ So, when you say mentor, where my mind goes is to the first mentor that I had in BP, cos that was the first time I heard the word mentor in the most official way. And I think that the intention was good, but the follow through wasn't good as how it was supposed to have been.		

The participants in the study entered mentorship relationships for different reasons, as was seen in the results to the question "What type of mentorship relationship are you involved in?" The discussion here was more around how they started off their mentorship engagement. Many females never even realised that they were in a mentorship relationship and preferred not to refer to it by a formal name. One response was "Yes I have a mentor in the industry, and they are not even aware of it. I go to them for advice when I need it*".* The researcher has referred to this as "ghost mentorship" in the coding, whereby the mentor is not even aware that he or she is mentoring an individual. Many of the participants preferred to have an informal type of mentorship, where they meet outside of work and can have a casual "chat". Other participants preferred to have a more structured approach and even referred to it as a "life coaching" type of mentorship.

The higher order codes for this question were then grouped and categorised as shown in figure 8 below:

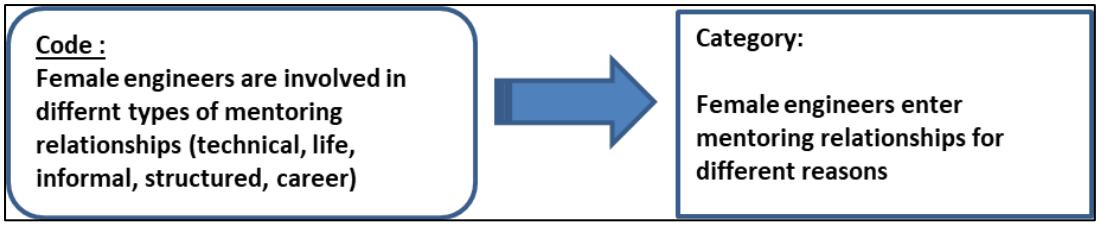


Figure 8: Category showing female engineers enter mentoring relationships for different reasons

4.2.4. What are some of the aspects that stood out most during your mentoring sessions? Can you share some of your experiences?

Table 4: Participants mentoring experiences

Some of the Focus Group responses	Sub-codes	Codes
FG1 ➢ So the mentorship/mentee ship relationship worked out very well for me and he had a way of directing me to the right place and I still go back to him for advice in terms of how to grow and develop. I respect our relationship and I feel like he's a mentor that I can have for the rest of my life regardless of where I am. And I've also had a female mentor, and the female mentor was not really much about work related stuff, the female mentor was an HR person and helped me with the day to day issues of being female in the industry and how to get around all of it	➢ Mentor offers guidance ➢ -Mentor offers professional advice ➢ -Mentor pushes mentees out of comfort zone ➢ -Mentor assists in developing full potential	**Mentorship assists in career progression**
FG2: ➢ I had a mentor when I started off in the industry. We needed to do a project, so we approached this guy, we were about four. He chose one of us that he would mentor. Luckily the person that was chosen was not doing her part. So, I started going to the guy saying i don't understand this, I have done that. So, he ended up deciding that he will mentor me. And he has been with me since I started, to date. It didn't even end in the work environment, it even went outside of it. Even after i resigned at Sasol and went to Mossel Bay, he even went to Mossel Bay to see where I was staying. The relationship developed further. We knew at Sasol that when we were working, it was professional, however once i clocked out we were friends. Even my mentor's wife is also close to me now. I've become a family friend. His been mentoring me each and every step of the way	➢ -A lifelong relationship evolves from the mentor/mentee ➢ -Support from the mentor is comforting and evolving ➢ -Can be used as a coping mechanism for females in the engineering workplace ➢ -Mentor becomes a confidante ➢ -Assists in showing how to balance work and outside life	**Mentoring aides in maintaining a work life balance**
	➢ Mentorship creates awareness of safety, especially in engineering environment ➢ Mentorship has reinforced self regulation ➢ Mentorship has created social awareness ➢ Due to mentorship, female engineers have become more direct and focused ➢ Mentorship assists with conflict management ➢ Mentorship has allowed female engineers to see the bigger picture ➢ Mentorship has boosted female engineers confidence levels	**Mentoring assists in closing the gaps from a professional career perspective**
FG3: ➢ I'd like to add on to what was said, because this for me is a very personal topic as well. I've had numerous mentors within BP, as well as outside of BP, and it's usually with the intention of having someone to help you figure out what your career progression is, and sort of understand where career opportunities lie. So, the mentors that I have had up to this point mostly contributed to understanding where I want to be, development required to get to that point. But I think the follow up has been very disappointing, despite a lot of initiative coming from my side. And I don't necessarily agree that somebody more senior would actually improve that or provide more rigour in terms of follow up and how that mentor/ mentee relationship would work.	➢ -Mentor gives direction ➢ -Mentor assists in developing full potential of mentee ➢ -Mentor is focused on the technical growth of the mentee	**Mentorship has assisted in technical advancement in the industry**
	➢ Mentor is too young ➢ -Mentor is too inexperienced ➢ -Mentor not senior enough to offer advice ➢ -Mentee not feeling the value add from mentor ➢ -No personal element to the mentor/mentee relationship ➢ -Bad follow up from mentor ➢ -Not enough time spent with mentor ➢ -No creation of opportunities from mentor ➢ -Mentee feels relationship is one sided relationship ➢ -Not a mutually beneficial	**Mentor/mentee shortcomings that reduced the effectiveness of the relationship**

The participants overall experiences on mentoring as discussed in response to this question could be clustered into five different higher order codes, which are elaborated on below.

4.2.4.1 Mentoring assists in career progression

The first code developed referred to how mentoring was undertaken for career progression. Participants felt that the oil industry in itself was very tough and navigating through it and being able to face the daily challenges as a female, required some guidance from an individual who has experience. Female engineers felt that being mentored provided the guidance and direction needed in order to progress in their career. It was also evident that the motivation from the mentor was important because this pushed many females outside of their comfort zones and gave them courage to pursue opportunities which they would not necessarily have done without being mentored. Participants explained that mentoring assisted them in developing their full potential by giving them insights into what the possible pitfalls are in the industry.

4.2.4.2 Mentoring aides in maintaining a work life balance

The second code referred to how mentoring assisted participants in finding work-life balance. The mentees explained that the mentorship experience gave them a comforting feeling, knowing that there was someone who could give guidance and support. They described the mentor as becoming a “confidante”. One particular female described the mentoring relationship as a dynamic one through which she has built relationships with the mentor and his family and the relationship has evolved to be more than just a typical mentor/mentee relationship. Work-life balance also emanated as one of the reasons why females are not retained by their employees as compared to their male counterparts. The participants in this study found that the mentor emulated “real life” for females and could give real life advice on how to maintain a good balance between work and family life and gave guidance on how to manage this when pressure becomes more intense. Other females thought that the mentor could serve as a coping mechanism when it came to stress, because they could obtain tips on how to manage the pressure that stems from the type of industry in which they find themselves. The biggest concern was how to start a family and still advance within one’s career as a female engineer.

4.2.4.3 Mentoring assists in closing the gaps from a professional career perspective

Most females felt that being mentored, especially by an engineer who has been through the ups and downs of the industry made it easier to bridge the gap between tertiary and the world of work, especially when newly entering the profession as a graduate. Mentoring created immense awareness for these participants when it came to safety, which was a key value in most engineering workplaces. There were other respondents who felt that being mentored also reinforced how much strength they had as females on a personal level and emanated qualities such as self-regulation, social awareness and have increased their confidence levels to a much greater extent. Many participants agreed that mentoring has increased their ability to focus on their goals and has clarified how they can achieve both short- and long-term goals.

4.2.4.4 Mentorship has assisted in technical advancement in the industry

Most participants felt they needed a mentor because of the difficult environment they faced. Mentoring assisted with their integration into this very tough profession on a technical level. Most females felt that there was a lot expected from them and the learning curve in the industry was quite tough, hence they needed someone to help guide them on a technical level in order for them to reach their full potential and deliver results. It was clear that most participants engaged in mentoring mainly to get some type of assistance technically.

4.2.4.5 Mentor/mentee shortcomings that reduced the effectiveness of the relationship

Whilst most of the participants felt that mentoring was excellent in order to assist with adaptation and settling into the engineering industry, there were however others who felt that there were a few shortcomings that could reduce the effectiveness of the mentoring experience. Many participants thought that sometimes the mentor him/herself was too young and inexperienced to offer sound advice. This resulted in a breakdown and little value being added to the mentees' experience. Other shortcomings included mentees feeling that it was a one-sided relationship, and hence they were required to do all of the follow-ups. In these cases, the mentees did not feel that it was a mutually beneficial relationship. Participants mentioned that in order for the relationship to be equally beneficial to both mentor and mentee, there needed to be a relationship prior to mentoring, which will add more value to the mentoring relationship because both parties would know and possibly understand each other better and be motivated to want to have a fruitful mentor/mentee relationship.

These five cluster codes were then grouped together to form two different categories as shown in figure 9 and 10 below:

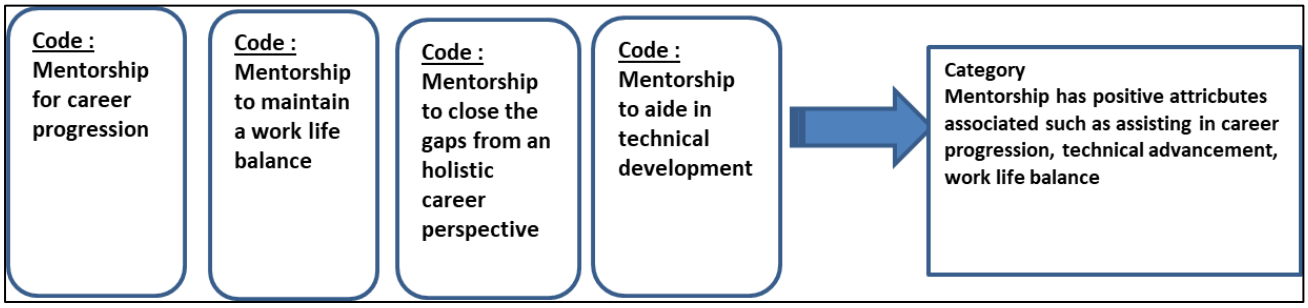


Figure 9: Category showing positive attributes associated with mentorship, such as career progression, technical advancement and work life balance

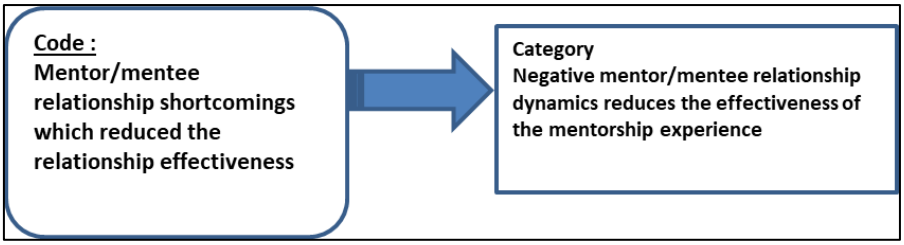


Figure 10: Category illustrating the negative mentor/mentee relationship dynamics reduces the effectiveness of the mentorship experience

4.2.5 What were some of the coping strategies that you employed when you found yourself in a male-dominated environment? How did your mentorship experience assist you?

Table 5 : Participants coping strategies in a male dominated environment

Some of the Focus Group responses	Sub-codes	Codes
FG1: ➢ For me I can attest to what she says about the language barrier being a challenge, because when I started working it was just males. So I guess with me coming in as a female, they didn't see the need to adjust and change the way they were doing things. So unfortunately, I had to fit in within that environment and be one of them to survive. Language being swearing was a normal man to man talk, sometimes there would even be acting like they sorry but would just continue and do the same thing again. As time has continued, things change, however it has not fully changed. FG2: ➢ I think that the challenges that we are facing are not specific to females only it is challenges that an engineer would typically experience, A small portion of it though indicates that there are people who are still stuck in a patriarchal mindset and who feel they have authority because they are male. And oftentimes it's just the level of education and the type of people that you work with, because you work with other engineers. Often times its more our fellow counterparts, engineers who are more respectful.	➢ -Female engineers seek out mentorship relationships ➢ -Female engineers seek a support structure at work in male dominated ➢ -Family support has helped female engineers cope	Female engineers adopt positive coping strategies, such as mentorship, in the male dominated environment, which assists in sustainable practices
FG3: ➢ In my previous team, in Air BP, I was the only female in the engineering team. And then even at the sites that I used to work at, I was the only female, so whenever I would feel like there was "discrimination" in a way, my natural response which obviously also isn't the most mature, was to disengage. And basically, just keep my opinions to myself and not really feel comfortable to bring as much as I could to the table. So, from a coping strategy perspective, that is what i did, but it changed over time. And the more i learnt about the environment and about me, it evolved. Now in this new team that I am in, even though it is male dominated, I feel like I have integrated really well, also because I think there is a high level of maturity.	➢ Female engineers disengage and isolate themselves ➢ -Female engineers keep opinions to themselves ➢ -Female engineers conform to environment (curse etc)	Female engineers adopt dysfunctional coping strategies conforming to the male dominated environment

The results above show the different coping strategies employed by these female engineers when entering the industry. Two higher order codes emerged from responses to this question. Participants considered both negative and positive coping strategies in order to adapt and survive in the engineering workplace in South Africa. The first code related to positive coping strategies had sub-codes that referred to seeking out mentorship relationships to assist with the pressure and technical challenges of the industry and other aspects that could assist with integrating into the male-dominated environment. Other sub-codes referred to seeking a support structure at work. Participants also felt that it was important to have support from family, as this assisted them when they faced challenging times.

The second code related to negative coping strategies that females admitted adopting to stay in the industry and survive. Sub-codes here included electing to rather disengage in dialogue at work, keep their opinions and ideas to themselves and isolate themselves whenever possible. Other respondents admitted to conforming to the environment they found themselves in by cursing, adopting male characteristics etc.

Figure 11 below illustrated the codes for this question and how they were categorised:

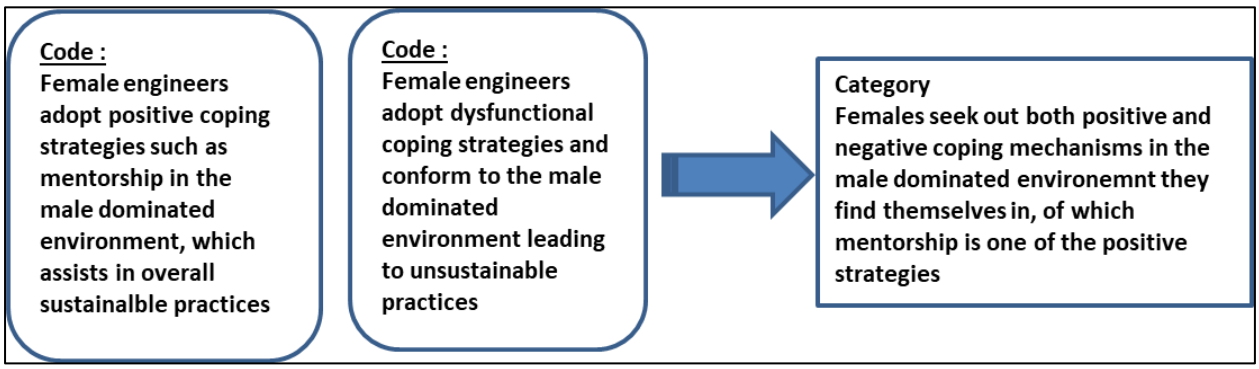


Figure 11: Category depicting the positive and negative coping strategies that females seek out in the male dominated environment. Mentorship was one of the positive strategies

4.2.6 Did you have a male or a female mentor? Did the gender of your mentor make any difference to you? If yes, can you explain how this impacted you? If no, why did it not make a difference to you?

Table 6: The impact of the gender of the mentors on the relationship

Some of the Focus Group responses	Sub-codes	Codes
FG1 ➢ No, it's doesn't matter whether it's a male or female. Because the people that I am mentoring aren't females, it's just a matter of understanding each other. This is this kind of a person, and that one is like that. And learning how to handle it. ➢ I guess that when you are female, and you have the right female mentor it's a plus, however it doesn't necessarily mean that just because you are a female you gonna have a female mentor because they can attest to your experiences. You can find some men who can actually still be relevant in both circumstances.	➢ Lack of preference for male or female ➢ -Gender of mentor does not matter to female engineers ➢ -Men can be sensitive also, hence good mentors ➢ -Society has changed and roles have become reversed ➢ -Gender is irrelevant for technical mentoring ➢ -Gender preference of mentor can be individual dependent	Gender does not matter when it comes to career/technical mentoring of female engineers
FG2: ➢ From the technical side being a male or a female doesn't really matter. It all comes down to how you develop and push the individual. I think when it comes to the softer skills, that when I find it personally easier to open up to a female than I would to a male. The difference is that I know people who connect better to a male or female, so I think it's a personal preference. So i think it all comes down to whom you feel comfortable with. ➢ For me personally I would prefer a female because I feel like they can understand where I'm coming from and they can put themselves in my shoes. Also, we are more similar, and also on the flip side of things, women in general are very tough and we are tough on each other. So, you would get the sympathy from a female which you would necessarily get from a male.	➢ -Females are more empathetic ➢ -Female mentors will understand female issues ➢ -Female mentors have more emotional intelligence ➢ -Female mentors understand female struggles ➢ -It is easier to open up with a female ➢ -Males will need more context and explaining to understand the female struggles ➢ -Females inspire females ➢ -Females mentors can assist on work life	Gender matters only when it comes to female specific issues that needs to be addressed
FG3: ➢ **The mentor that I had was female. So I don't have a mentor in BP at the moment, but I think if I did have a mentor,** I'd **want a female in a leadership position, just looking at what** was **touched on, I worry about in my career going forward, how I am going to balance a career and starting a family.** It's **very personal, so I think it would be easier to speak to a female than a male and get their experiences of how they have been able to manage that. So, I think it would be more applicable.**		

The responses to this question could be clustered into two distinct higher-order code groups. Firstly, the gender of the mentor did not matter at all when the reason for mentoring was career advancement or technical advancement. Most female engineers in this study showed no preference when it came to have either a male or female mentor, since they felt that this would not matter when it came to gaining knowledge of the industry. Some of the participants mentioned that the reason why they were not fixated about gender was because of the way that society has changed,

and hence most males could relate on some level and would have a deeper understanding and empathy of female specific issues. Most participants felt that in today's society, increasing numbers of males were looking after children at home and the wives were the breadwinner. The only reason for wanting a mentor of a specific gender would be as a result of the individual and her preference.

Secondly, some participants did comment that they would prefer a female mentor for specific issues such as raising a family and climbing the corporate ladder. The only issue raised with finding a female mentor was that there were limited females in management positions in the engineering industry, so the pool to choose from was smaller, whereas there were still more males available because of the male-dominated environment. Certain females in the groups did, however, feel that their first choice would be a female mentor only because a female would understand a female's problems first hand due to her living it, so it would be easier to open up to a female. Issues such as these (for example, work-family balance) were the ones that they felt a female would be able to assist with most.

Figure 12 below illustrates the codes and the category for this question:

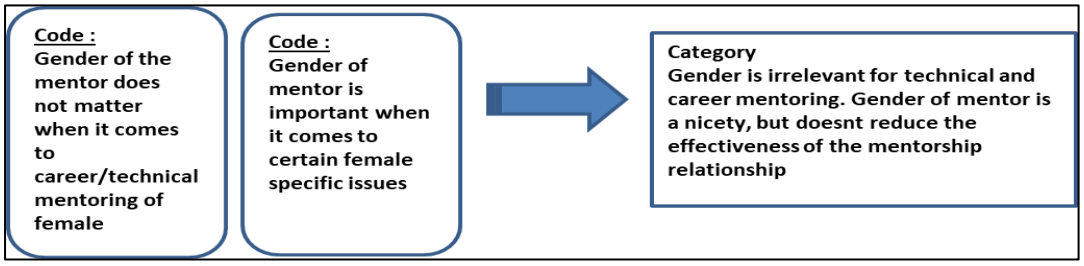


Figure 12: Category showing that gender is irrelevant for technical and career mentoring. Gender is individual specific. The gender of the mentor does not reduce the effectiveness of the mentorship relationship

4.2.7 Would you consider becoming a mentor to female mentees wanting to go into the oil industry?

Table 7: Would female engineers enter mentoring relationships with new entrants

Some of the Focus Group responses	Sub-codes	Codes
FG1 ➢ I'm already doing it because I know the benefits, I know how I benefited from it, so it is really essential for the next person to benefit from it.	➢ -Personal benefits gained ➢ -In order to be an inspiration to others ➢ -To give hope for new engineers (male and female) ➢ -Giving back to the community ➢ -To assist with challenges that they have already experienced and give guidance ➢ -To help change the perception of females wanting to enter the engineering industry ➢ -To share the story of hope ➢ -Show that it's possible to survive and thrive as a female in a male dominated environment ➢ -To encourage others ➢ -To provide career mentoring ➢ -To change industry mindset in South Africa ➢ -To inspire growth in the individual and the South African female population in engineering sector ➢ -To be the change and Inspire change	Female engineers are inspired to become mentors to drive change in the engineering oil industry
FG2: ➢ I think yes but I wouldn't want to draw the line and say that it has to be specific female. I think engineering in its entirety is so different from varsity, in what you do, and think is so different from varsity, it's a real eye opener. I think that any engineering graduate in general needs a lot of technical development, mentorship and guidance and a little bit of hand holding. Females are generally strong and highly motivated people, but they need that little extra nudge in order for them to reach their full potential. So, if its mentoring on a technical basis then it doesn't really matter whether its male or female.		
FG3: ➢ I definitely would. I also have my family member, cousins and so on, who's always asking questions about engineering and the oil industry and about what to study. And I'm constantly asking them how things are going and so on. But within the BP context, I have one resource that is tagged to a project that I am currently working on now, and that sort of naturally evolved into a mentor mentee relationship. It didn't necessarily go out to be that way, but it is and I'm always willing to help other women and equip women about the challenges that i dealt with and help them see that there are only opportunities out there for them and that things won't always be a certain way. So i would hope that my mentorship influence would help in some way in which they think. But also, that depends on the individual and how malleable they are to change. But i am not entirely convinced that mentorship can be used as a retention strategy because there are different sides to it.		

The answers to this question were unanimous across the different groups and hence were clustered into one higher-order code. The participants felt that mentoring should be a necessity when entering the engineering industry and, because of their mentoring experience (even though it was not always working), they would become a mentor to a new entrant—either female or male—entering the industry. The main motivator here was to share and instil hope in new entrants that it was possible to remain in the industry and succeed. Most females in the groups wanted to change the perception and mindset in South Africa by sharing the story of hope and success, and they believed that this started with mentoring one female or male at a time. Other participants also wanted to give back to the community and show how mentoring can impact future lives for the better. Figure 13 below shows the code and its category:

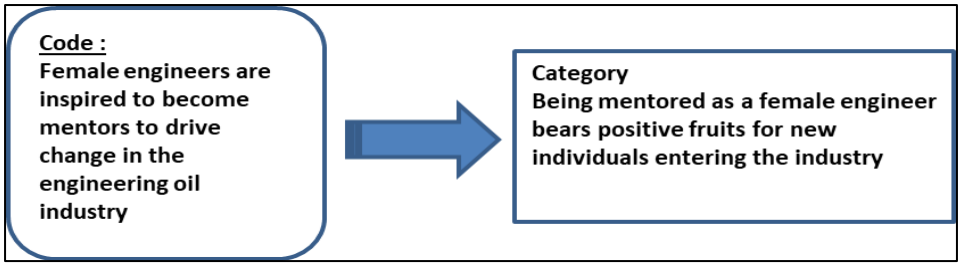


Figure 13: Category showing being mentored as a female engineer bears positive fruits for new entrants

The categories developed in relation to each of the questions above were clustered together in order to be grouped under themes. The following section will show a schematic of how these were grouped. These themes were also developed by being aware of the overall research questions and objectives of the study.

4.3 Theme Generation

The categories were grouped together into three themes.

Theme 1: Coping Mechanisms

There is evidence of discriminatory treatment against females in the oil industry in South Africa, and as a result female participant have sought out mentorship as one of the coping strategies to survive and retain in the industry

The first group of categories which were clustered together under theme 1, in figure 14, below refer to how the oil industry in South Africa is not catering to the needs of female engineers on most levels. It also shows that many females are in need of a job and hence do not have the luxury of rejecting a job that could pay well. This theme also refers to how the female engineers in this study are now having to resort to coping mechanisms to be able to deal with the harsh environment. One of these coping mechanisms is mentorship.

Theme 2: Mentorship value add

Participants' experienced mentorship as offering positive value on a personal and professional level. There are shortcomings, though, and more can be done to make the most of mentorship as a retention strategy.

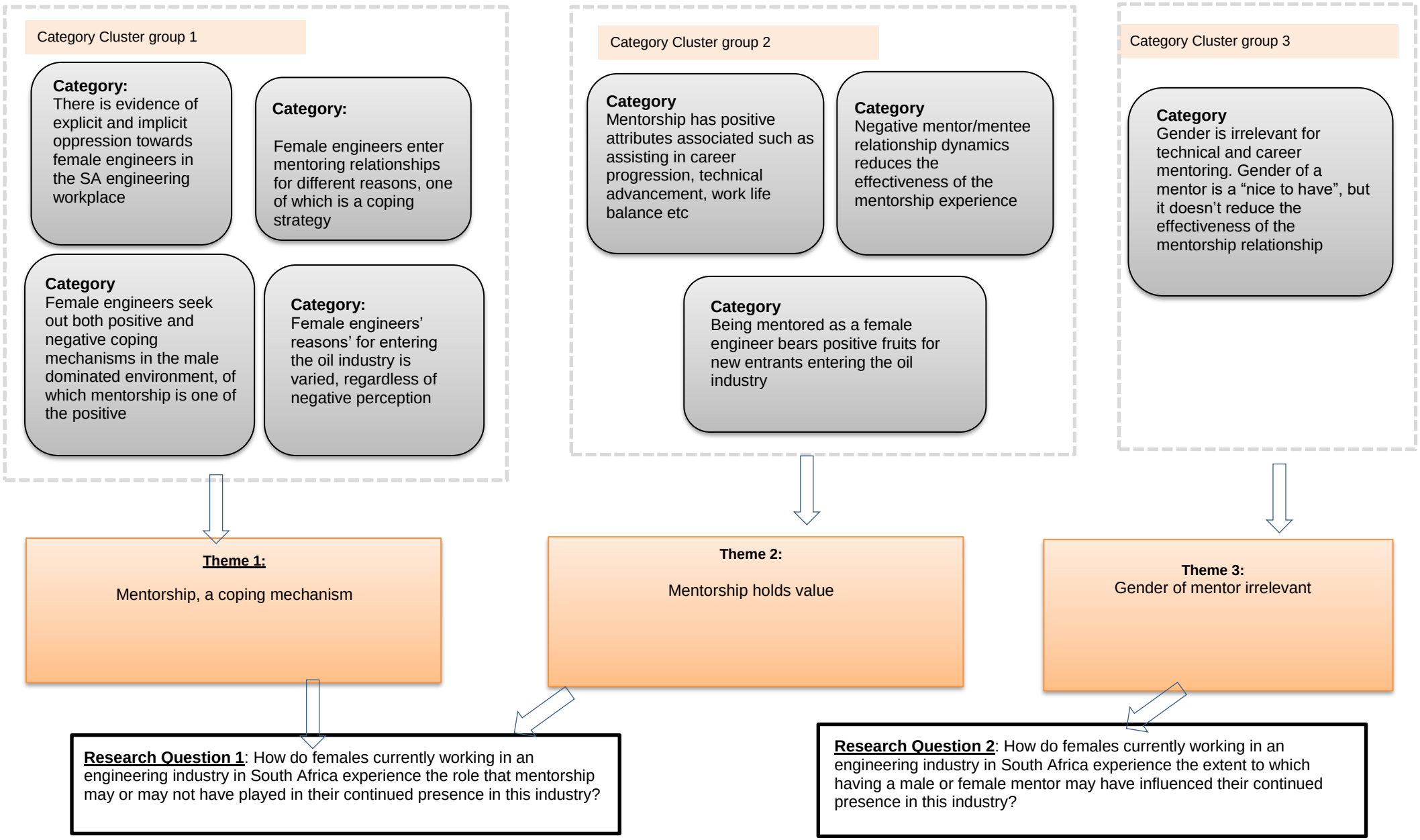
The second theme refers mainly to how mentorship has added value to the lives of many of the participants both personally and professionally. It also shows that there are shortcomings when it came to the mentor/mentee relationship that could be addressed on a personal level as well as corporate level. This theme also refers to how mentorship could be powerful since many of the female participants wanted to become mentors to new females entering the oil industry.

Theme 3: Mentor- gender neutral

The second research question wanted to evaluate the impact of gender on mentorship. No evidence was highlighted that gender has any impact on the effectiveness of the mentorship process and is, according to these participants, irrelevant to the retention levels of female engineers in the oil industry

The third theme referred mainly to the gender of the mentor. It shows clearly that there was a lack of female mentors in the industry but, regardless of this, participants had no issue with the gender of the mentor. It became irrelevant when they were aiming for career and technical advancement and it was more of an individual preference but not a necessity if the relationship worked well. The main reason why certain females wanted a female mentor was to discuss issues around how to balance raising a family and moving up the corporate ladder, and hence there were a few which would appreciate a female mentor in this regard.

Figure 14: Summary of thematic analysis



5. Discussion

The objective of this research was to understand and explore the experiences of female engineers in the male-dominated oil industry in South Africa, and to explore some of the challenges they face. The study aimed to ascertain whether mentorship can be used as a retention strategy for females in the engineering industry.

The results, as shown in the previous section, reveal that there are clear challenges that still predominate in South Africa. For example, female engineers are still dealing with overt and subtle ill treatment in the workplace. These challenges include biased organisational practices and gender discriminatory facilities that cater to males only. The results also articulate that female engineers in South Africa enter mentoring relationships as a coping strategy to survive in the oil industry. The other reasons mentioned for undertaking mentoring were directly proportional to the gender discriminatory behaviour displayed towards females in the industry, such as wanting to progress and advance their respective careers, to maintain and attain a work-life balance, to understand the industry better and to gain technical knowledge. Females also shared their experiences on mentoring, both positive and negative, and explained how some of the shortcomings could be reduced to have a more effective mentor/mentee experience. Gender had no bearing on the effectiveness of the mentoring relationship in the study, however there was a slight preference shown towards wanting a female mentor when it came to certain aspects around child bearing and learning how to balance work and family life.

5.1 Female engineers' treatment in the oil industry

South African female engineers in this study were still trying to overcome the barriers of male dominated mentality when it comes to equality in South Africa. For example, a respondent from Total SA reported,

> "Worst thing is that you still have to prove yourself as a female engineer and in the engineering field. And that as females we end up having to commit to

other things outside of work such as families, we have to work two jobs. Also, if you find yourself in operations, I find it very demanding at times and it tends to like to become a bit of a conflict between work and home. You end up struggling between the work life balance (work and family)"

This is in line with research conducted by Nel (2004), who found that younger engineering females needed to work twice as hard to prove their worth in the patriarchal workplace they found themselves in. Many of the participants in this study found that in South Africa, the patriarchal culture infuses the workplace and directly addressing a man is still seen as disrespectful. Nel (2004), as well as Du Plessis and Barkhuizen (2015), stated that most males in the African and Indian cultures were not willing to take instructions from a female due to the practise of a more subservient role that women play in those cultures. This was also corroborated by research by Yadav (2016) who concluded that females experienced an environment of incivility, where they were treated by senior management in an insolent, demeaning manner. The work environment was set up to consistently undermine and belittle female engineers. (Yadav, 2016)

In line with the findings of this study, regarding the role that the physical environment plays, Nel and Meyer (2014) also stated that the more supportive the physical environment in which females work the more productive they are. If the environment does not cater for females, there will be reduced levels of productivity. This was also noted by Martin & Barnard (2013), who found that women's physical needs were neglected by having inadequate resources for females and a biased infrastructure catering mostly to the male population.

A study was conducted by Salo, Liersch, Mohlakoana-Matopi, & Maree (2014) whereby they examined the way incentives can be used to both attract and retain women in the Science, Engineering and Technology industry in South Africa. They interviewed 45 women across corporate institutions, government as well as tertiary institutions in South Africa. The results from this study proved that the industry was still mainly dominated by a masculine organizational culture. Many women who entered and were employed by engineering companies were deemed to be "unattractive or unfeminine". This pointed towards the biased

organizational stereotypes towards females highlighted both in this study and theirs. A minority (11%) of the respondents in the study done by Salo et al (2014), did however find that their workplace was very supportive of their progress and well-being in their jobs. They found that there were transformation programs in place in those institutions in South Africa and there was better representation of females in the overall company hierarchy. These transformation programmes included more flexibility around their schedules if requested, more flexibility with regard to childcare, and they had wellness programmes in place to support females.

5.2 Mentoring Experiences

Mentoring emerged in the current study as a coping mechanism for females to remain in the industry in light of the biased and discriminative organizational practices. Nkhoma and Thwala (2014) also substantiated this in their study saying that mentoring was used as a tool by females in the construction industry to survive the day-to-day male-dominated environment, but also to nurture and grow talented individuals. Martin and Barnard (2013) concluded in their study that formal and overt organisational practices that were upholding gender discrimination were the main challenges faced by females and hence mentoring emerged as a mechanism to remain in the industry. For example, respondents from BP and Total reported below,

> BP Respondent: “It was difficult. The coping strategies I employed was my natural response was to disengage, keep opinions to myself, and not feel comfortable to bring much to the table. A mentor at the time would have helped”
>
> Total Respondent: “I tried to fit into the environment, and was also starting to curse”

Mentoring has been identified as an indirect incentive to retain and attract women into previously male dominated fields by Salo et. al (2014). Mentoring was seen as a tool through which talent can be recruited and retained (Nkoma & Thwala,

2014). Mentoring was seen as important to participants in this study because of what it had to offer in terms of career satisfaction, work life balance, technical advancement and because of how it closed the gaps between tertiary and the real world of work. A similar view was seen by Aigbavboa et al (2016) in their study conducted on females in construction industry in South Africa, whereby effective mentoring had the potential to ensure that there was constant continuity, enhancement of mentees' development and that growth in the organisation was ensured.

5.2.1 Career satisfaction and advancement

The ability to advance in their career and being fulfilled was of utmost importance to females in this study as can be seen in the following comment by a SAPREF respondent:

> "I have also been lucky to have a mentor, as I came through the graduate programme, so I have a mentor for not only work but also a life coach. I also have a technical coach. So, I've had someone on a technical basis who assisted in terms of my competency levels to assist in my engineering career and beyond. And then I've had someone who looked out for the softer side of things such as my career aspirations and my goals and I've found that it is very beneficial especially for a young female coming into the industry. It is quite daunting to go into such an industry as a female. Also to have someone else make you think of the bigger picture because sometimes you don't think so far ahead, someone who's going to guide you and constantly push you, and nudge you forward and make sure you take advantage of opportunities, but also for those days where you breakdown and you had a bad day at work and you not feeling very confident enough and obviously there is a lot of pressure involved. It is nice to have a person to deflate to and to tell you that it is okay, and that its gonna take you so long to get to where I am and basically someone to hold your hand through your career. My mentor has left the company and is now an external structure and is someone I can pick up the telephone

with and do a check in with, of how is my career going and how is my aspirations going and even on the technical."

It was noted in the study that most participants referred to glass ceilings in companies as a result of certain restrictions they face which males do not. This concept of a glass ceiling concept was also a finding by Stone and Coetzee (2015). They noted that females found that they were discriminated against when it came to top management positions. Martinez-Leon, Olmedo-Cifuentes, & Ramon-Llorens (2017) corroborated this notion of glass ceilings in their study when female participants referred to glass ceilings restricting them from advancing their careers due to child care commitments. This forced females to reformulate their careers and caused delays in promotions and other opportunities as compared to their male counterparts.

5.2.2 Work-Life Balance

Most of the respondents in this study sought mentorship in order to find a balance between advancing in their career and starting a family, while still being as successful as their male counterparts. Due to the masculine-oriented organisational culture many females were prohibited from having a work-life balance (Salo, Liersch, Mohlakoana-Matopi, & Maree, 2014). The scarcity of females in the workplace is as a result of structural factors related to a work-life balance, such as having to balance reproductive responsibilities and work pressures (Salo et al., 2014). This finding was also pertinent in the study by Ijagbemi (2017) who sought to understand why so few women were retained in engineering and the built environment. The main finding was with regard to finding a balance between having a family and a successful, fulfilling career.

5.2.3 The effectiveness of gender on the mentoring process

The majority of participants in this study had no preference to the gender of the mentor to the mentoring process or to the effectiveness of the mentor/mentee relationship. A small majority did show a preference when it came to female specific issues. This can be seen in response by some of the respondents below:

BP Respondent: “I have no preference on gender. It’s all about whether you can relate to the individual example in terms of background”

SAPREF Respondent: “From the technical side being a male or a female doesn’t really matter. It all comes down to how you develop and push the individual. I think when it comes to the softer skills, that when I find it personally easier to open up to a female than I would to a male. The difference is that I know people who connect better to a male or female, so I think it’s a personal preference. So, I think it all comes down to whom you feel comfortable with”.

Total Respondent: “Men can still relate and be sensitive when it comes to female issues such as wanting to start a family etc. In today’s society, lots of males are also staying at home and they understand the struggles, so sex doesn’t matter at all”

Most participants in the current study found that gender did not matter when aspiring to gain a better understanding of the oil industry or when trying to advance their technical knowledge. This finding was supported by Yokwana et.al (2016) who came to the conclusion that the gender of the mentor does not affect the mentoring functions. This was also substantiated by Stone and Coetzee (2015) whose study provided nothing conclusive regarding gender within the mentorship relationship.

Whilst it was unanimous in this study that the gender of the mentor does not play a role in terms of career advancement, there were a few females who indicated that they would have preferred having a female mentor for specific female issues, e.g. related to how they managed to navigate having a family and a career etc. The respondents did mention that there few suitable female mentors available in their respective organisations, which was also what Stone and Coetzee (2015) discovered in their study. This was in line with what Dasgupta (2014) concluded regarding the value of pairing a female with a female mentor and the related benefits such as gaining self-assurance, less anxiousness, and more confidence. This was also advocated for by Mullen (1998) in an earlier study who deduced in his study that female mentors were more influential when it came to psycho-social

mentoring functions and male mentors were more influential when it came to career mentoring.

Muller (2011) showed that there were consistent differences in the mentoring relationship between female and males and the study substantiated work done by Mullen (1998) which showed that female mentors offer more psychosocial support to their mentees whereas male mentors needed their trust to be earned (Ensher & Murphy, 2011). This was also confirmed by Sosik and Godshalk (2000) who showed that female mentors emulated more role modelling in both homogenous or diversified mentoring relationships and male mentors offered less psychosocial support and was associated with more career development functionality

6. Conclusion

This study has highlighted the importance of mentoring in the engineering industry in South Africa. Organizations in South Africa, such as the ones represented in this study, are now using mentoring as a way in which to recruit and retain top talent in their organisations.

This study concluded that female engineers in the oil industry in South Africa still face discriminative organisational practices that make it challenging for them to remain in the oil industry. It has been evident from this study that females use mentoring as a means to cope and survive in this male-dominated environment. The mentoring relationship has shown positive value for certain females in conjunction with other coping strategies, but much can still be done to improve the mentor/mentor relationship in order for the practice to be used with maximum benefit as a retention tool and improve the gender disparity that is still evident in the oil industry in South Africa.

The results of the study also suggest that gender plays a limited role when it comes to the effectiveness of the mentoring relationship. There is a however a slight appetite from female engineers to engage with more experienced females in the industry on certain female specific issues

7. Recommendations

As per the World Development Report of 2012, it was shown that mentors and role models are important for attaining and retaining females in the oil industry. One way of encouraging women is by showing them that other women have survived (and thrived in) the industry and that they have used constructive mechanism to do so, without having to conform to the negative norms imposed on females. Additional forums for women should be formed to allow for support groups, networking skills, leadership skills as well as motivating each other to stay in the industry.

Other ways of retaining females could include amending current organisational policies, re-examining the governance policies and educational structures in order to make them more attractive and conducive to female talent. There should be a legislative framework implemented that requires engineering companies to implement gender mainstreaming and employment equity practices to reach diversity in the South African workplace.

Additional work needs to be done on the relationship between the mentor and mentee. Corporates should try to place new graduates with mentors who have similar backgrounds in order for mentees to see the similarities and gain trust and respect easier. Organisations need to place emphasis on mentoring practices and formulate strategies to keep the mentoring relationship more relevant.

Females entering the industry should also try to have more than one mentor in order give them different perspectives on how to handle different situations. This could also expose them to different mentoring styles.

There is a need for further academic research to be done to fully understand the mentoring process in South Africa, especially in the following areas:

- How can corporates incorporate mentoring to fit in with the millennial generations digital lifestyle and make it more interesting?
- Which conditions needs to be incumbent in organisations in order to create a safe space for a successful mentoring programme?

8. References

Alvi, M. (2016). A Manual for Selecting Sampling techniques in research. International Journal of Biometrics and Biostatics, pp1-14

Amelink, C. T. (2010). *Overview: Mentoring and Women in Engineering*. Assessing women and men in Engineering. Virginia Technology. pp1-15

Anney, V. N. (2014). *Ensuring the Quality of Findings of Qualititative Research: Looking at Trustworthiness Criteria*. Journal of Emerging Trends in Educational Research and Policy Studies. 5(2) 278-281,ISSN: 2141-6990

Archer, E. (2018). Qualititative Data Analysis: A primer on core Approaches. *Journal of Psychology Society of South Africa*,73(1) pp1-23. http://dx.doi.org/10.1037/amp0000151

Association, M. C. C. (2003). *Mentoring Across Differences: A guide to cross gender and Cross-Race Mentoring*, Journal of Cross Cultural Diversity,pp 1-35

Barnes, D. S. A., & Atfield, G. (2014). Analysing Interview Data, Institute for Employment Research.pp 4-33

Boyd, N. (2013). *An introduction to qualitative data analysis*. Journal of Qualitative Research,pp 1-35

Bozionelos, N. (2002). Mentoring provided: Relation to mentors career success, personality, and mentoring received. *Journal of Vocational Behaviour, (64*) 24-46.

Braun, V., & Clarke, V. (2006). Using Thematic Analysis in psychology. *Qualititative research in psychology*, 77-101.

Conner, J. G. J. (2010). A strategic approach to employee retention, Healthcare Financial Management,40-44

Crutcher, B. N. (2007). Mentoring Across cultures. Academie Online, *93*(4).

Dasgupta, N., & Stout, J. G. (2014). Girls and women in science, technology, engineering, and mathematics: STEMing the tide and broadening participation in STEM careers. *Policy Insights from the Behavioral and Brain Sciences, 1*(1), 21-29. doi:10.1177/2372732214549471

Du Plessis, Y., & Barkhuizen, N. (2012). *Career path barriers experienced by women engineers.* South AFrican Journal of Economic and Management Sciences 15(1), 16-30

Ehrich, D. L. C. (2001). Closing the divide:Theory and practice in mentoring,Journal of mentoring and theoretical stances , pp1-18

Ensher, E. A., & Murphy, S. E. (2011). The Mentoring Relationship Challenges Scale: The impact of mentoring stage, type, and gender. *Journal of Vocational Behavior, 79*, 253-266.

Fouad, & Singh. (2011). Stemming the Tide: Why women leave Engineering Journal of Human Resource Management, 57(4), 901-914

Hill, C., Corbett, C., & Rose, A. S. (2010). Why so few? Women in Science, Technology, Engineering and Mathermatics.1-134, ISBN: 978-1-879922-40-2

Hofmeyr, K., & Mzobe, C. (2012). Progress towards advancing women in South African organisations: Myth or reality. *African journal of business management, 6*(4), 1276-1289. doi:0.5897/AJBM11.742

Jugder, N. (2016). The thematic analysis of interview data: an approach used to examine the influence of the market on curriculare provision in Mongolian higher education insititutions. *National academy of governance of Mongolia, 3*.1-8, https://www.researchgate.net/publication/330141287

Kanaskie, M. L. (2006). Mentoring- A staff retention tool, Critical Care Nursing Journal, 29(3) ,pp 248-252

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitiative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, 120-124. doi:10.1080/13814788.2017.1375092

Labour, D. o. (2005).1-53, Women in the South African Labour Market. Development Policy Research Unit, ISBN Number: 978-1-920055-40-0

Lee, J. H., & Nolan, R. E. (1998). The Relationship Between Mentoring and the Career Advancement of Women Administrators in Cooperative Extension. *JournalofCareerDevelopment,25*(1). doi:https://doi.org/10.1023/A:1022969028052

Lyon, M., Farrington, P., & Westbrook, J. (2004). Mentoring of Scientists and Engineers: A Comparison of Gender. *Engineering Management Journal*. 1-16

Manerikar, V., & Manerikar, S. (2014). A Note on Exploratory Research. A peer reviewed Research Journal 17(1), pp 95-96

Martin, P., & Barnard, A. (2013). The experience of women in male-dominated occupations: A constructivist grounded theory inquiry. *sa Journal of industrial psychology, 39*(2), 01-12.

MatthewMiles, Huberman, M., & JohnnySaldana. (1994). Qualitative Data Analysis.Journal of Social Scciences, 3(3) ISBN 978-1-4522-5787-7

McKimm, J., Jollie, C., & Hatter, M. (2007). Mentoring Theory and Practice. *Journal of Social Sciences*. 6(6), pp 1-24

Merrick, L. (2017). How coaching and mentoring can drive success in your organization Journal of Behavioural Studies pp 1-16.

Nkoma, M., & Thwala, W. (2014). Review the importance of mentoring young graduates in the construction sector in South Africa.Journal of Economics and Behavioural Studies 8 (6) , pp. 183-187

Ospina, S. (2004). Qualitative Research. *Encyclopedia of Leadership*. pp 1279-1284

Padayachee, P. (2017). We have too few women engineers in South Africa-Heres what we can do to fix it.

Palinkas, L. A., Horwitz, S. M., Green, C., Wisdom, J., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Journal of National Institute of Health, 5*, 11. doi:10.1007/s10488-013-0528-y

Parsloe, E. (2016). Coaching and Mentoring: Practical Questions to Improve Learning. 3rd Edition ISBN-13: 978-074947762, 352 pages

Salo, E. R., Liersch, F., Mohlak oana-Matopi, L., & Maree, M. (2014). Carrots or Sticks? A study on incentives to attract and retain women in Science, Engineering and Technology in South Africa. *Paths to Career and Success for Women in Science*, 161-190. doi:10.1007/978-3-658-04061-1_10

Sargeant, J. (2012). Qualittiative Research Part II: Participants, Analysis, and Quality Assurance. *Journal of Graduate Medical Education, 4*. doi:10.4300/JGME-D-11-00307.1

Scandura, T. A., & Pellegrini, E. K. (2007). Workplace mentoring: Theoretical approaches and methodological issues. *Handbook of mentoring: A multiple perspective approach*, 42.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. Journal of Information and Communication Studies, 22(40, pp 63-75

Shrestha, C. H., May, S., Edirisingha, P., Burke, L., & Linsey, T. (2009). From Face to Face to e-mentoring: Does e mentoring add any value for mentors? Journal of Education 20(2), pp 116-124 ISSN 1812-9129

Sosik, & Godshalk. (2000). The role of gender in mentoring : Implications for Diversified and Homogeneous Mentoring Relationships. *Journal of Vocational Behaviour, 57*.

Statistics-SA. (2017). *Women in Power: What do the statistics say?* South Africa. Retrievedfromhttp://www.statssa.gov.za/wp-content/uploads/2017/08/StatsBiz_August2017.pdf

Stone, K., & Coetzee, M. (2005). Levelling the playing field: Reducing barriers to mentoring for women proteges in the South African organisational context. *SA Journal of Human Resource Management, 3*, 33-39.

Sunday, D. C. E. (2016). Qualitative Data Analysis. NIHR Research Design pp 1-46

Taherdoost, H. (2016). Sampling Methods in Research Methodology; How to choose a sampling technique for research. *International Journal of Academic Research in Management (IJARM), 5*(2), 18027.

Thipe, T. S. (2010). A Rock strikes Back: Womens Struggles for Equality in the Development of the South African Constitution. *Political Science*.

Thomson, N. R., & Zand, D. H. (2010). Mentees' perceptions of their interpersonal relationships: The role of the mentor–youth bond. *Journal of Youth And Society, 41*(3), 434–445. . doi:10.1177/0044118X09334806

VanWyk, D. B. (2015). Research Design and Methods Part 1, University of the Western Cape.

Yadav, S. (2016). Women Engineers- Past , Present and Future Scenarion. *Journal of Engineering and Education Transformations*.pp 1-16

Yokwana, N. R. A., Ndihokubwayo, R., & Windapo, A. O. (2016). The influence of mentors' gender on the psychosocial and career mentoring of women in the South African Construction Industry. *Journal of Construction Project Management and Innovation, 6 (2)*.

Appendix A: Information Letter

The Graduate School of Business Administration
University of the Witwatersrand, Johannesburg
2St Davids Place, Parktown, Johannesburg, 2193, South Africa
PO Box 98, WITS, 2050

Dear Participant,

Title of Study: Mentorship as a retention strategy for female engineers in the oil industry in South Africa

My name is Ashlene Claasen and I am currently undertaking an academic project in the partial fulfilment of the requirements of the Master of Business Administration (MBA) degree at the graduate school of Business Administration, University of the Witwatersrand, Johannesburg (Wits Business School)

Wits Business School MBA students are required to carry out an Applied Research Project on a topic of their choice, which typically requires data collection and analysis grounded in academic literature. The project has been approved by the Wits Business School Post graduate committee and has been granted ethical clearance.

The aim of this specific study is to evaluate through the experiences of female engineers, whether mentorship can be used as a retention strategy to retain more females in the South African engineering industry.

Your participation in this project is entirely voluntary and if you choose to participate it is expected to take approximately 30 minutes. You are free to withdraw from the project at any time. Please note that all responses will remain confidential and will only be used for the purposes of this project. For the purposes of this specific project, the sessions will be video recorded and will only solely be used for the purposes of this project. Should you have any questions

regarding the project please contact the student, Ashlene Claasen or the project supervisor, Mrs Andeline Dose Santos as below:

Student: Ashlene Claasen, Cellphone: 0723375350, Email: ashleneclaasen@yahoo.com

Project Supervisor: Mrs Andeline Dose Santos, Tel: 0124204724; Cellphone: 0832898261, Email: Andeline.dossantos@up.ac.za

Yours sincerely,

Ashlene Claasen

Appendix B: Participants Consent Letter

I, the undersigned……. voluntarily agree to partake in the research study.

I have had the purpose and nature of the study explained to me in writing and I have had an opportunity to as questions about the study.

I understand that at any time may I withdraw from the study and refuse to answer any question without any consequence.

I understand that I will not benefit from partaking in the study.

I am aware and agree that the interview will be both audio and video recorded.

I understand that all the information in the study will be treated as confidential.

Signature of Participant:

Date:

Signature of Research student:

Date:

Signature of Research Supervisor:

Date:

Appendix C: Focus Group Open Ended Questions

1. What are some of the best and worst things about being a female engineer in SA?
2. What was the major contributing factor that influenced your decision to go into the oil industry?
3. Describe some of the typical challenges faced on a day to day basis, as a female, in this previously male dominated environment?
4. What prompted you to undergo mentoring? How long were you mentored? How were you introduced to your mentor?
5. What are some of the aspects that stood out most during your mentoring sessions? Are you able to share some of your experiences? And were you able to incorporate this back into your work environment?
6. Did you have a male or female mentor? Did the gender of your mentor make any difference to you? If yes, can you explain how this impacted you? If no, why did it not make a difference to you?
7. Before being mentored, did you ever consider going into the engineering field?
8. How easy or difficult was it for you to integrate into a field previously classified as “male dominated”? What was some of the coping strategies that you employed? How did your mentorship experience assist you?
9. Have you experienced a shift in your own behaviour, attitude, and outlook towards the oil industry as a result of being mentored?
10. Would you consider becoming a mentor to female mentees wanting to go into the oil industry?

Appendix D: Transcripts from Video Recorded Focus Group Interview

Question 1: What are some of the best and worst things about being a female engineer in SA

FG1 (BP)

Ok I think that one of the best things about being a female engineer is that you are given a lot of opportunities because there is a strong focus on closing the gender gap, so the variety of opportunities that are available are quite vast.

I guess one of the negative things about it is that a lot of the industries that female engineers find themselves in are quite male dominated and so it's about equipping a women, a female engineer with the right tools, and uhm, and I guess mindsets, to rather get out all of the pre-conceptions and misconceptions and biases against women in like a technical field.

So yes, the worst things are that you have to prove yourself, when a man doesn't have to in this industry. I've worked with men and they look down upon you like you don't know what you are speaking about, especially when you in a plant environment, they don't take you seriously. So, you have to prove yourself as a woman when a man doesn't have to. Oh, and other challenges that I've experienced is that there are limited facilities for women on site. And some of the sites that I have travelled to in remote locations, they actually don't even have female toilets. And so, its uhm quite like strange because, and strange isn't even the right word, it's quite like, demeaning to use a male toilet when especially it only has a urinal.

So, I always struggle with this question, because I haven't gone that far into my career to have felt the biases that others have spoken about against women. I have never really seen myself as a female in engineering, uhm I only ever think of gender stereotypes in engineering when I hear it from other people, I've never really experienced it myself. Or maybe I never thought about it through that type of lens, i.e. a gender bias sort of lens. Uhm so i can't really say what is good about being female and what is bad about being female cos i just have never experienced it.

I'd like to agree, I've also never really been in a situation where I felt that being a female engineer counted against me. Uhm I think that whilst we were studying, well studying chemical engineering was one of the degrees where there were a lot more females than other, but its a lot more equal than mechanical engineering or other engineering disciplines. So i didn't really have that issue whilst studying, and i actually feel that being a female engineer is one of the factors of why i got this job. So, for me it's been beneficial.

I have experienced the negative side of things where I was working on a plant where probably 95% of the people working on the plant were male. So that was tough, being one of the only females on the plant. Having to navigate sexual harassment, and biases in the plant. So I think it's better for them cos they have always worked in an office environment, but i feel for female engineers who actually want to work on a plant environment, there are definitely a few more challenges.

Can I just add one more thing, I think that I've also experienced that kind of environment, and especially having to navigate the sexual harassment, that is very challenging, especially when you a young female. And I don't think its necessarily associated with being an engineer, but i think it's the nature of the environment, because it is so male orientated. Or rather male dominated. But I do think though that working for companies like BP where there is a strong focus on respect as a value, leveraging diversity, it does tend to create an environment where people want to hear what the new person has to say, regardless of whether it's a male or a female. That has been kind of beneficial as well, and i do think that one of the advantages in the diversity in that women bring is the way that we think and solve problems, even the way we are more in tune with our emotional intelligence kind of topics.

FG2 (SAPREF)

I think some of the best things are the opportunities, there is so much happening, so much change that is affecting the number of females that are going in. The opportunities for females have increased drastically and there is a relaxation of the stereotype. Because when you say engineer, a female is not the first thing that comes to mind. You think of a guy in his hard hat and his boots. If you are a female and you are in this field, it shows that you are tough enough and smart enough to be here, and with that comes one of the worst things, that is with the industry still being male dominated, especially engineering.

I will agree regarding the opportunities and the challenges. If it is challenging, then it is the best thing to be in.

Worst thing is that you still have to prove yourself as a female engineer and in the engineering field. And that as females we end up having to commit to other things outside of work such as families, we have to work two jobs. Also if you find yourself in operations, i find it very demanding at times and it tends to like become bit of a conflict between work and home. You end up struggling between the work life balance (work and family)

FG3 (TOTAL)

Oh right I think, in terms of the corporate, it depends, it's just my thinking, it depends on where you are within the company, or the division that you are in. Because like for me, I am not specifically within the engineering side, I am more in the sales division, however within that it is more of a male dominated environment. So, the challenge within that is that males always say that they don't always take female comments that seriously. It feels like you always have to push yourself, you always have to work more harder than your male counterpart in whatever you do so that you become more relevant and they can get to hear you. That is a challenge. So, any comment that you make, you have to make sure that you are serious so that they can hear you. So that's the bad part of it. And the good side of it is that if you get to be yourself, and not always try to prove yourself, because when you try to prove yourself, it becomes more of a, you are always following on someone's footsteps. So i think for me it is more a matter of adjusting and not just saying "I'm a female". You have to say and believe that you are equal with any other person, regardless if it's a male or a female. And just work as hard as you can without having anyone else set up a standard for you trying to achieve.

For me I will say, basically I report to technical, im under the technical team, theres projects and then theres maintenance. I report under projects. I am am the only female in the team. The nice thing about it is that I get a lot of support . SOmetimes its really challenging because as you know engineers like to brag about what they know, i know this, i know that, . Another good and bad thing is that I am always put on the spot, in terms of presentations, they always expect you to do it, and those admin things. They expect you to know how to write minutes and reports. So for me this is my first experience, the company has been good to me. I have alot of support, everyone is alwys willing to help me. They treat me special

So for me, it depends on where you started right, because Ive been everywhere. Cos initially when I started, I started in refinery operations, there were a lot of men, and just one women working in this whole refinery operations set up. So obviously you do get attention from the men. But as you step up and you get more experience, I personally dont take it that this is happening because I am a woman. I always take it that this is hapoening because I am a human being. amongst other human beings and therefore i wouldnt say, especially at the stage where i am now, i would not say that things are happening because I am a women. Its the corporate environment.

And another thing if I may add, we have to work ten times harder, you have to deliver more, they always expect more from you, you have to know more. And also emotionally , us sometimes we are sensitive, and men just joke about everything. You need to learn to adapt.

Question 2: What was the major contributing factor that influenced your decision to go into the oil industry?

FG1 (BP)

I think it's about how dynamic it is and the fact there is a lot of moving parts to the value chain. And even the way that the organisation is structured according to downstream and upstream, you know. The variety of opportunities that exist within the oil industry. And also, the flexibility that is has to take on other power related products, like your renewable energy for instance. But for me i deduct the question to be more engineering related, where the reason i did engineering is because i really just loved maths and science and i wanted it to be a part of my life forever. So, it's fun...

I think that the economic situation that this country finds itself in, when I was specifically looking for a job, it wasn't that I was specifically seeking out oil industry jobs, it just kind of came across my path. And it looked like a good option, and to be honest, compared to what i heard the other graduates were getting when they applied for jobs, the pay was also good. So that was also one of the magnetic factors. And now that I am in the oil industry, I am enjoying how relatable it is to everyone around you. To understand when they talking on the radio about crude oil prices, you actually know what's happening when the petrol price is going up or down. It's good to be in an industry that actually gives you practical knowledge. And as an engineer, I agree with the love of maths and science, you also get to do a lot of analysis especially with the job that I'm in. I really enjoy that part of it.

FG2 (SAPREF)

For me I was bursar, sponsored by an oil and gas company. So as part of the contract I signed I was going to work in the oil and gas industry also I didn't see myself wanting to go into any other industry.

For me there wasn't much opportunity for me to choose to go somewhere else because of my bursary conditions. I think I am glad I ended up where I am, I find it most complex and challenging.

For me it was not a specific field that I chose. When I got a job at BP it was part of the development programme that I had to undertake and I had to come to the oil industry to gain experience and that will help me again when I'm back at BP . Also, it might not have been a choice but I was so excited to come and gain that experience, because it is a complicated industry and there is so much to learn. So i was so happy to be able to go and learn.

FG3 (TOTAL)

I went into it because it was a job that was available and relevant to what I studies as a qualification

For me with a chemical engineering background, I always wanted to be in a refinery, so this for me was good. I consider myself lucky to get in.

It was a job that I got.

I would say for me initially it was just a job that I got. I initially worked somewhere else and then I got a job at Sasol. It came naturally for me, because it is that kind of industry I loved.

Q3: What prompted you to undergo mentoring? How long were you mentored? How were you introduced to your mentor? Can you share some of your mentorship experiences?

FG1 (BP)

So, when you say mentor, where my mind goes is to the first mentor that I had in BP, cos that was the first time I heard the word mentor in the most official way. And basically, it was Cebo, who was already in the refining supply team at the time, and as a graduate coming into BP, specifically within the refining supply team, my line manager saw to it that every person had a mentor that had preferably come through the graduate programme as well. So, she was my official mentor during that first few months at BP, and we went for maybe one or two coffees. And i think that the intention was good, but the follow through want good as how it was supposed to have been. I think she was quite young at the time so she was also quite inexperienced, and i think that when you are coming into an environment green, completely new, new to the working environment, i think working with someone who has a bit more experience, i.e. more middle or senior management type, as a mentor will be a bit more helpful to you as new person, because it will give you more confidence specially on the path that you still need to go through

Id like to add on to what you are saying, because this for me is a very personal topic as well. I've had numerous mentors within BP, as well as outside of BP, and its usually with the intention of having someone to help you figure out what your career progression is, and sort of understand where career opportunities lie. So, the mentors that I have had up to this point mostly contributed to understanding where I want to be, development required to get to that point. But i think the follow up has been very disappointing, despite a lot of initiative coming from my side. And i don't necessarily agree that somebody more senior would actually improve that or provide more rigour in terms of follow up and how that mentor/ mentee relationship would work. I think that the secret to a successful mentee/mentor relationship lies in how invested both of the people are in the relationship, and how much each of them gives and receives in terms of the value from that relationship. So like right now, the mentor that I have, its been very difficult to get time with her and in every single interaction that we have had, i feel that it is very one sided, and I haven't necessarily received much value from it because i do believe that the development that i have done up to this point, both personally and professionally have been driven by myself and all the opportunities i have received have been created by myself and pursued by myself. And basically, from my own understanding and

accountability that I have in terms of my career. But i do think that if it is set up properly with someone that you trust, and who has the connections, resources, the insights to actually enable your plan, then it can be really valuable. But there are a lot of ifs and buts, but it is a really delicate kind of relationship, that needs investment that needs a lot of direction and clarity and you really need to have somebody that has your back. And its hard to find that person, especially when e.g. in BP there is a lot that a person will be doing at a time. So it needs to be set up in the right way and it needs to be managed rigorously, that's what I'm trying to say. Up until this point, it really hasn't added much value to my career progression. But i haven't left BP, so from a retention perspective which is what you are talking about, i do think that there are other things that work more effectively.

I think just building on that, I think that there is this whole philosophy on mentorship where people think that it is purely a professional relationship, but in order for a functional mentorship relationship to work, there must be some sort of personal element there. So ideally someone who you have worked with before and has seen you working, they have actually started investing in you before you have even started taking your relationship to the mentorship sort of level.

I fully agree with that, but I've also seen many instances where there is a mentor and mentee relationship where its set up such where the mentor has never worked with the mentee before. But it works like a bomb. They meet on a regular basis, and there is a lot of value that is received from that engagement, but it doesn't necessarily mean that they must have been working together before. I think its about having that balance between professional and personal, where the personal is not just about what can i get out of it, its about understanding also what can i give and bring to the table.

SO I don't think I've had a mentor in the formal sense, I think I've had many informal ones, like for instance I had a lecturer who saw that I liked research and I did a lot of work with him on a lot of research projects, and he took it upon himself to start guiding me and in the search for jobs and stuff. He would help me out and even at university level, he would look through my work, help me, correct me, guide me. So up to now, I still have a relationship with him, where we still talk, say every couple of months. And then when i came to BP, we had the buddy system, where it was kind of an informal mentor system. So i had Marco who was my mentor and he helped me through that first 6 months, to get your feet on the ground, understanding how the business works etc. So I've never had the formal sense, but i would like someone who would put an effort into guiding me . I think that right now my boss has tried to do that, but because they are busy people, they cant invest that much time in you. So that's the struggle, when you don't have someone who are as invested in it as you are.

When I was first year at university, I had a mentor who was final year, in chemical engineering, and having that person, who has gone through everything I was about to go through, and made a success of it and being able to talk to her about the things I struggled with and which she also struggled with and gone through it, that really helped me to believe that i could get there and where she was. So that was my mentorship relationship that really helped me and it was just for one year. But it was helpful because i was new, the degree, university was new and i didn't know what to expect

So that's where I feel I'm on the same side, cos I'm a mentor to someone who's going through university, she's third year, she was introduced to me by my cousin, so I helped her get through all those fears and stresses. You share your experiences and they know what to expect. And until now I still keep in contact with her just to check on how she's doing, and how she's managing. And she's actually very grateful that I'm still keeping in contact with her, and she's even now started asking for advice around jobs, like how to write a cv or cover letters and so on. So, it's basically giving back.

And I guess there's another angle to look at if from, like when a mentor and mentee relationship works really well, you can have a situation where the mentee realises their potential and they also realise that this isn't the place where they want to be, and then i guess where your argument on it being a retention strategy falls flat because the relationship was set up quite well, but it actually worked so well that the person realised that this is not where they want to be or that they have the potential to follow their dreams, or start their

own business. And then there is also the flip side of it where the person feels that BP is taking such good care of them and they set me up with this amazing mentor and I'm going to stay here for the rest of my life. So it can work both ways. And it really comes down to the individual, because I've had really bad mentor experiences, but it has never in any way impacted my perception of BP

So like Pratna, I've never really had an official mentor or a specific person that I felt was really guiding me through my BP journey and so on, but what I do like about BP is that we do get to speak to a lot of different people, locally as well as internationally. I'm specifically focusing on the time when Judith came down from IST, and for me i feel like their careers are so wow, and they've achieved so many things. SO just to be able to speak to someone like that on a personal level, and also to ask them questions about how they manage family and work, it really helps when i think about how my journey is going to go and to be made aware that you can do both, its not a choice that you need to make. So that was the one thing that i wanted to highlight. But in terms of BP's mentorship programme here, im too scared to go up to someone and ask "do you want to be my mentor". I feel like that is quite intimidating and im not quite sure if it is as structured as it can be. In terms of putting engineers together or certain types of people together, or who you think could be a possible mentor to someone.

FG2 (SAPREF)

So ive had a mentor, actually my previous manager was my mentor, who is an operations manager.

I have also been lucky to have a mentor, as i came through the graduate programme, so I have a mentor for not only work but also a life coach. I also have a technical coach. So I've had someone on a technical basis who assisted in terms of my competency levels to assist in my engineering career and beyond

So I've had a mentor, actually my previous manager was my mentor, who is an operations manager. Because we had the operations background in common and him being a male and having experience in the industry, he was able to guide me and get me out of my comfort zone and wanted me to explore more and develop my full potential.

So the mentorship/mentee ship relationship worked out very well for me and he had a way of directing me to the right place and I still go back to him for advice in terms of how to grow and develop. I respect our relationship and I feel like he's a mentor that I can have for the rest of my life regardless of where I am. And I've also had a female mentor, and the female mentor was not really much about work related stuff, the female mentor was an HR person and helped me with the day to day issues of being female in the industry and how to get around all of it. I am a bit different to my colleagues in that I came through the learnership programme in operations, and i find that there are more challenges there than here in technology, and sometimes you need someone to talk you through and push you and motivate you and push you through the challenges. And sometimes you can think that you have personal issues and they are not really personal issues, its common in the industry and you actually just need to find a way around it. So mentorship i think its very important for a female. And as females we truly are emotional people, which is not a problem or an issue, or something that we should be ashamed of. I think it is one of the things that makes us special in the industry because we bring something with, a different perspective of the job and a different dimension as well. So, its good to be guided to do things the right way.

FG3 (TOTAL)

I had a mentor when I started off in the industry. We needed to do a project, so we approached this guy, we were about four. He chose one of us that he would mentor. Luckily the person that was chosen was not doing her part. So I started going to the guy saying i don't

understand this, I have done that. So, he ended up deciding that he will mentor me. And he has been with me since i started, to date. It didn't even end in the work environment, it even went outside of it. Even after i resigned at Sasol and went to Mossel Bay, he even went to Mossel Bay to see where i was staying. The relationship developed further. We knew at Sasol that when we were working, it was professional, however once i clocked out we were friends. Even my mentor's wife is also close to me now. I've become a family friend. His been mentoring me each and every step of the way

For me I wouldn't say it's a formal mentorship relationship, but there are people in my life that I consider as my mentor, even if they don't know formally. Like when I look up to them and I engage them. Like we know friends and its people that are in the industry as well and they have businesses outside. So when i engage with them, they always give that advice to say do this or that, especially in the work environment. But its not like formal mentorship, where i can say "you are my mentor"

I do believe that its good to have a mentor.

For me, I did have a mentor, I've had him since I've moved to this company. He helps me with what im good at, assists with my career path and where to go from here.

I think its important to have a mentor, not only in the engineering industry, but in any industry. There are always things that you will encounter and if you don't have someone guiding you, you will end up being lost.

And engineering is very broad, you can end up not even doing any engineering roles. A mentor can also help advise you about what you are actually good at and you can end up branching out. Especially us black people, I know I'm being stereotypical, but after matric, when you check your results, you will either end up studying to be a doctor or an engineer. You are not really informed about other options. But once you here and you find a mentor, you end up realizing what you really good at. And its powerful to branch out, so a mentor is really good to have.

Q4: Did you have a male or a female mentor? Did the gender of your mentor make any difference to you? If yes, can you explain how this impacted you? If no, why did it not make a difference to you

FG1 (BP)

I think its just more about who adds value. But my previous two mentors that I did have at BP were female because I thought that they can add value, because they were both women who have been in a technical environment.

I've had a male mentor, but the way I see it in terms of preferences its more about adding substantial value to your life. I've actually had a male mentor right from my matric year when I was deciding what to study. I always knew it was chemical engineering, but he acted like a sounding board because he had been a chemical engineer as well and he worked at Sasol. He assisted in applying for job, at

different companies and then deciding on which career I should go into it. And even now with my career at BP, I'm always sense checking with him, in terms of is this the right decision, what do you think about this

I don't think I would have a preference whether it's a male or a female either. Its mostly based on who you feel more relatable to. Like do you have the same background etc.

I think I would have a slight preference for a female mentor, because on an emotional level, it would be easier to understand you and know where you are coming from, emotional intelligence, that's what it comes down to. Women do think differently than men, and they place more value on feelings and emotions. So i think a female would be able to understand better than a male. However, there wasn't much females around to be a mentor, so it wasn't that easy.

The mentor that I had was female. So I don't have a mentor in BP at the moment, but I think if I did have a mentor, I'd want a female in a leadership position, just looking at what Tessa touched on, I worry about in my career going forward, how I am going to balance a career and starting a family. It's very personal, so I think it would be easier to speak to a female than a male and get their experiences of how they have been able to manage that. So i think it would be more applicable.

FG2 (SAPREF)

From the technical side being a male or a female doesn't really matter. It all comes down to how you develop and push the individual. I think when it comes to the softer skills, that when I find it personally easier to open up to a female than I would to a male. The difference is that I know people who connect better to a male or female, so I think its a personal preference. So i think it all comes down to whom you feel comfortable with.

For me personally I would prefer a female because I feel like they can understand where I'm coming from and they can put themselves in my shoes. Also we are more similar, and also on the flip side of things, women in general are very tough and we are tough on each other. So you would get the sympathy from a female which you would necessarily get from a male.

Mentors that I have had before have always been female. So I think because of the same reason as Thirusha said, I think it's much easier to connect with a female, its better to speak to someone who's been through what you've been through which makes it easier, than when you dealing with a male you will find yourself in a situation whereby you now need to explain yourself, whereby in cases where you dealing with a female, you can easily connect the problem. And its easier for them to coach you on how to deal with that specific problem than when its a male, there's a lot of explaining to do for them to actually understand your problem.

Especially in the industry that we find ourselves in, I've been in the industry for 14 years, and back then there wasn't many females in the industry, especially in the field and production. So if you are looking for a mentor, it's usually related to something that you want to understand.

The only way you can make females stay in this industry is if you have more females mentoring other females. So the more you see other females in the industry, the more likely that they will stay longer in the industry. Because its known sometimes that you can be in a meeting and be the only female there and sometimes you c an feel that you are not competent or adequate enough. And if you know someone who's at a higher level, who can motivate you and tell you that you can do it, you can have hope. If it is you are just wanting to confirm technical aspects a male will be fine, but if you are looking for inspiration or more then a female is best suited. So I agree with

Felicia that if its just technical, then its fine for a male, but if you need someone to emotionally understand you and guide you, then a female will do.

FG3 (TOTAL)

No, it doesn't matter whether it's a male or female. Because the people that I am mentoring aren't females, its just a matter of understanding each other. This is this kind of a person, and that one is like that. And learning how to handle it.

Cos, I think you can actually relate to a person, even if it's a man, depending on what type of a person he is. It doesn't have to be male or female just because you are a female.

I guess that when you are female, and you have the right female mentor it's a plus, however it doesn't necessarily mean that just because your a female you gonna have a female mentor because they can attest to your experiences. You can actually find some men who can actually still be relevant in both circumstances.

The problem that I've had in my team is they keep telling me " please don't fall pregnant" cos when you go on maternity leave we will need you.

Q5: How easy or difficult was it to integrate into a field previously classified as "male dominated? What was some of the coping strategies that you employed? How did your mentorship experience assist you?

FG1 (BP)

So, I worked at SAPREF for a year, I was on the plant and it was very male dominated, but then again I've always hung out with a bunch of guys from my chemical engineering undergraduate days So when I was on the plant I didn't find anything weird about it. I didn't see myself needing help or

In my previous team, in Air BP, I was the only female in the engineering team. And then even at the sites that I used to work at, I was the only female, so whenever I would feel like there was "discrimination" in a way, my natural response which obviously also isn't the most mature, was to disengage. And basically, just keep my opinions to myself and not really feel comfortable to bring as much as I could to the table. It took like a personal paradigm shift to get me to a place where I'm not affected by it as much, and also assume that it was not the intention. And to try to look past it and no matter what still give my opinion, and also give as much as I could of myself. So, from a coping strategy perspective, that is what i did, but it changed over time. And the more I learnt about the environment and about myself, it evolved. Now in this new team that i am in, even though it is male dominated, I feel like I have integrated really well, also because I think there is a high level of maturity.

So my previous work environment was extremely male dominated. And I think that if I had had a mentor, someone to talk to and who would understand my situation, potentially I wouldn't have been so eager to leave. Because it was in the first few months that I decided I didn't want to work there anymore. But it wasn't just the male dominated environment, if I had a mentor who I could talk to , to support me through it, it would have been easier for me.

I think if I had one in my previous role, it could have worked for me as well

FG2 (SAPREF)

The obvious challenges are that you are in a male dominated industry. When a male sees you they get excited because there are such few females in their space. There are challenges whereby as a female you need to keep reminding the males where to draw the line and you have to keep reminding them to respect you.

The industry is changing and the females that are coming in are becoming more effective and being more respected and the offers and opportunities for females are becoming more and they are amongst the best engineers that I have ever worked with and are becoming very good at what they do.

I think that the challenges that we are facing are not specific to females only it is challenges that an engineer would typically experience, A small portion of it though indicates that there are people who are still stuck in a patriarchal mindset and who feel they have authority because they are male. And oftentimes it's just the level of education and the type of people that you work with, because you work with other engineers. Often times its more our fellow counterparts, engineers who are more respectful.

It becomes difficult when you are dealing with people who are outside of that space, e.g. in a turnaround where you dealing with contractors, and you on the plant and you have guys whistling at you etc. It just depends on the type of people that you are dealing with. But when i think of challenges i have challenges that are specific to being an engineer and not a female, challenges which my male counterparts would also experience.

FG3 (TOTAL)

For me, I was the first female in the team, number one the facilities were not there for a female when I started. So, everyone had to adjust, things had to change, the language had to change, it was a bit difficult because being a female and you taking leadership roles, there are those that will not accept it. I will make an example, there was a gentleman who said to me, " he was taught that a black female must serve him, he cannot report to a black female". So those were the things I had to encounter, however you have to find a way of working around it, and all of those things. So, you learn to become firm. Also, the support structure around you plays a vital role. on how to handle such things. These days it has changed, when we went into the industry, it was mostly Afrikaners, and Afrikaans was used as a medium of communication. So no 1 you come in as a black female and you don't speak Afrikaans, and it would be a big thing. For example, someone used to say in Afrikaans that " the company did not hire me to interpret, so whoever wants to speak to me must speak to me directly. Things however has changed now, back then it was more difficult.

For me I can attest to what she says about the language barrier being a challenge, because when I started working it was just males. And with all due respect, the males that don't necessarily have the education background, and therefore they've been in this environment

because they were employed those days and talking in a certain way has been the norm. So, I guess with me coming in as a female, they didn't see the need to adjust and change the way they were doing things. So unfortunately, I had to fit in within that environment and be one of them to survive. Language being swearing was a normal man to man talk, sometimes there would even be acting like they sorry but would just continue and do the same thing again. As time has continued, things change, however it has not fully changed.

I think now is much easier than back then, because now in my team I am the only female, but I don't really feel it. So, I think there has been a change from back then to now. The only thing that I do still feel is in meetings there is always that thing where they think "ok she's a female" when you know they not going to listen to you. That i encounter quite often. Even if it's not me, let's say I'm in a meeting and there's other females who responds, you can just sense that ok they don't really want to listen to her. So yes, things like that.

For me, I think they do listen to me. Things have changed a lot. I think it also depends on the maturity levels of the people that you work with. It's not just about the whole male section, it's also about at what stage of maturity they are at.

Question 6: Have you experienced a shift in your behaviour, attitude, and outlook towards the oil industry as a result of being mentored?

FG1 (BP)

I can definitely say that I have spent a lot of time thinking about how a mentor/mentee relationship should work, but I guess yes, I have seen some changes and It differs with the mentor. For instance, my previous mentor it was more about understanding safety and with my current one she's very direct and to the point, so I've tried to adopt that same approach in meetings

Not specifically from a mentor but I do appreciate our line manager, in the way that he doesn't shy away from having a difficult conversation with you, in terms of what you are doing well but also on how you can improve. So, I think that has been helpful. But in terms of mentorship, I think that is something that I would want, especially thinking of where i want to go in BP. There is not a lot of clarity and not a lot of roles available, and there also isn't clarity of what you need to do to get into those roles. And i think that is also contingent on the mentor having that knowledge. It's a big dependency,

I don't think a mentor changed me in any way, I think it's more than change in environment that you adapt to, and that's when you see the change. Its more about survival of the fittest, but I don't necessarily think its because of a mentor.

I don't think a mentor affected or changed the way I think. I think its more an amalgamation of different ideas and different people in my life. I sort of have an inner counsel in my life and I'm constant bouncing off ideas off them from a career perspective and then drawing off a few of their contacts as well.

FG2 (SAPREF)

It has given me firmer technical knowledge

FG3 (TOTAL)

Mentorship has shifted my view yes. For me I will say, when I came to total at first, I was really disappointed because I had this idea that I was going to be doing practical things on a plant etc. But now I'm really happy because I love thinking, I love designing, I love being behind the scenes. I wanted to quite when i got here but now I'm more into management and technical aspects without having to do it with my hands.

For myself I would say that working in the refinery, you really get to see the real thing without having someone explain to you the picture. You tend to take the wrong decision because you have not been there. For me if I could advise any person, I would start by saying go to the refinery and get your hands dirty because you will be a better manager, because e.g., she mentioned a valve, if there is a valve you need to design and you've never seen it, how do you also improve on something that you have never seen. It has also helped me branch to other sections, it becomes easier. Now I'm working as an economist, however that background that I attained there, helped me attain better decisions. It helped me understand the industry better. So, it opens you up.

You end up appreciating it when you get to corporate. Because I was frustrated when I used to wear overalls and boots and I'm outside in the refinery and I'm like this isn't what I signed up for and you think its freedom when you get to corporate. But when you get to this side, and you engage with people who's never been to the other side, that's when you start to appreciate it and realise that it wasn't such a bad decision.

I love more than where I am now, rather than working in the plant. Because it was tough, working in the sun.

Question 7: Would you consider becoming a mentor to female mentees wanting to go into the oil industry?

FG1 (BP)

As I previously mentioned, I am currently a mentor to a female studying to be a chemical engineer. So I've taken that step towards her many years ago. And I think it was beneficial to her because its quite scary being in that environment, not knowing anything and anyone. But according to her it has helped her,

I definitely would. I also have my family member, cousins and so on, who's always asking questions about engineering and the oil industry and about what to study. And I'm constantly asking them how things are going and so on. But within the BP context, I have one resource that is tagged to a project that i am currently working on now, and that sort of naturally evolved into a mentor mentee relationship. It didn't necessarily go out to be that way but it is and im always willing to help other women and equip women about the challenges that i dealt with and help them see that there are only opportunities out there for them and that things wont always be a certain way. So i would hope that my mentorship influence would help in some way in which they think. But also that depends on the individual and how malleable they are to change. But i am not entirely convinced that mentorship can be used as a retention strategy because there are different sides to it.

Yes ill definitely be open to it. I think we can definitely help each other a lot. And I feel that in our team, we are always there to support each other, especially if there is someone new coming into the team. Its not necessarily as structured as a mentorship programme but i would definitely be open to sharing some of my experiences, the issues I've had, the things that went well. All the things that you don't learn at university that is definitely helpful in a work environment.

I'm a really strong advocate for women mentoring other women, and especially what Tessa shared about meeting with IST, and just how inspired she was by how much they have done. I think that is really where the value sits. Its really just about inspiring other women and showing them what you are able to achieve. But its all in you sharing your story, and that can only work when there is a relationship

I've had two mentees, in 3rd year I was mentoring two, also studying chemical engineering, also in my residence, and I enjoyed that a lot. I found a lot of value in that, mainly because I was also mentored when I was a first year and it did a lot for me, I enjoy giving back. And the other day she messaged me on linked in and told me she got her first job. And when I was working in Anglo as well, there was a first-year graduate also working with me. And I saw a lot of potential in her and i also invested a lot of time in her, and she then went to UCT last year, so I've been keeping in touch with her on how things are going etc. She told me that she failed a subject and i talked her through my own experiences. I do enjoy being a mentor and giving back

I've had two mentees, in 3rd year I was mentoring two, also studying chemical engineering, also in my residence, and I enjoyed that a lot. I found a lot of value in that, mainly because I was also mentored when I was a first year and it did a lot for me, I enjoy giving back. And the other day she messaged me on linked in and told me she got her first job. And when i was working in Anglo as well, there was a first-year graduate also working with me. And I saw a lot of potential in her and i also invested a lot of time in her, and she then went to UCT last year, so I've been keeping in touch with her on how things are going etc. She told me that she failed a subject and I talked her through my own experiences. I do enjoy being a mentor and giving back

FG2 (SAPREF)

I think yes but I wouldn't want to draw the line and say that it has to be specific female. I think engineering in its entirety is so different from varsity, in what you do and think is so different from varsity, it's a real eye opener. I think that any engineering graduate in general needs a lot of technical development, mentorship and guidance and a little bit of hand holding. Females are generally strong and highly motivated people, but they need that little extra nudge in order for them to reach their full potential. So, if its mentoring on a technical basis then it doesn't really matter whether its male or female.

I think that if we are referring to career mentoring, I think that all graduates need, and every company should have some sort of structure to support your graduates on a working level because it is a reality shock from varsity. You need someone to tell you the do's and don'ts

and it can be simple things like dress code. And i think that that applied across the board whether it's a male graduate or a female graduate. *For me I can definitely say that I would definitely mentor people, because I have had an excellent career because of my mentor on the technical /professional side and I would offer that to someone else.*
FG3 (TOTAL)
I'm already doing it because I know the benefits, I know how I benefited from it, so it is really essential for the next person to benefit from it.